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Fig. 1

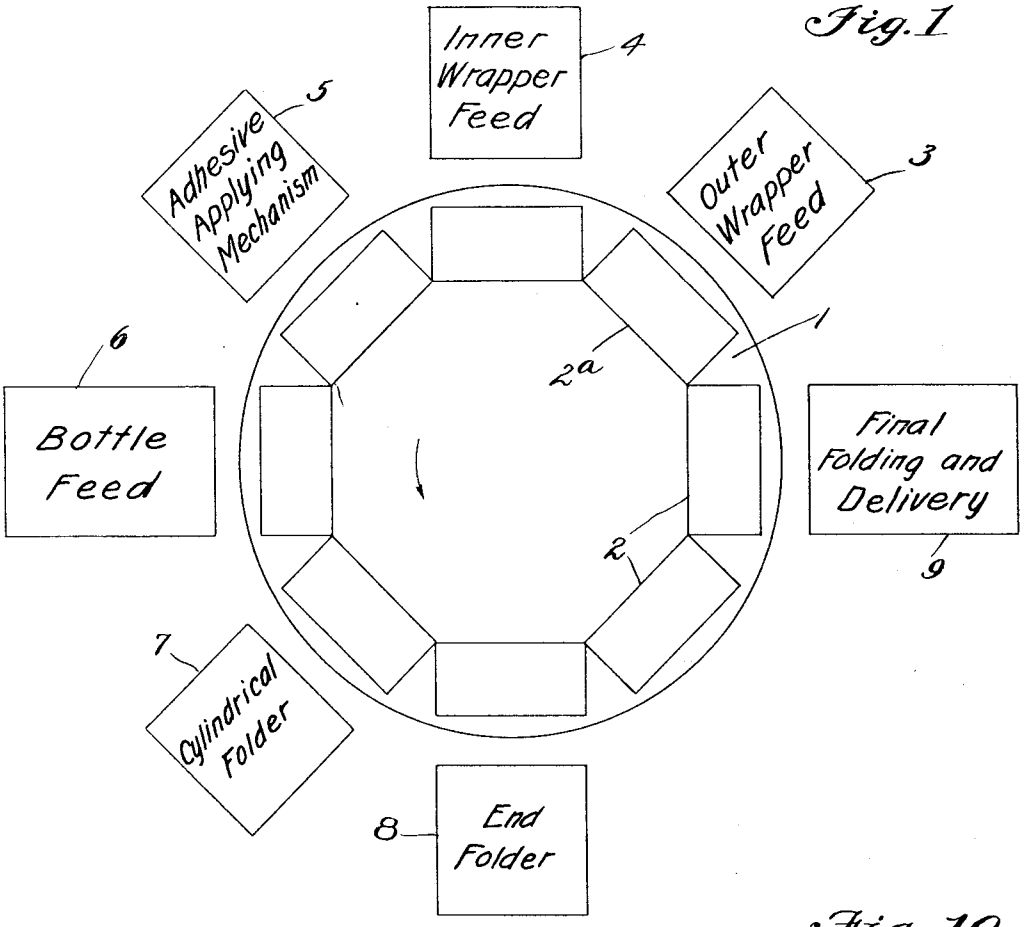
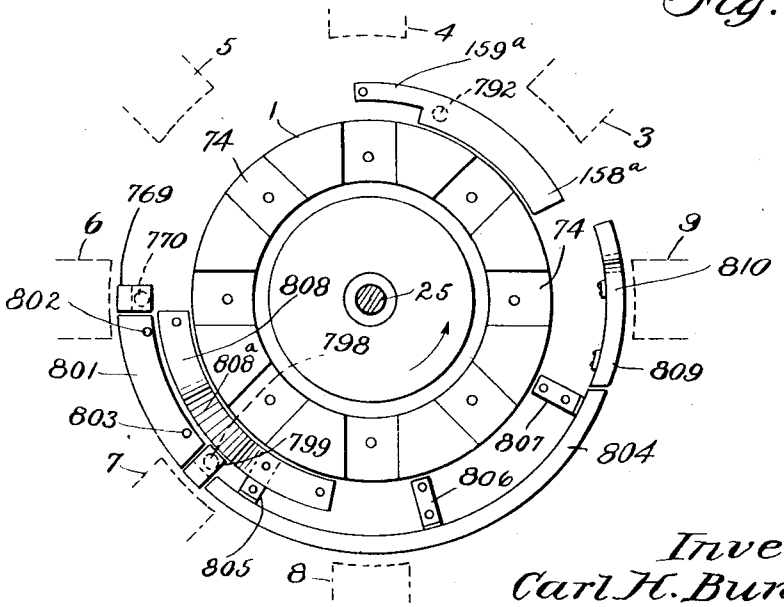


Fig. 10



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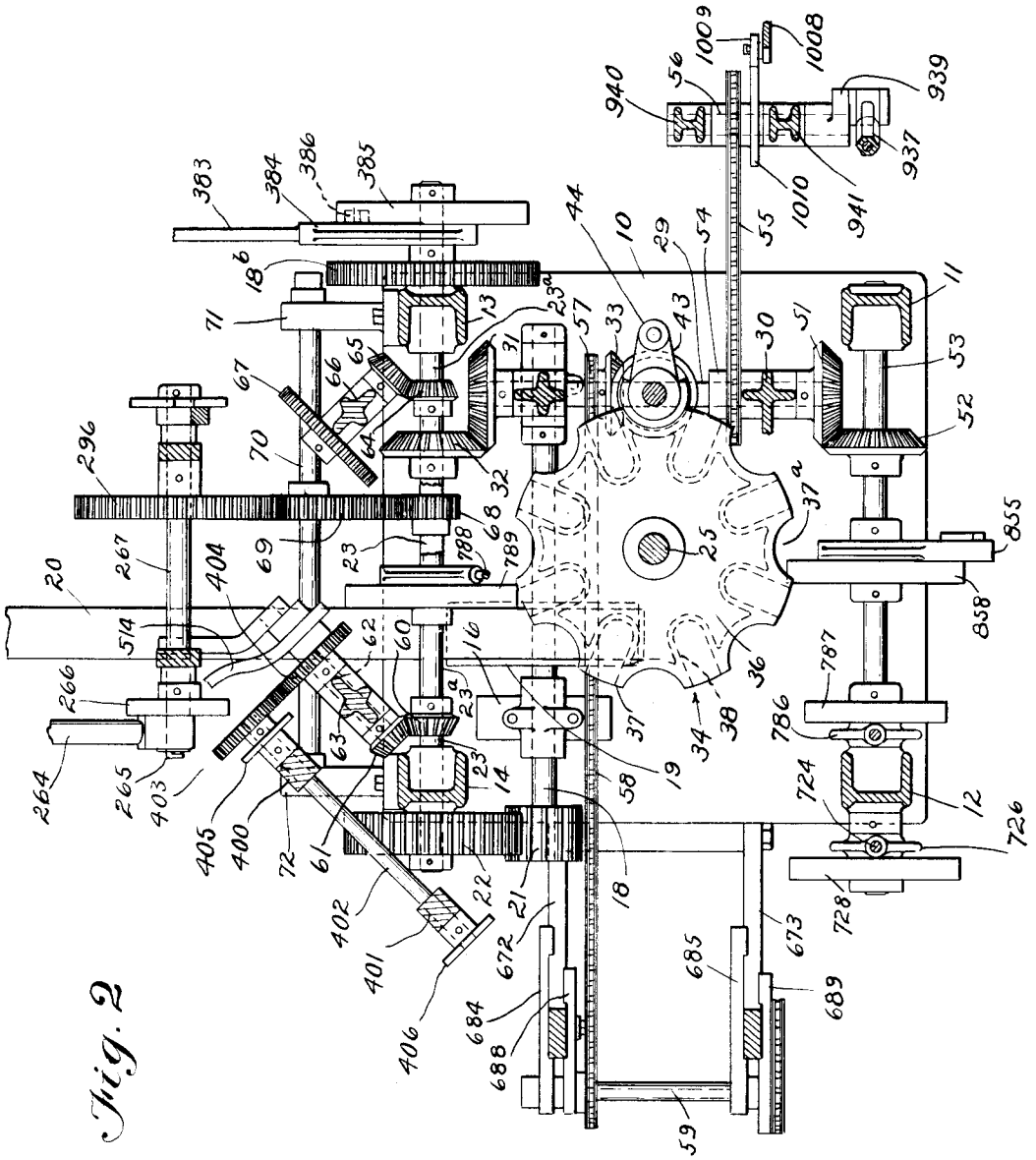


Fig. 2

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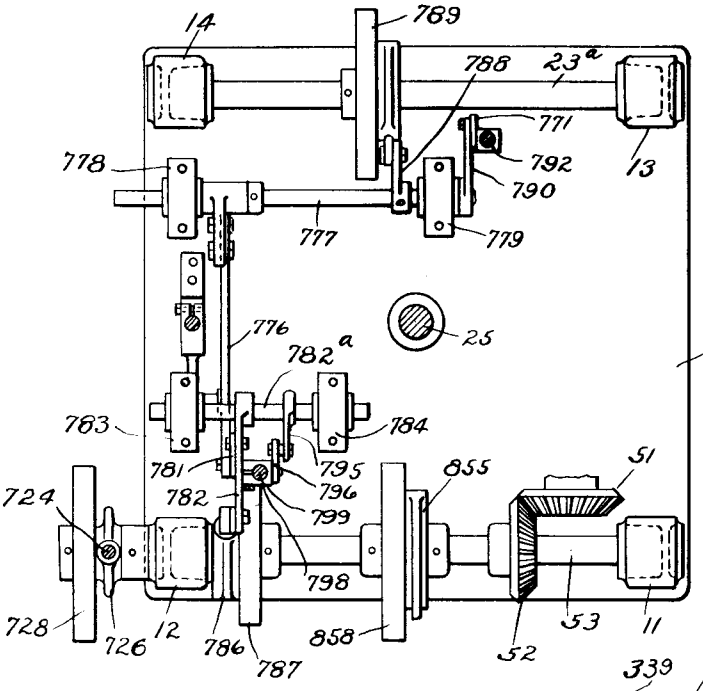


Fig. 2a

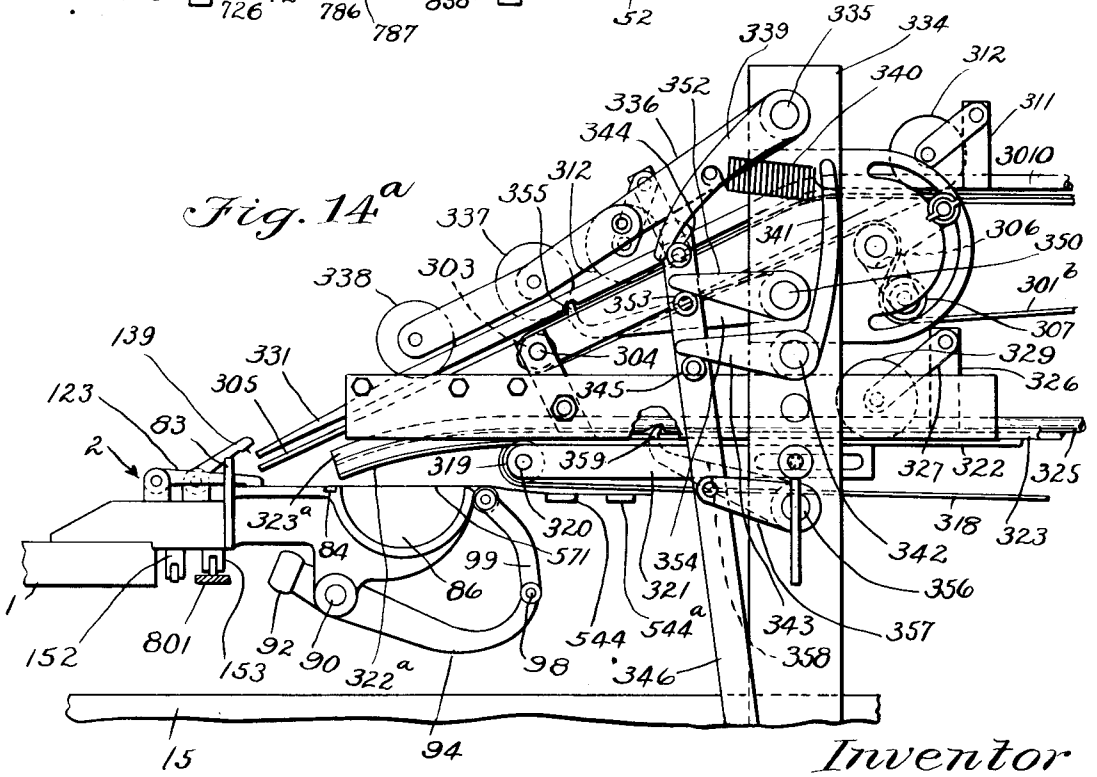


Fig. 14a

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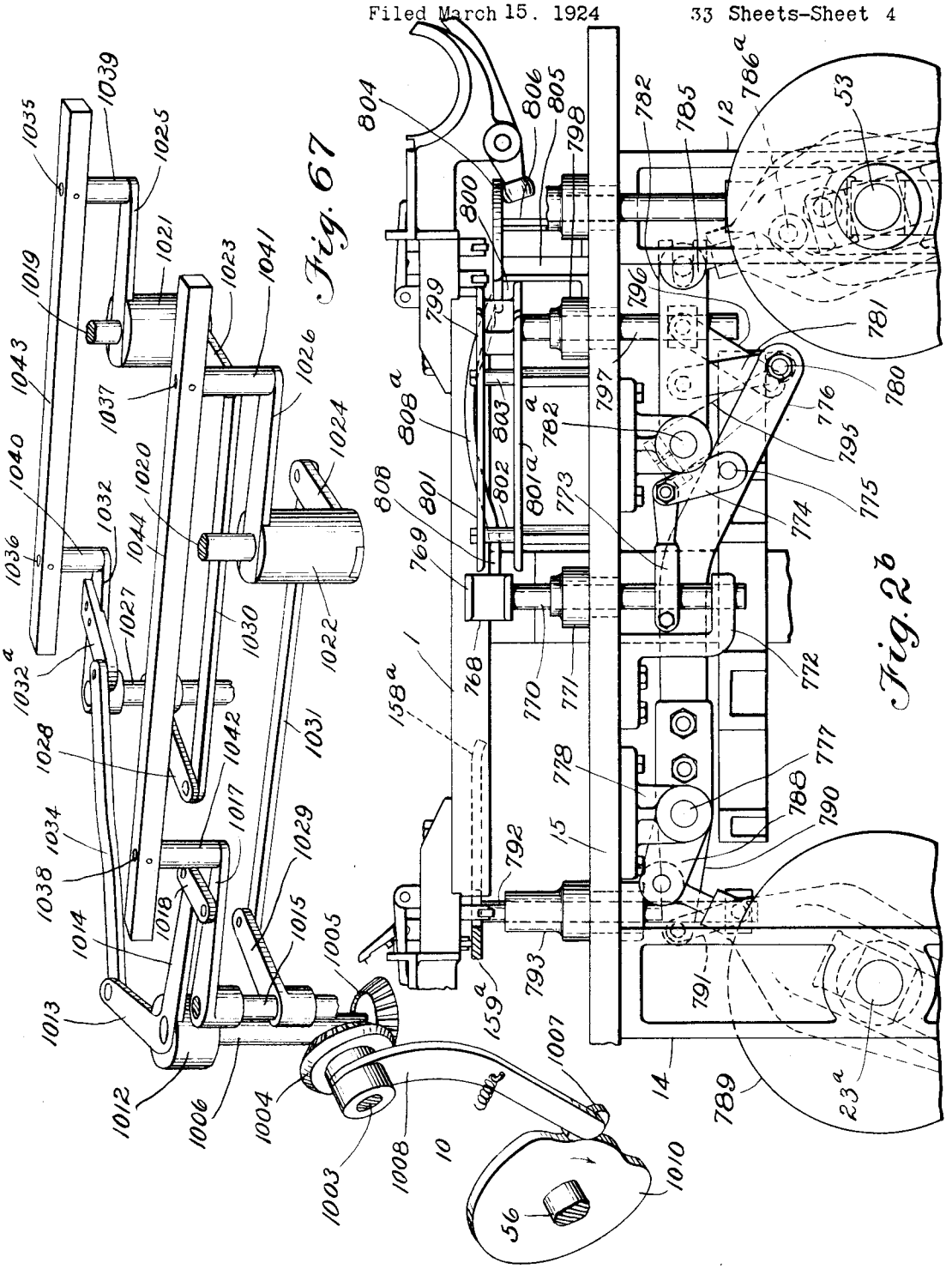


Fig. 67

Fig. 26

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Fig. 3

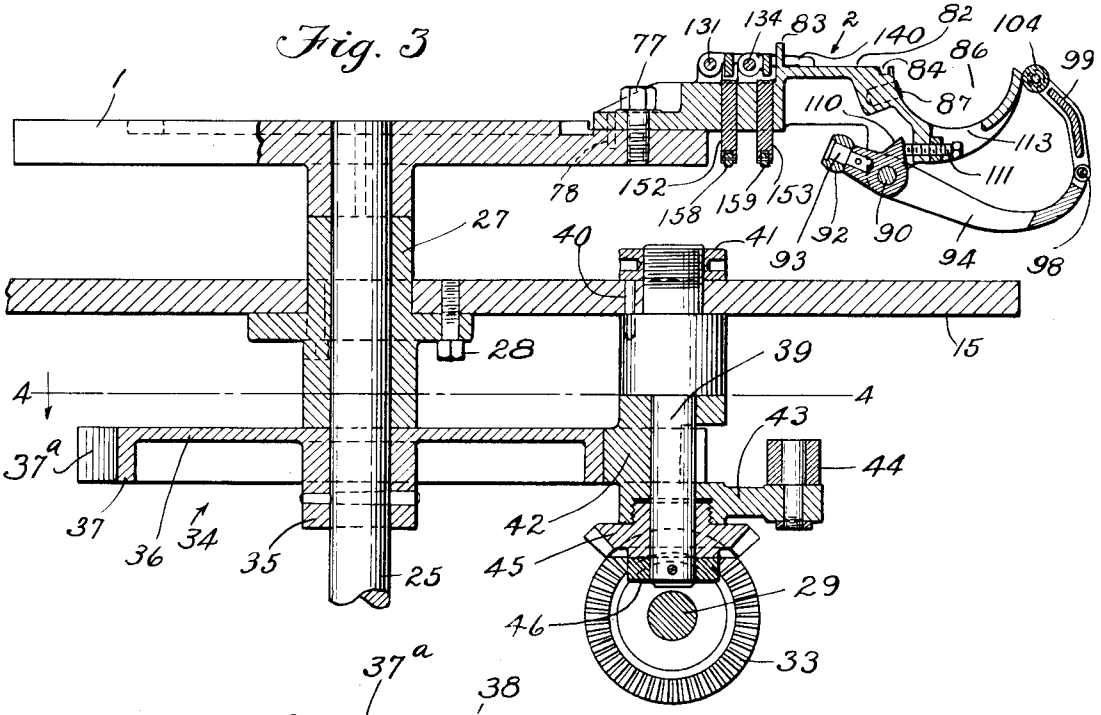


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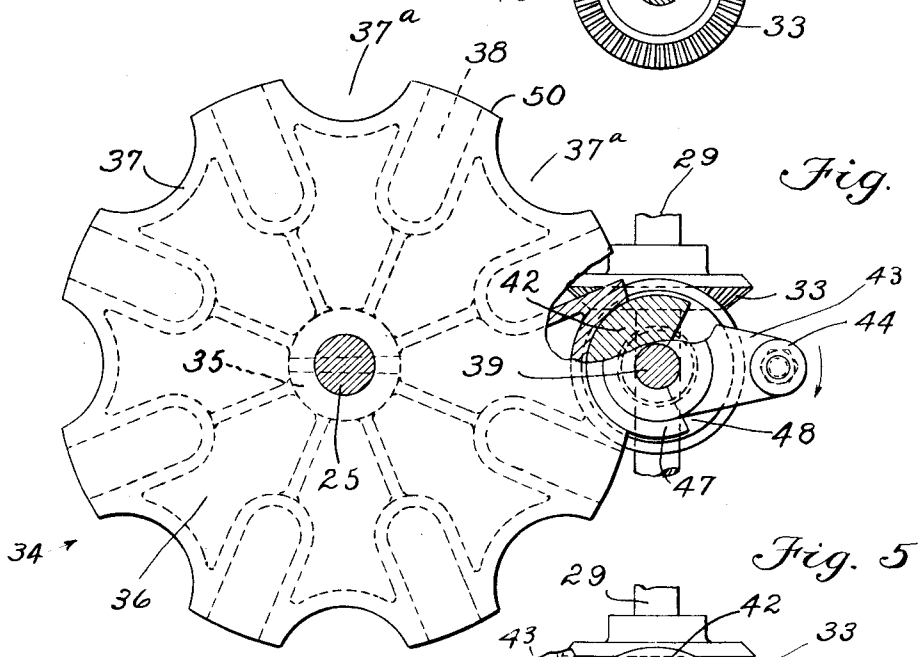
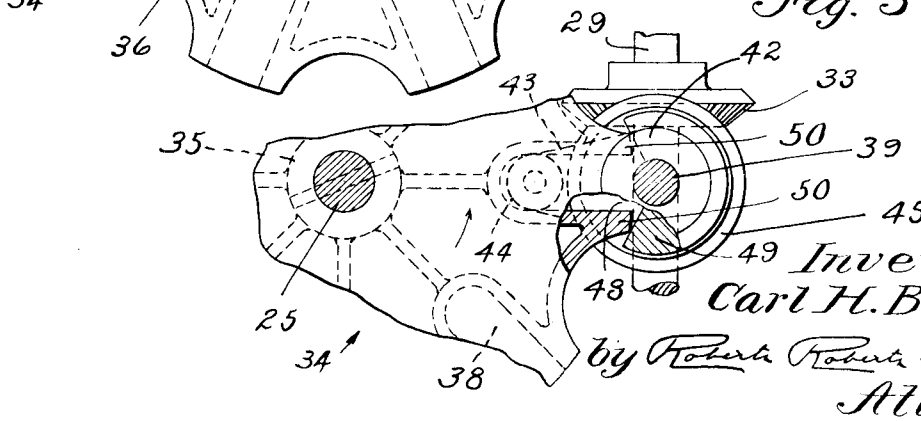


Fig. 5



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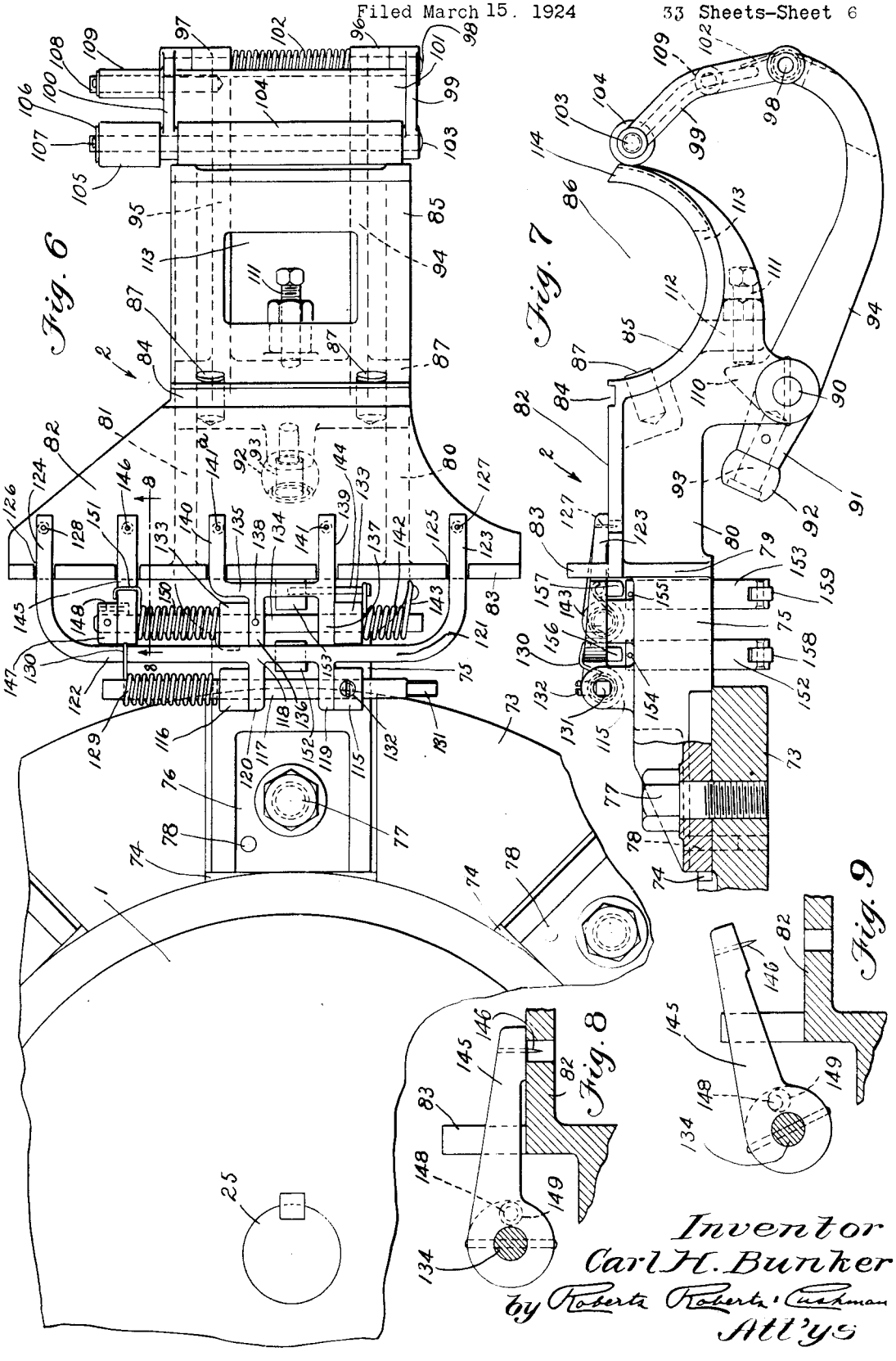


Fig. 6

Fig. 7

Fig. 8

Fig. 9

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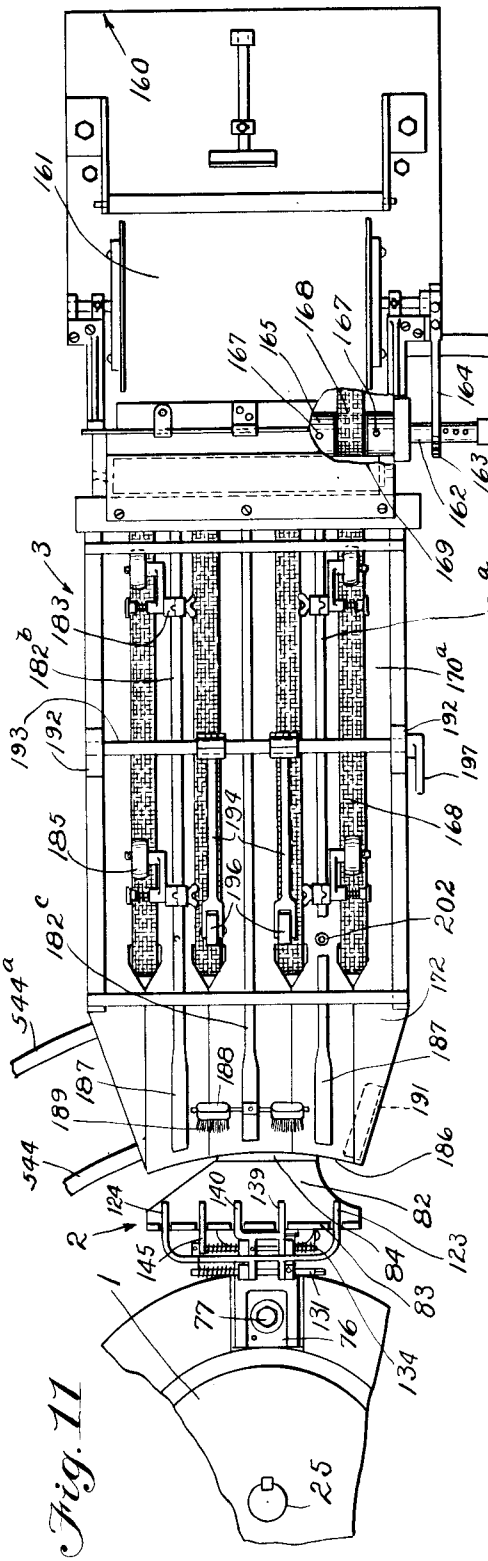


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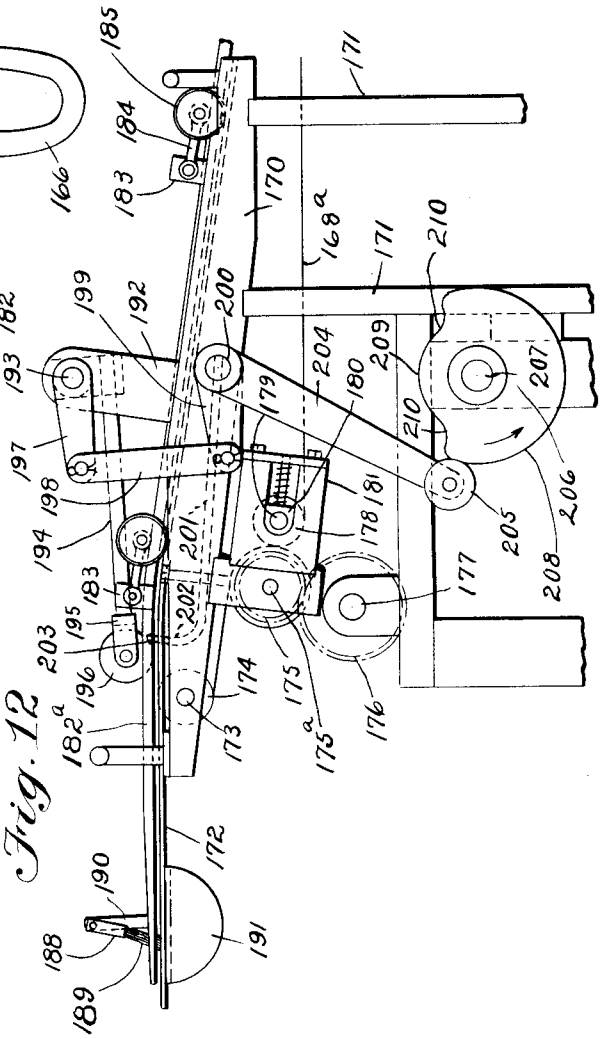


Fig. 12

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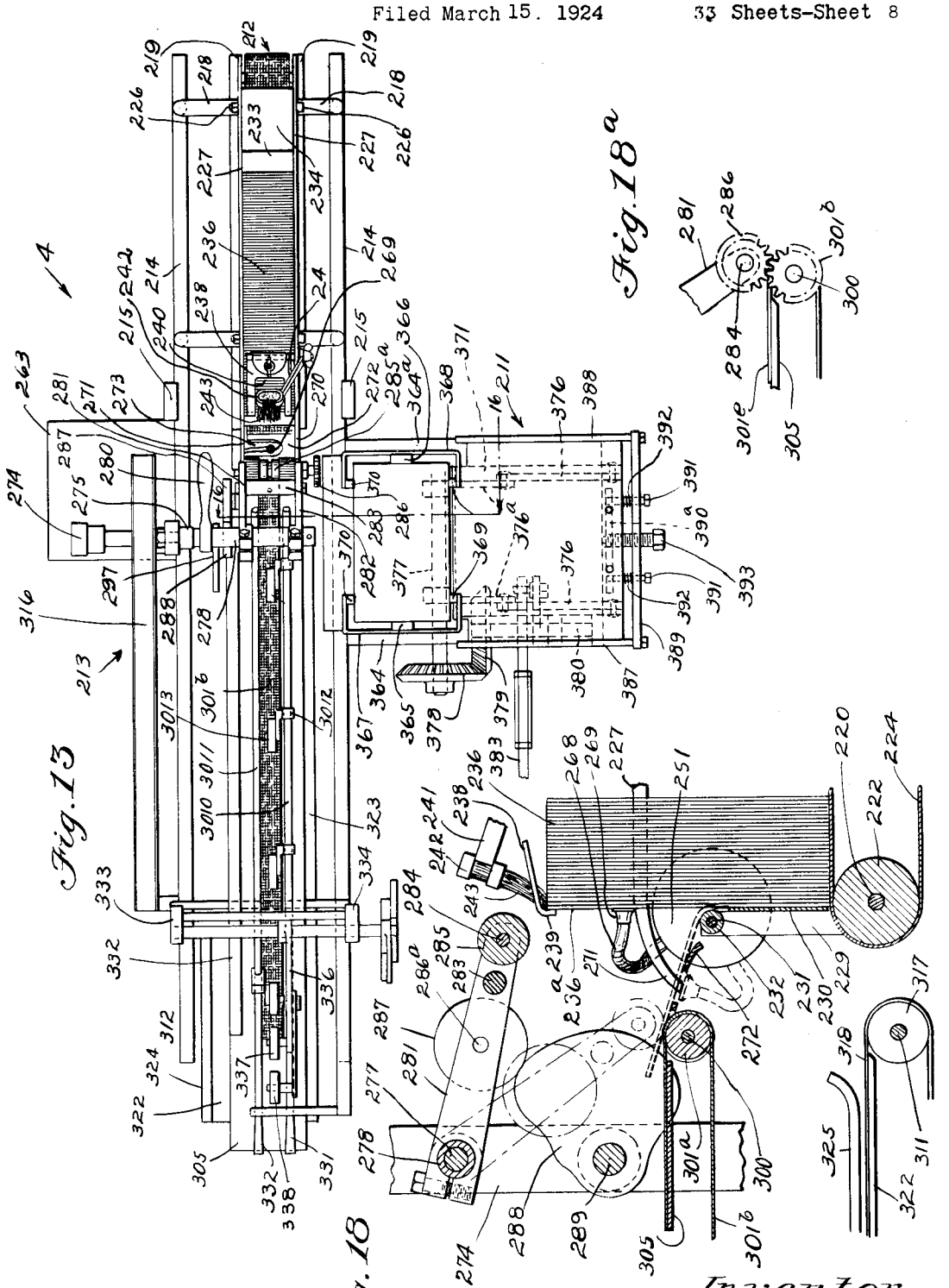


Fig. 13

Fig. 18

Fig. 18a

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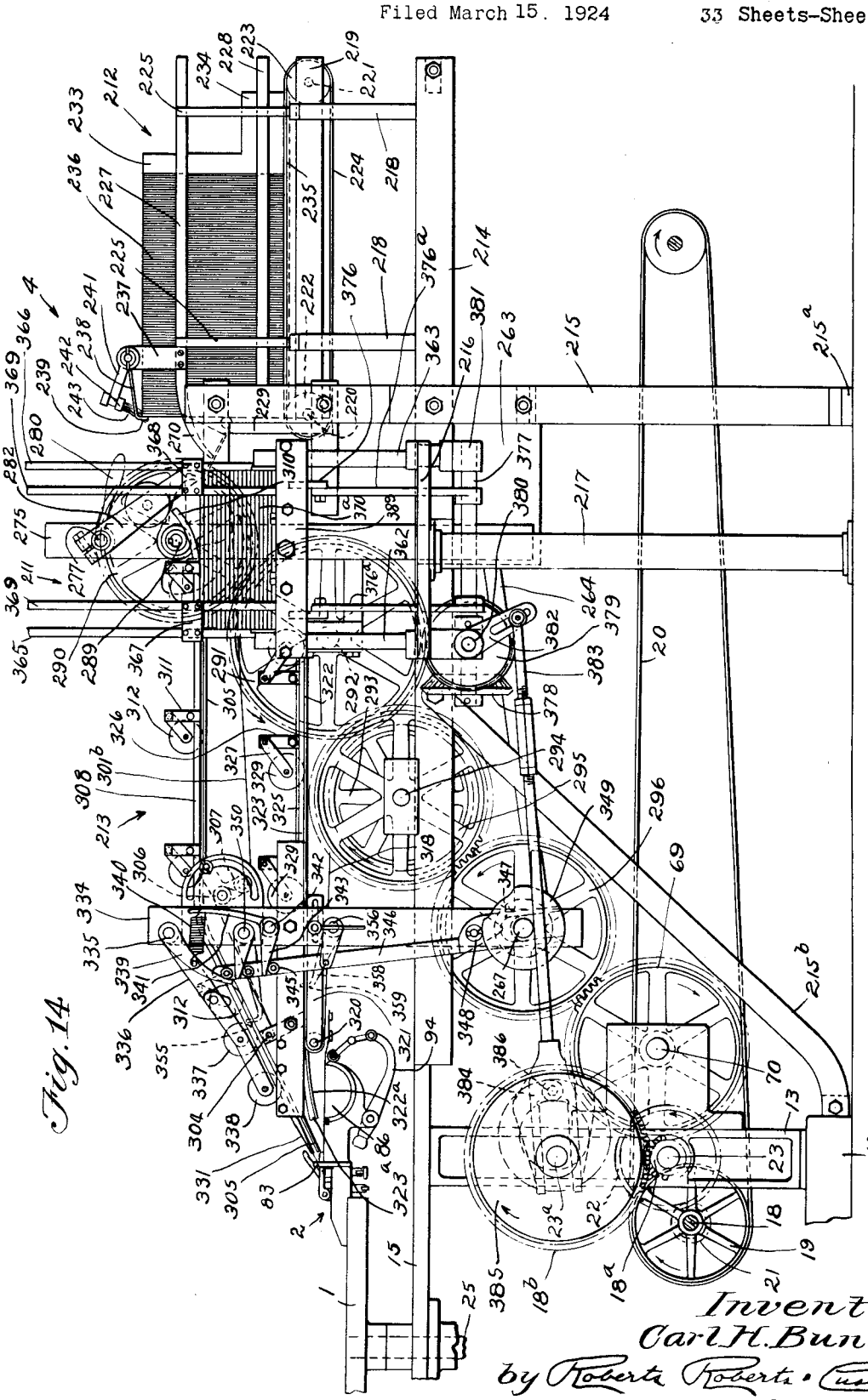


Fig. 14

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Carl H. Bunker
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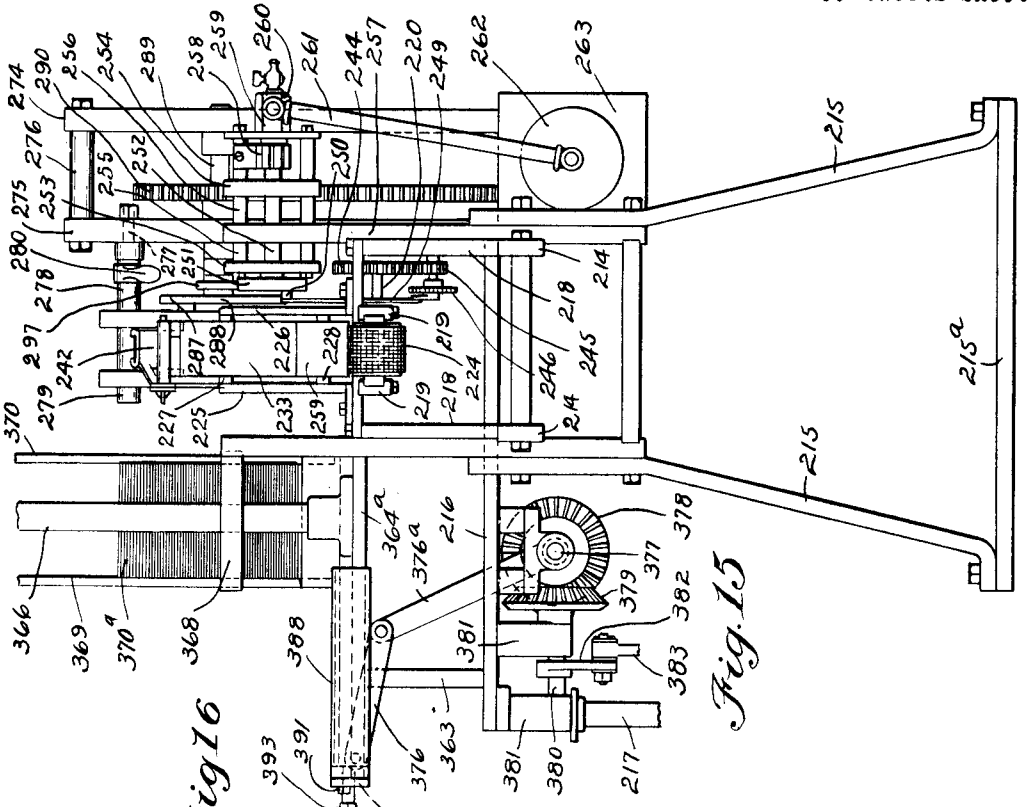


Fig. 15



Fig. 16

Fig. 17

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Carl H. Bunker
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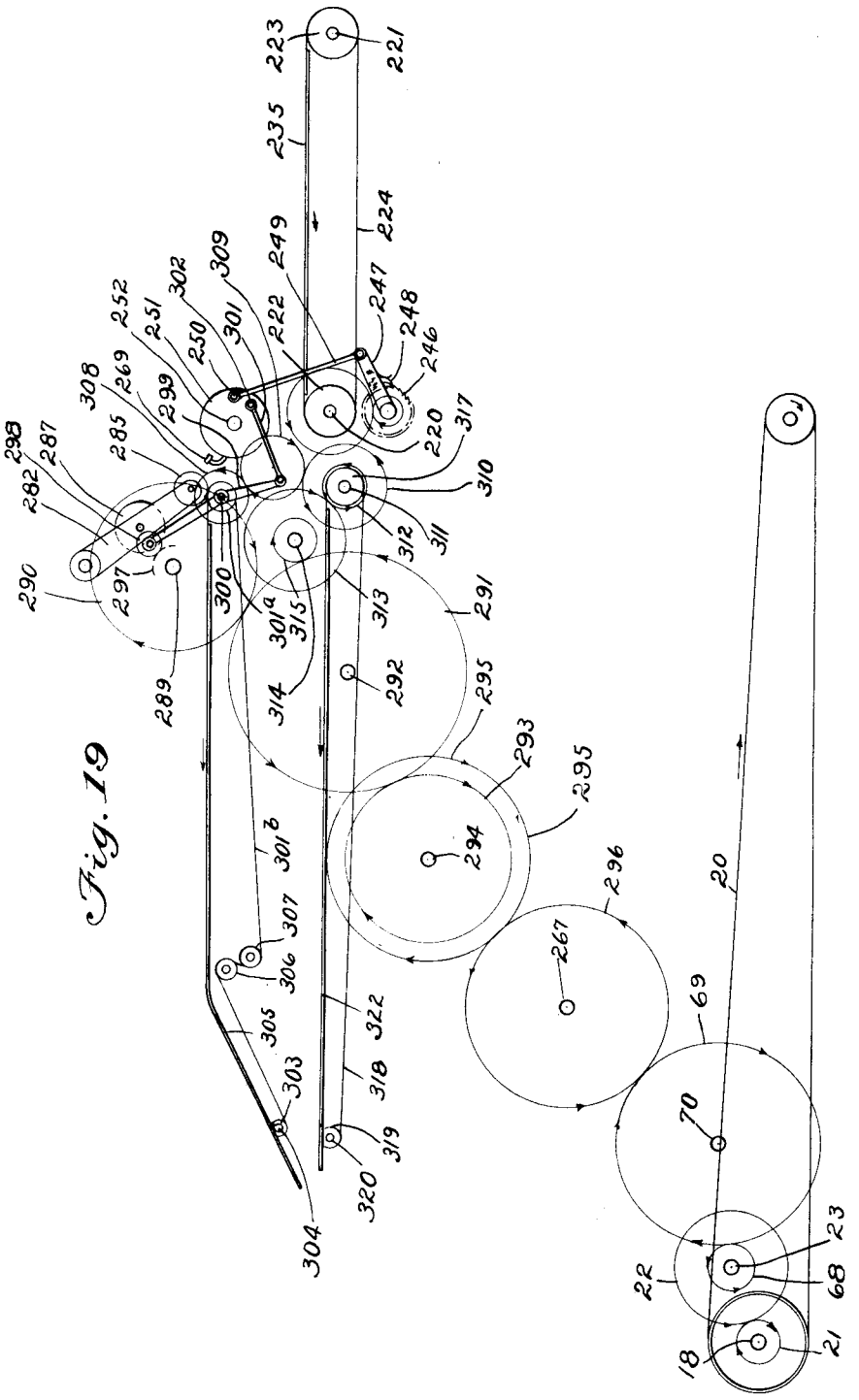


Fig. 19

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Carl H. Bunker
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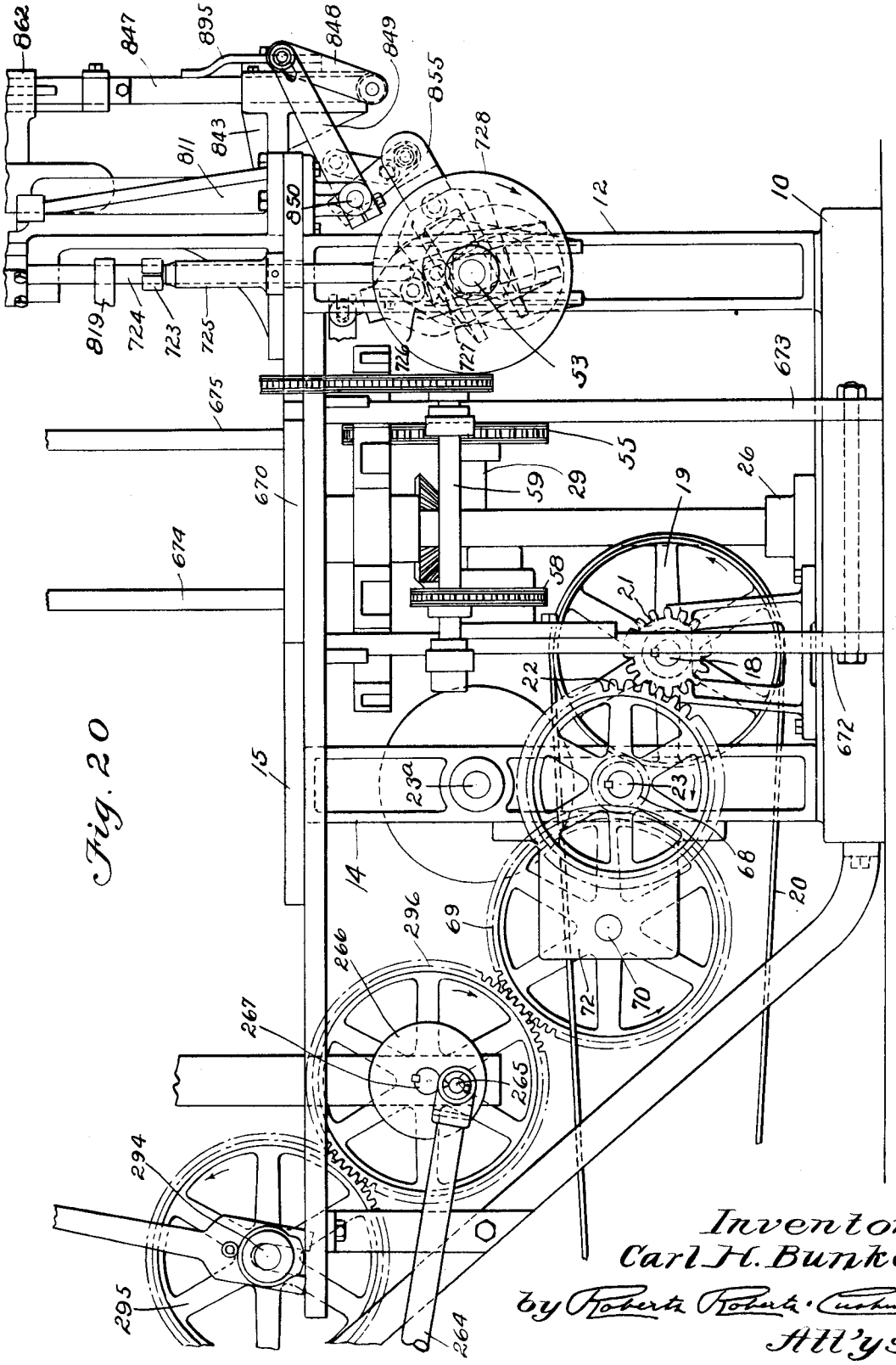


Fig. 20

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Carl H. Bunker
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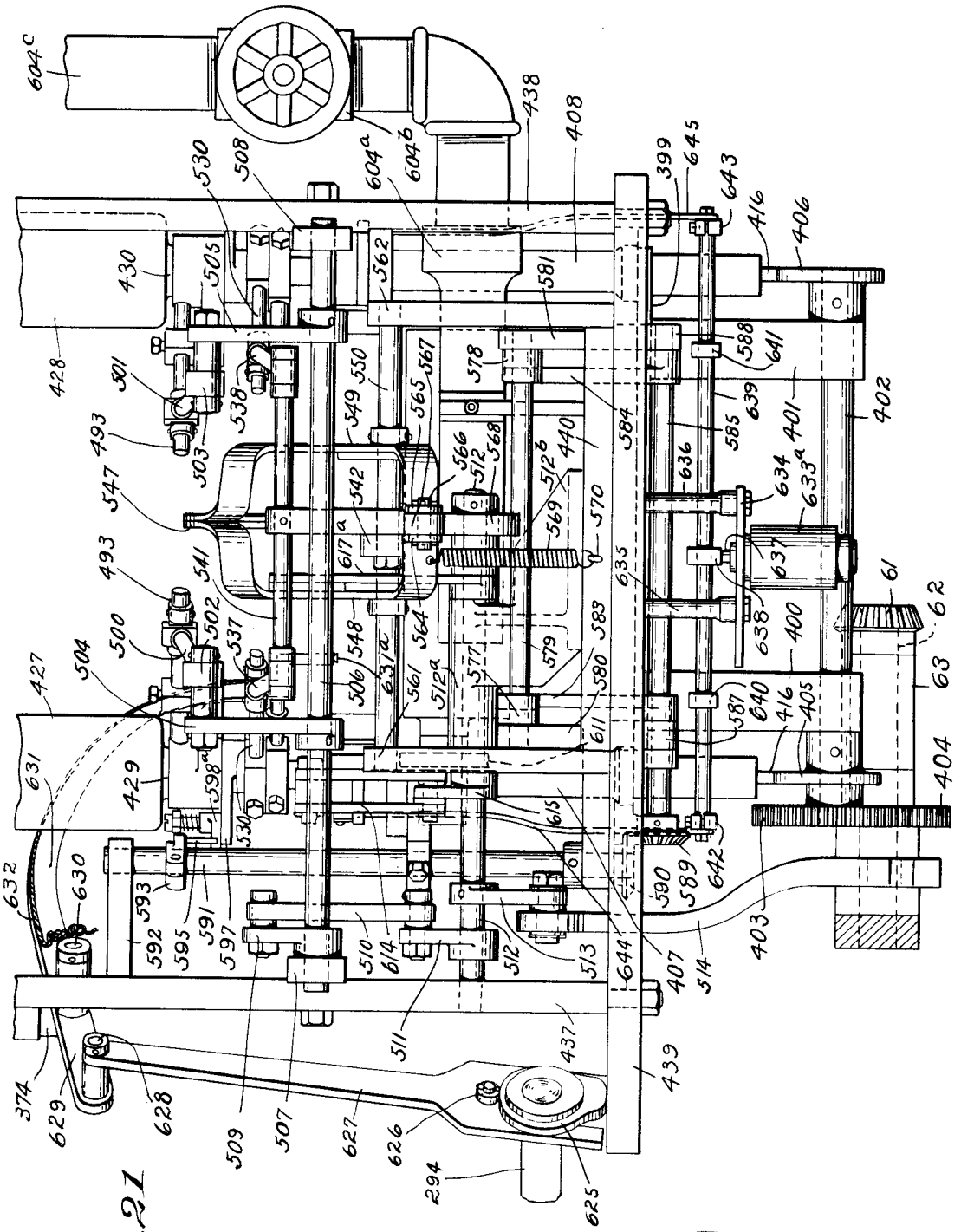


Fig. 21

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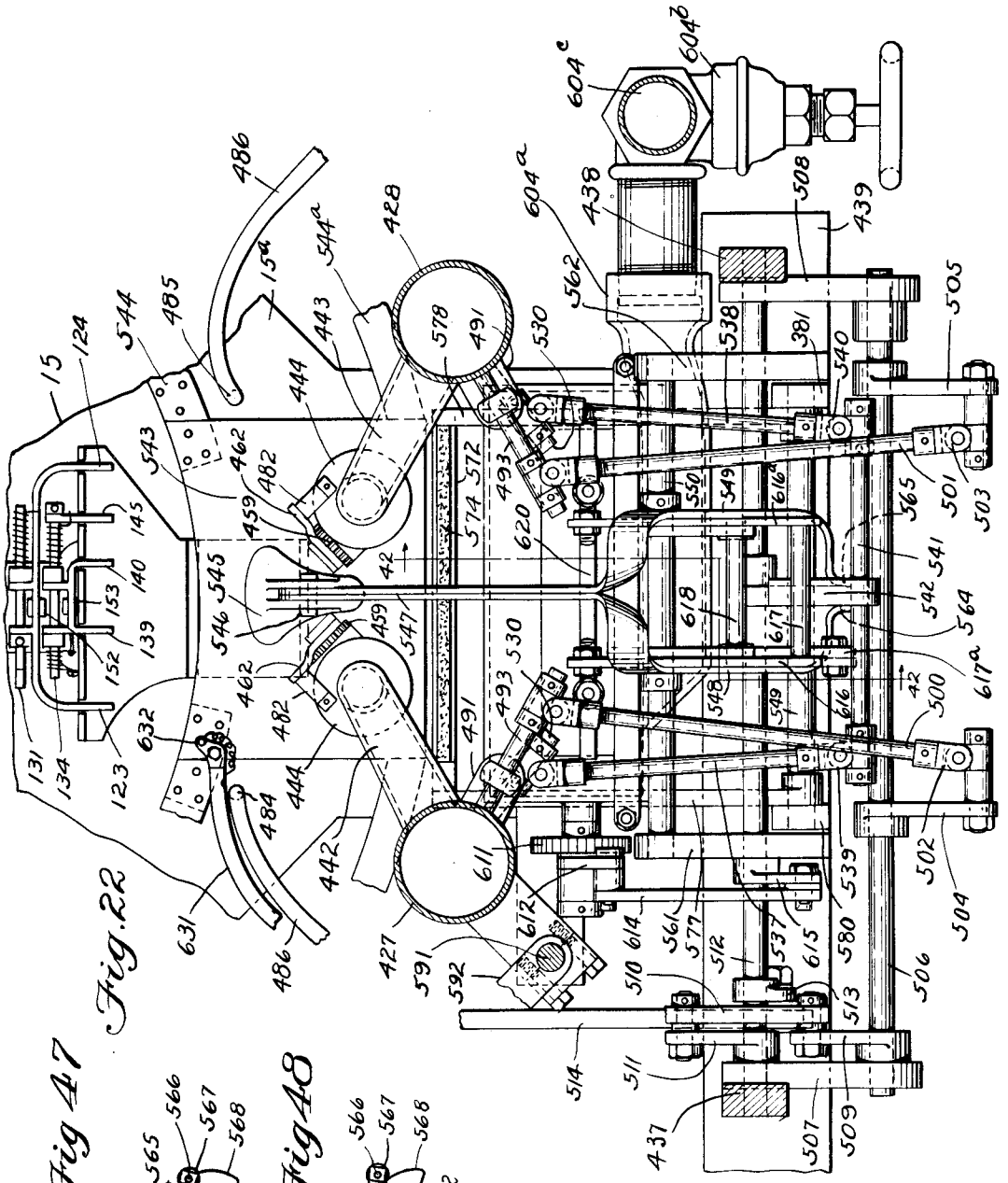


Fig. 22

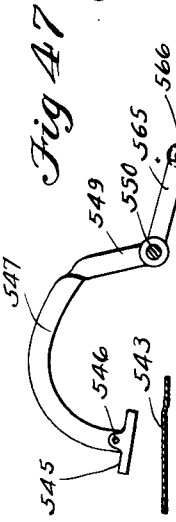


Fig 47

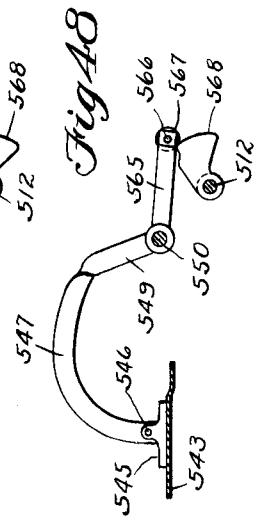


Fig 48

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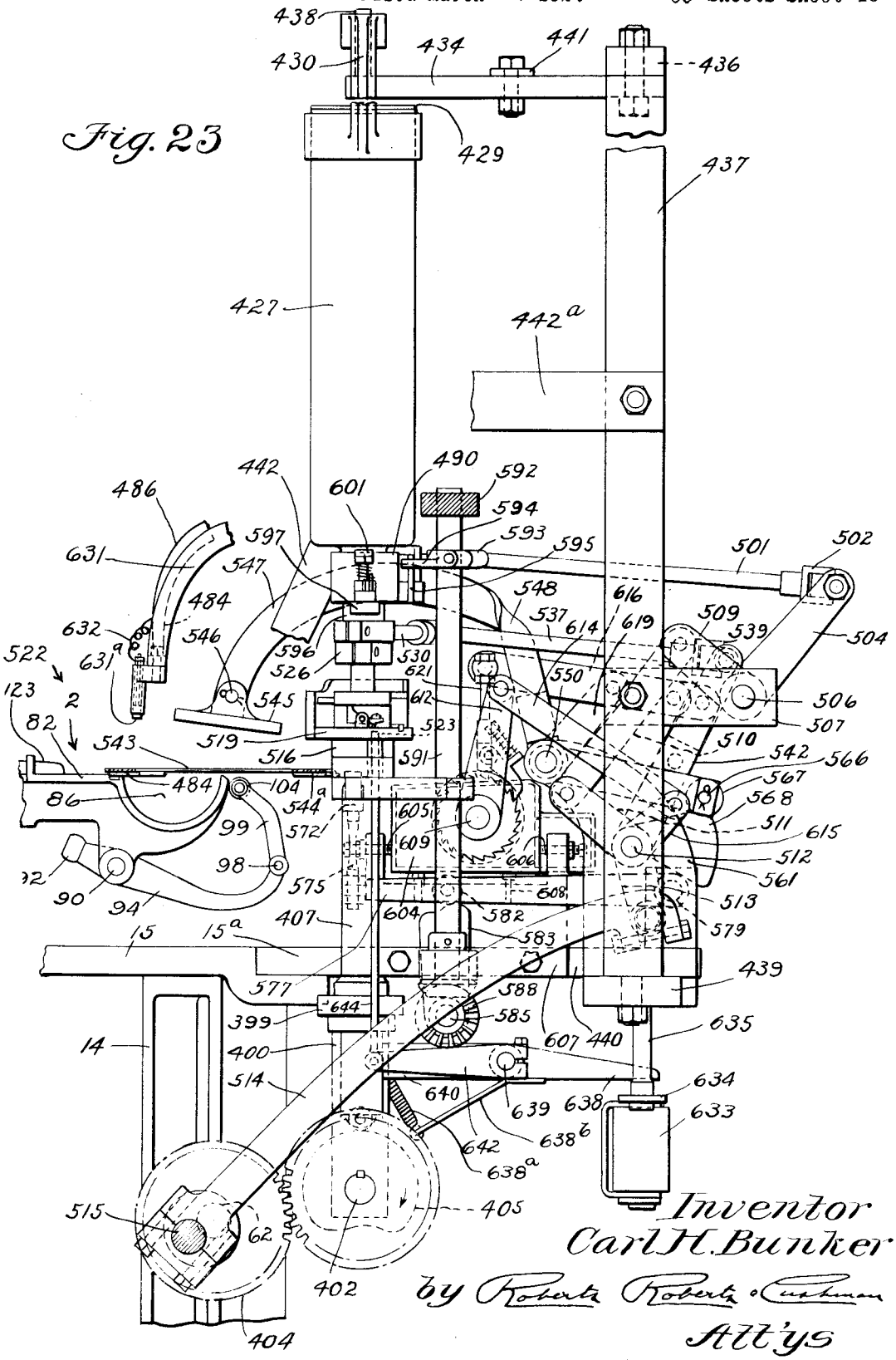
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Fig. 23



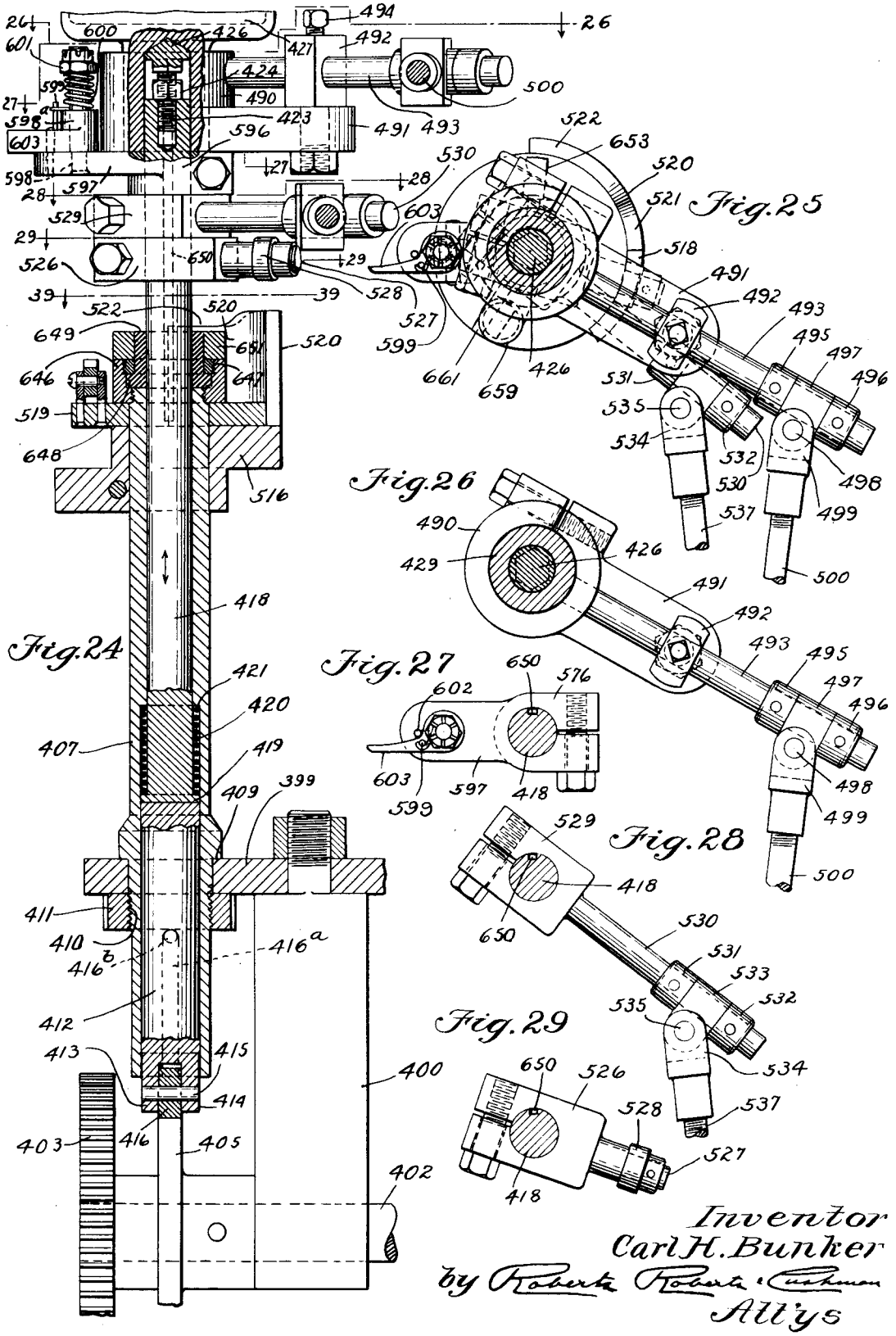
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Fig. 30

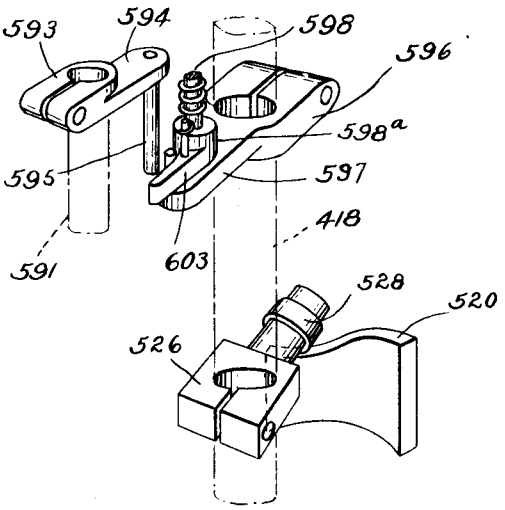


Fig. 31

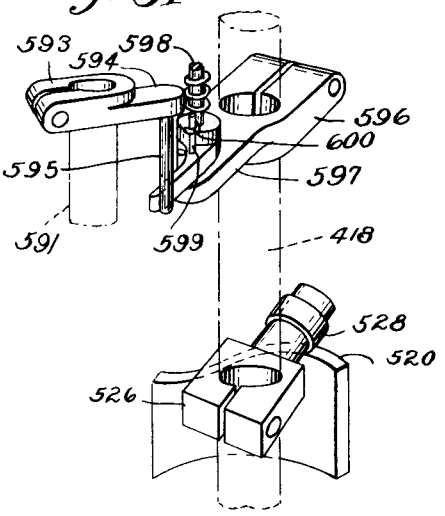


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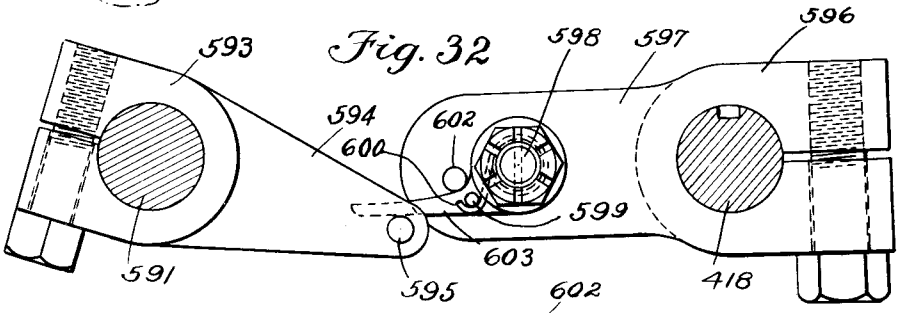
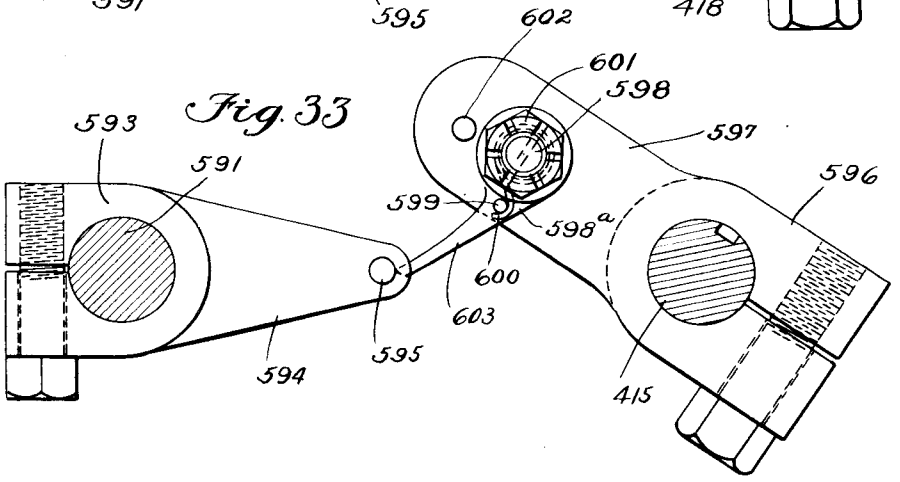


Fig. 33



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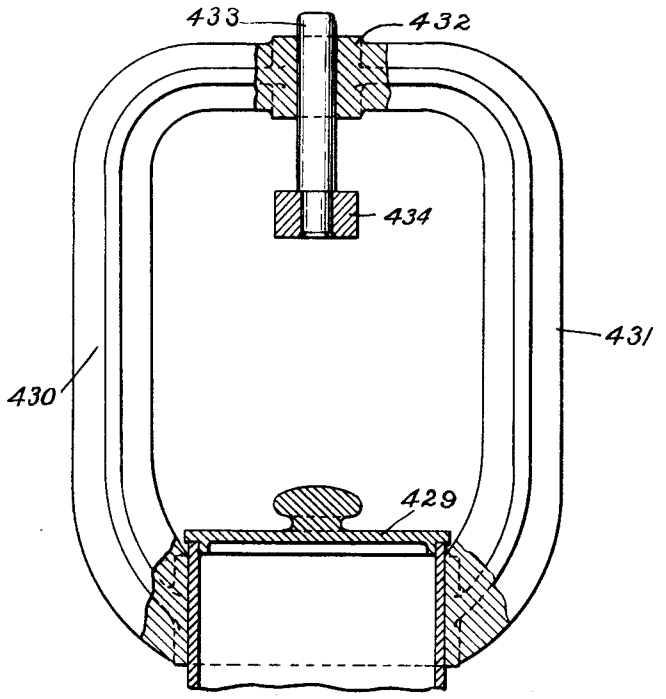


Fig. 34.

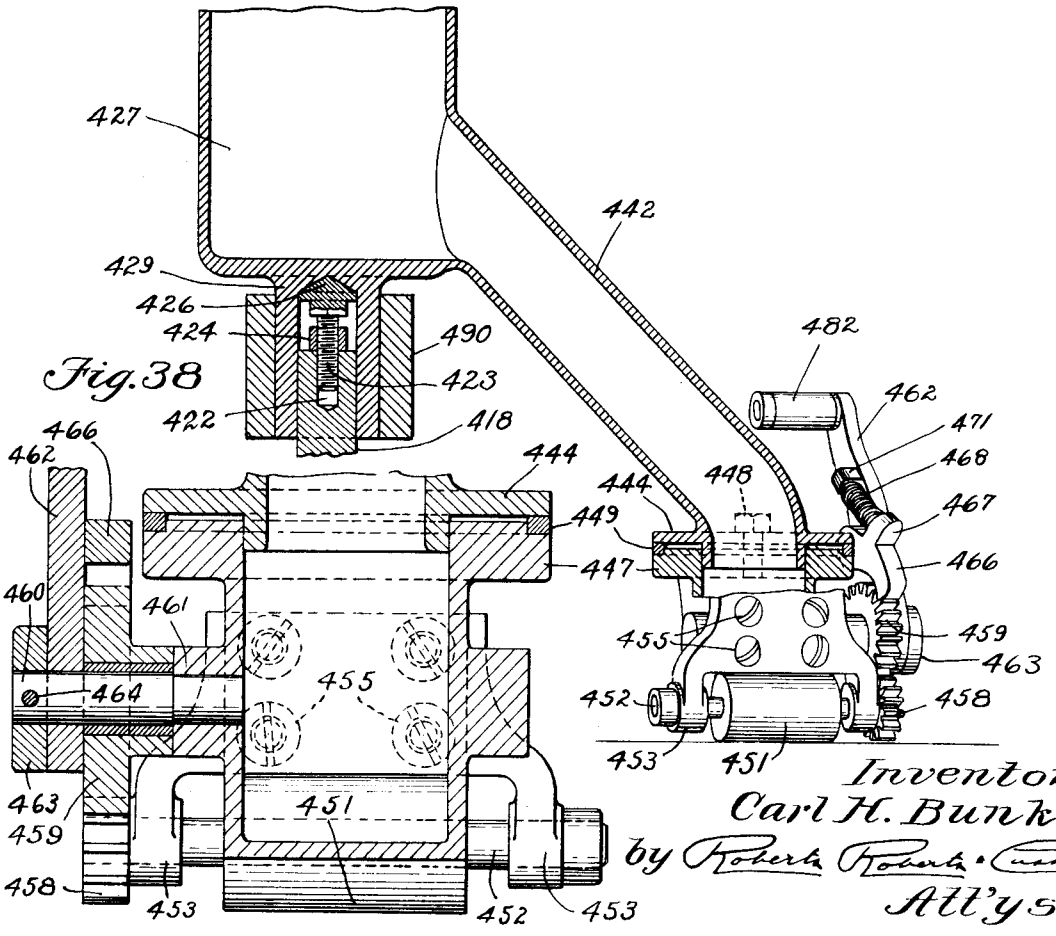


Fig. 38.

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Fig. 35

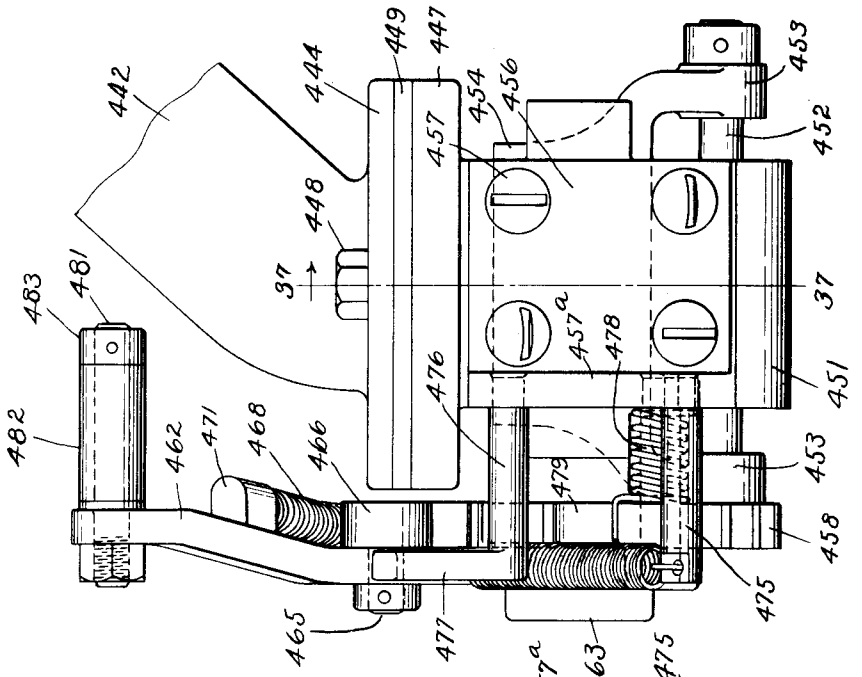


Fig. 36

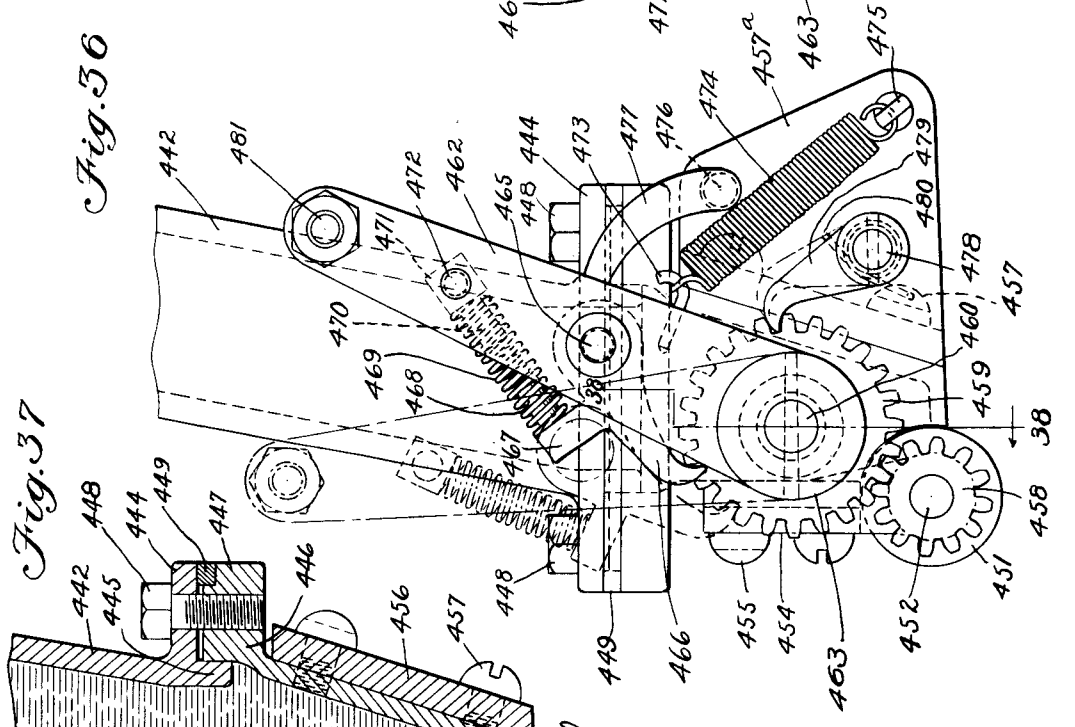
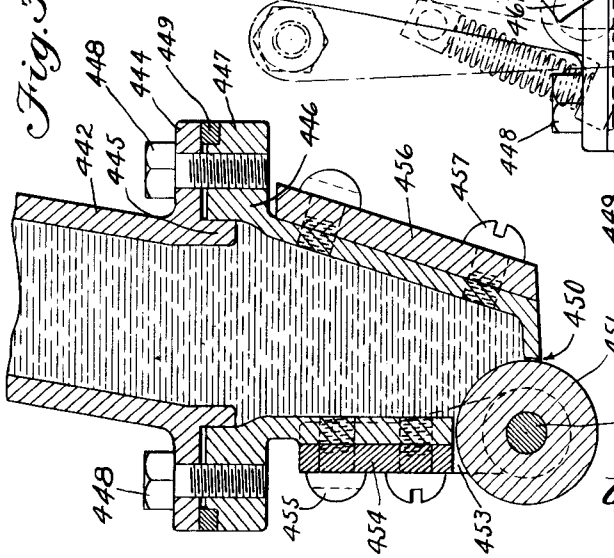


Fig. 37



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Fig. 39

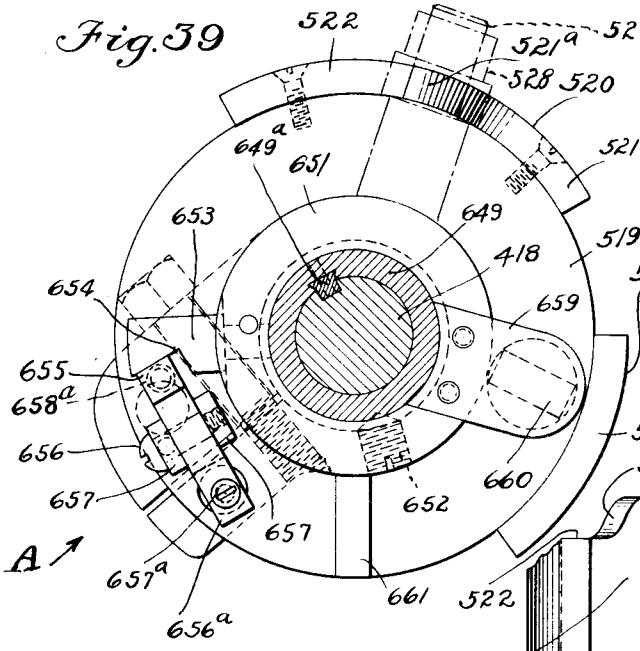


Fig. 40

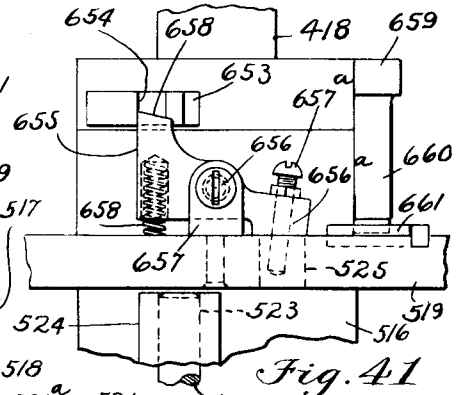
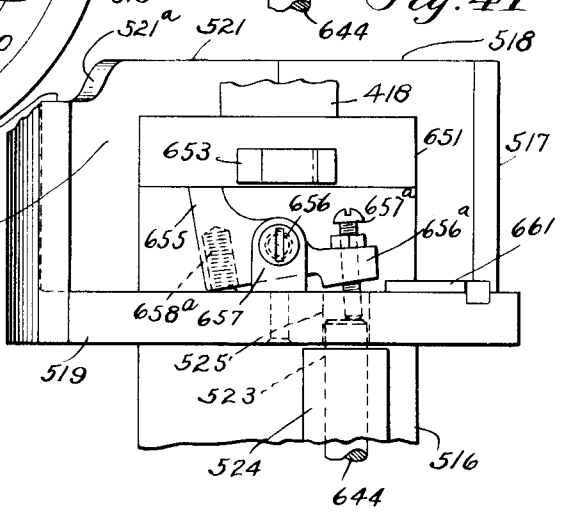


Fig. 41



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Fig. 42

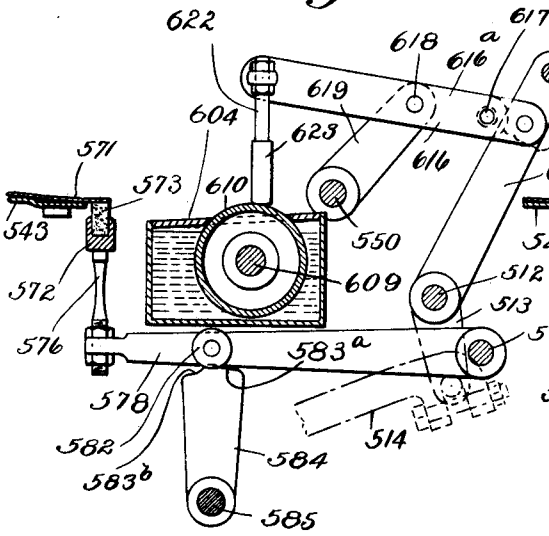


Fig. 43

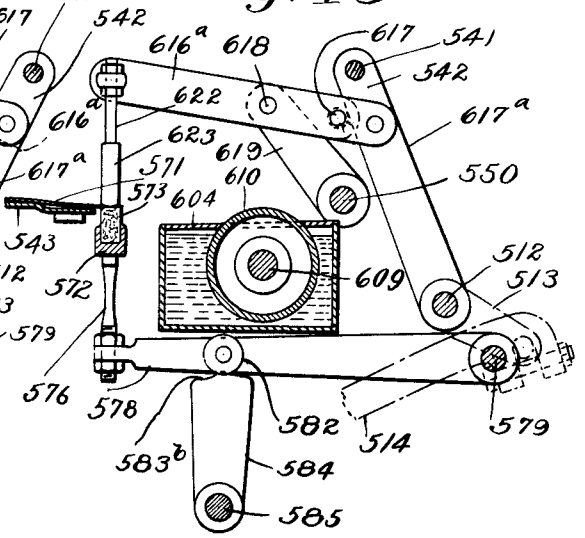


Fig. 44

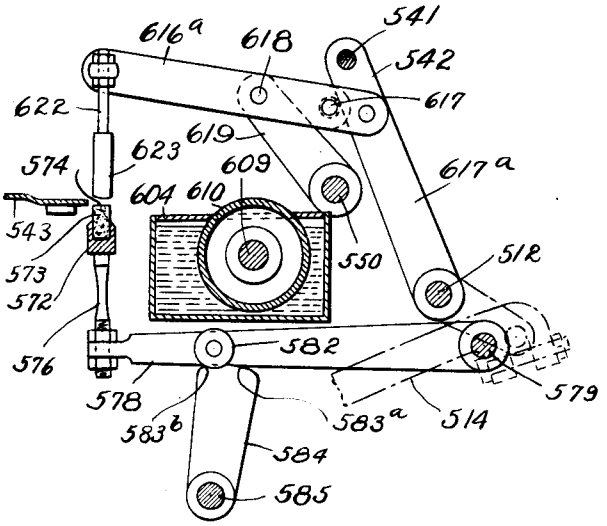


Fig. 45

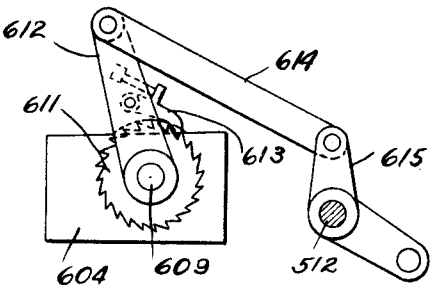
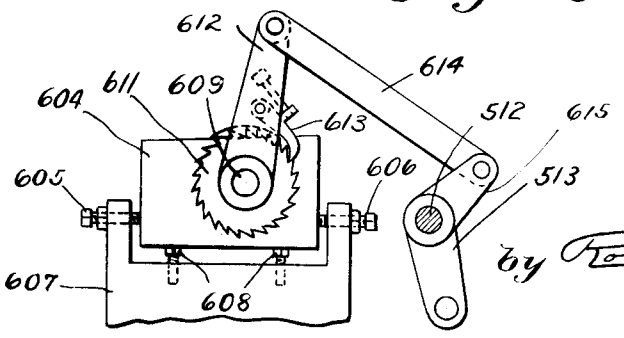


Fig. 46



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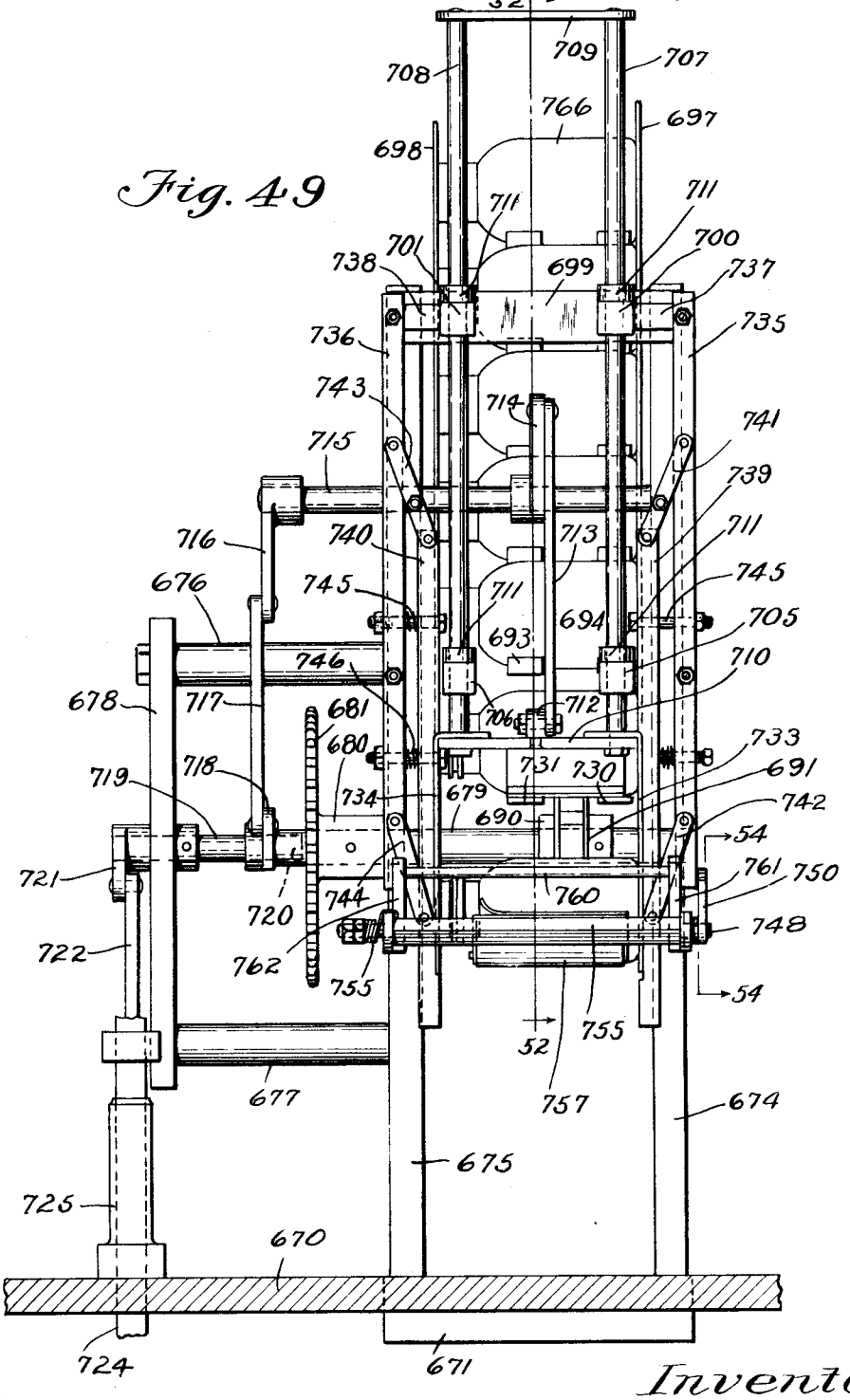
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Fig. 49



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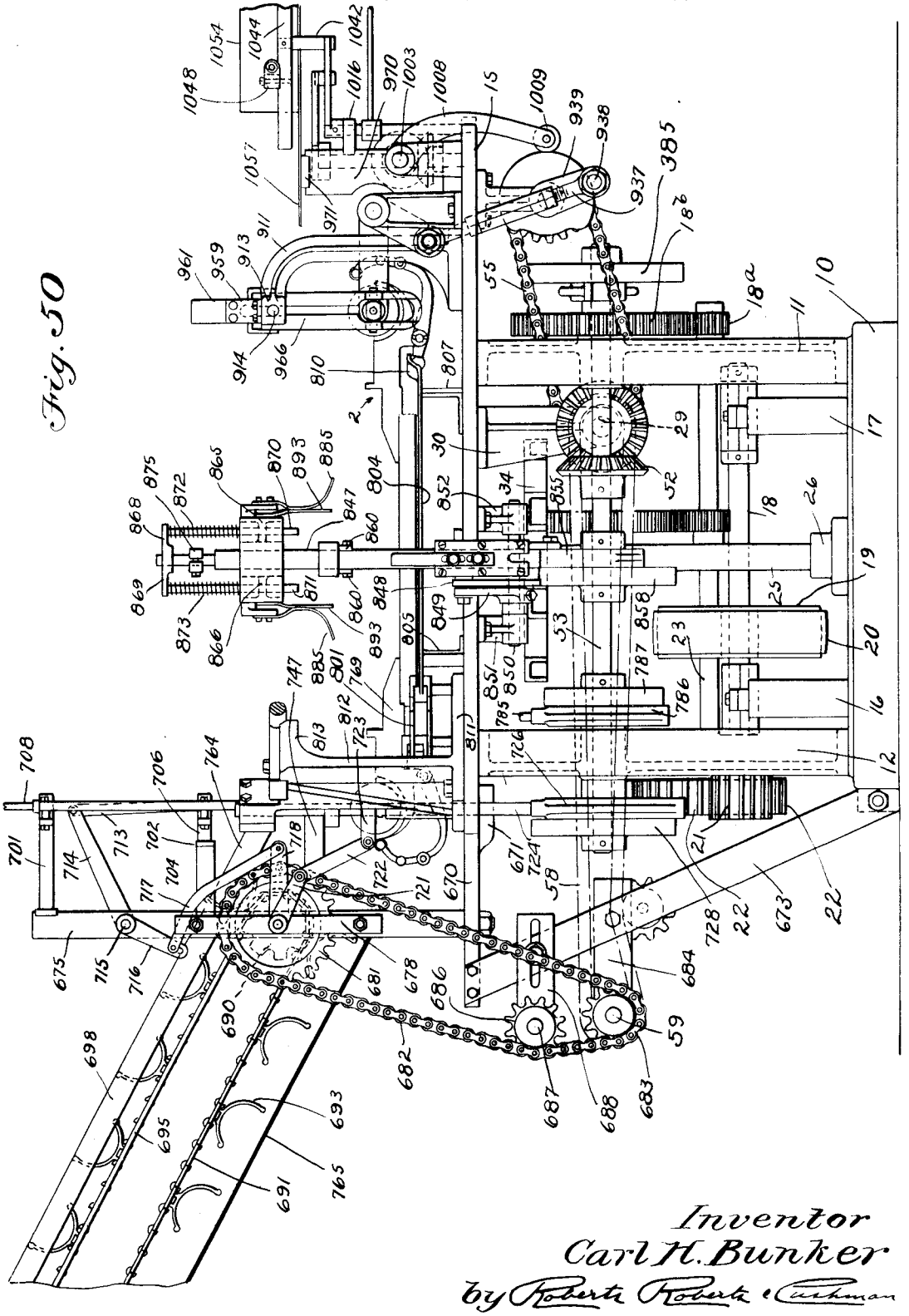
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Fig. 50



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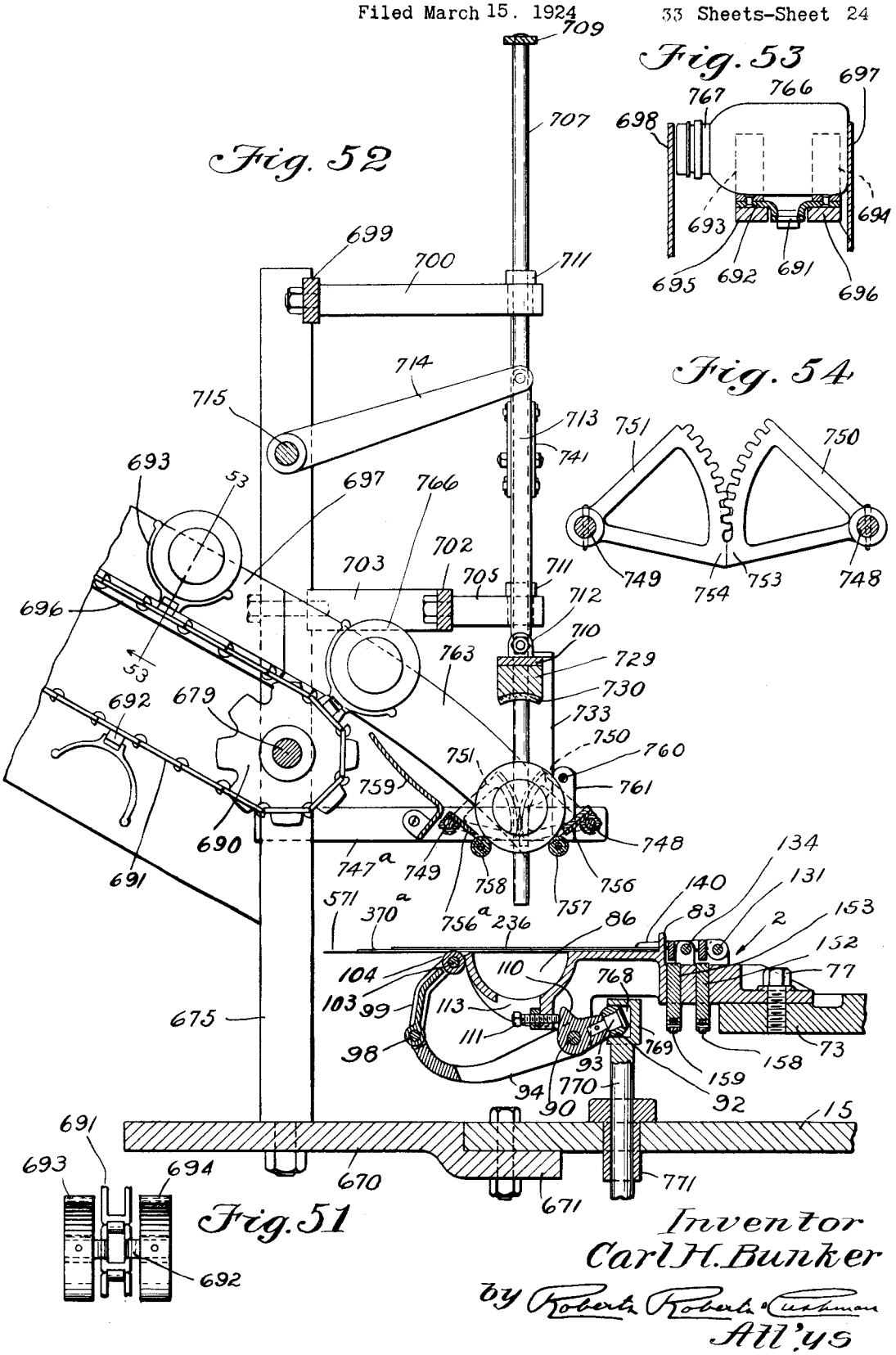


Fig. 52

Fig. 53

Fig. 54

Fig. 51

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Fig. 55

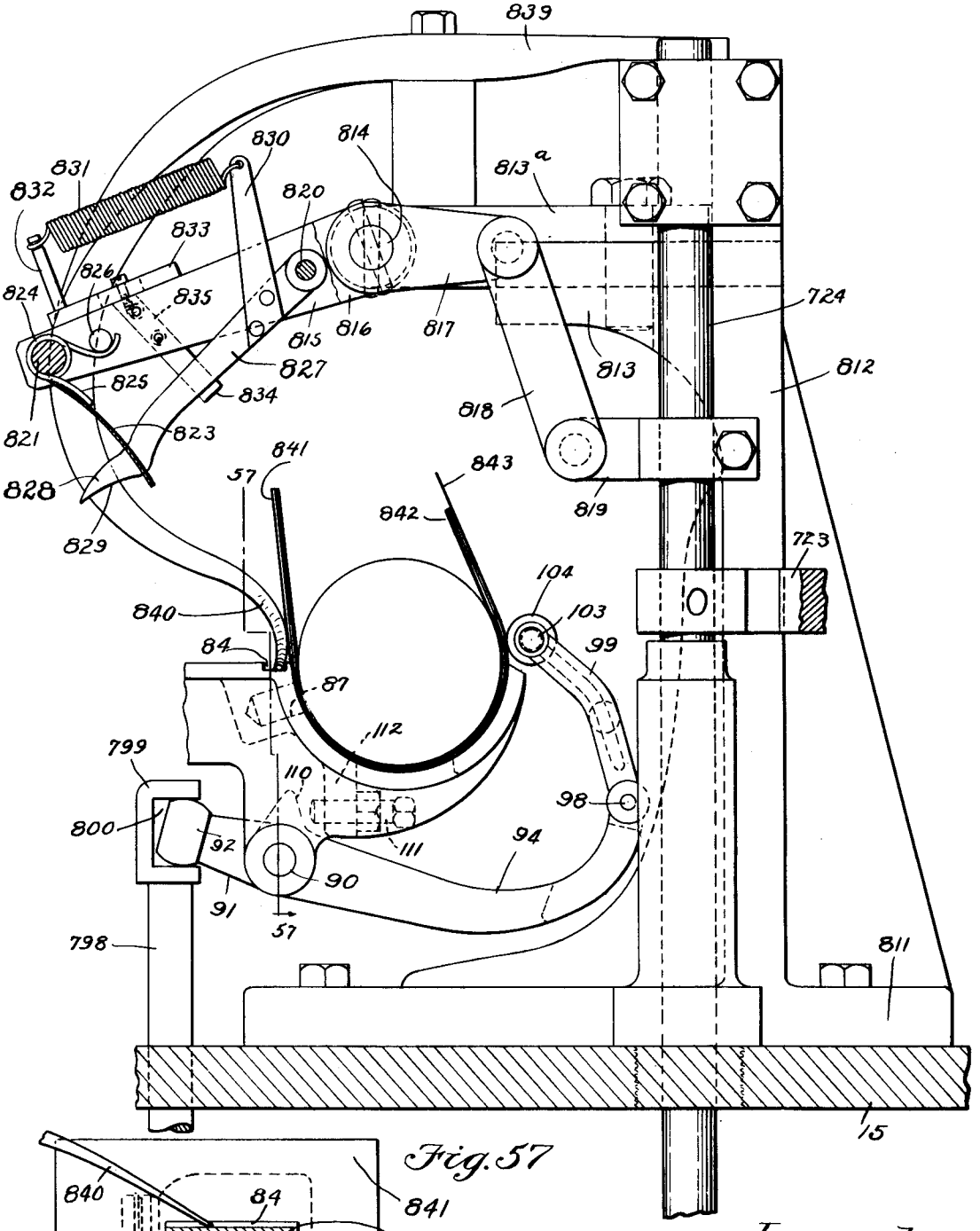
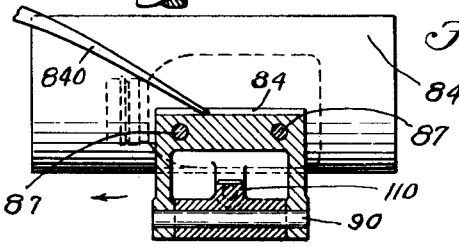


Fig. 57



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Carl H. Bunker
by Roberts Roberts & Cushman
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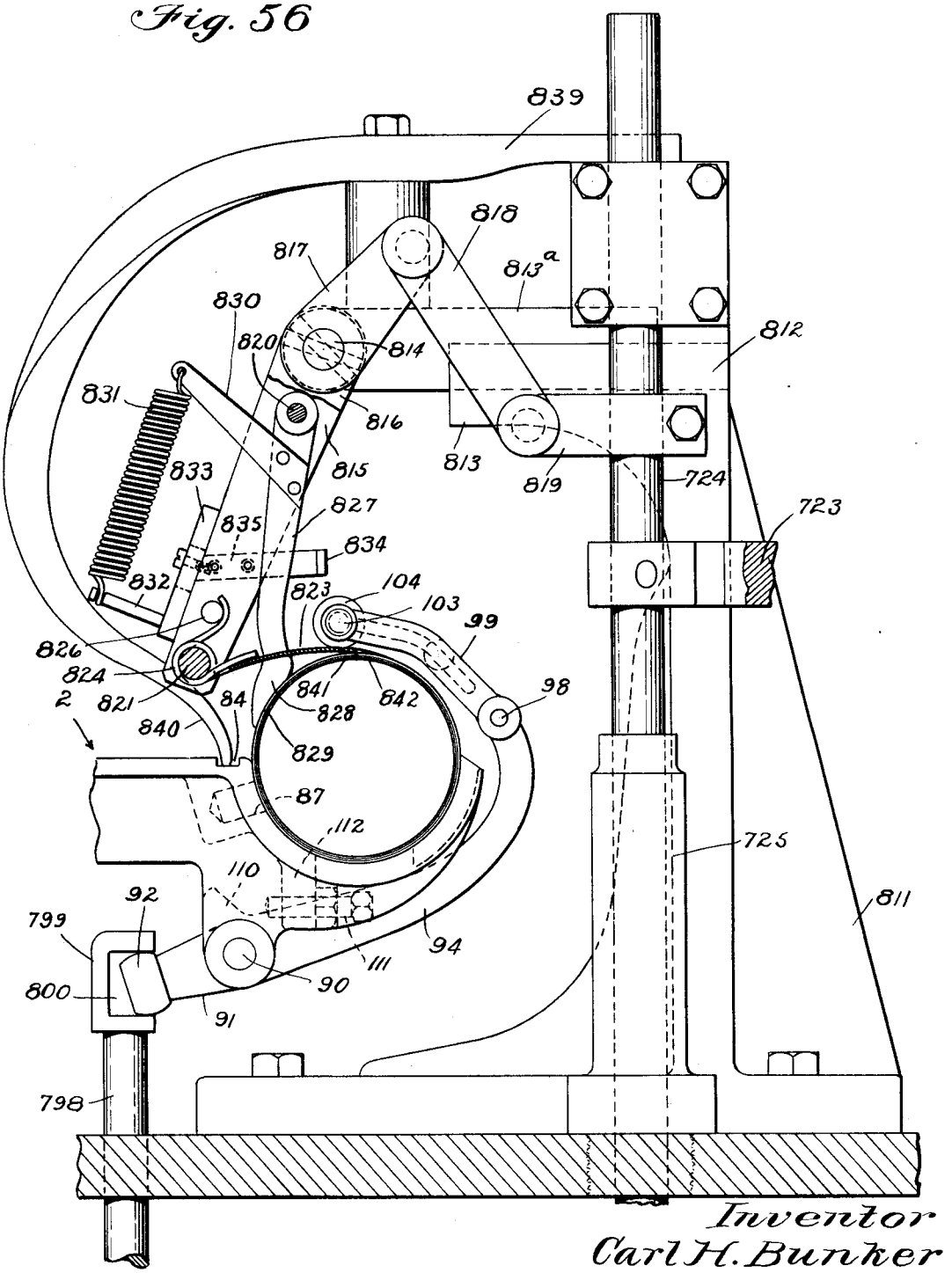
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Fig. 56



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Fig. 58

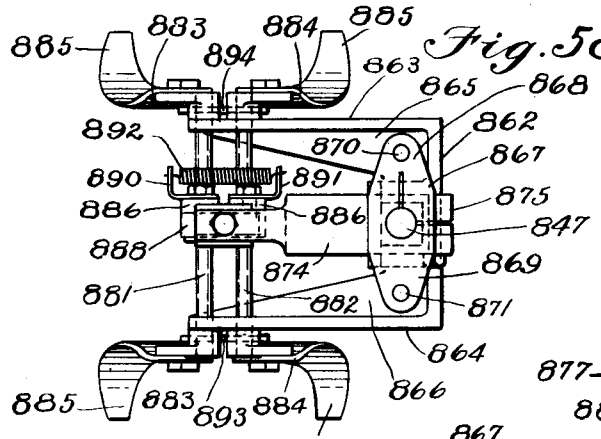


Fig. 59

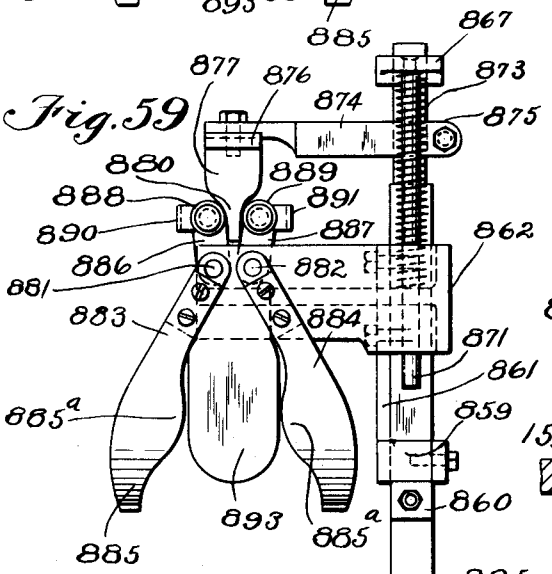
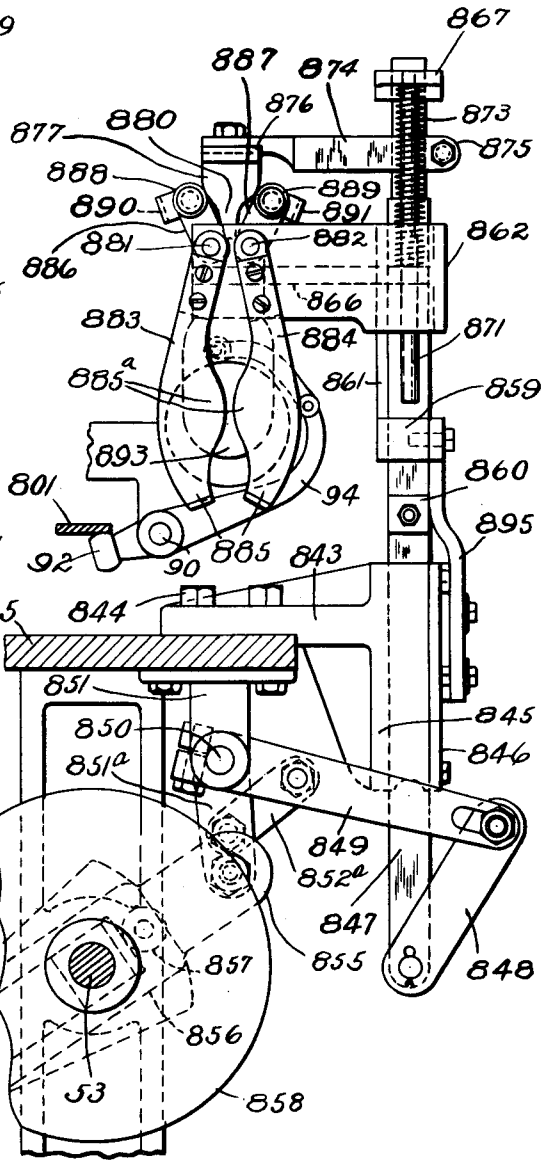


Fig. 60



Inventor
Carl H. Bunker
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WRAPPING MACHINE

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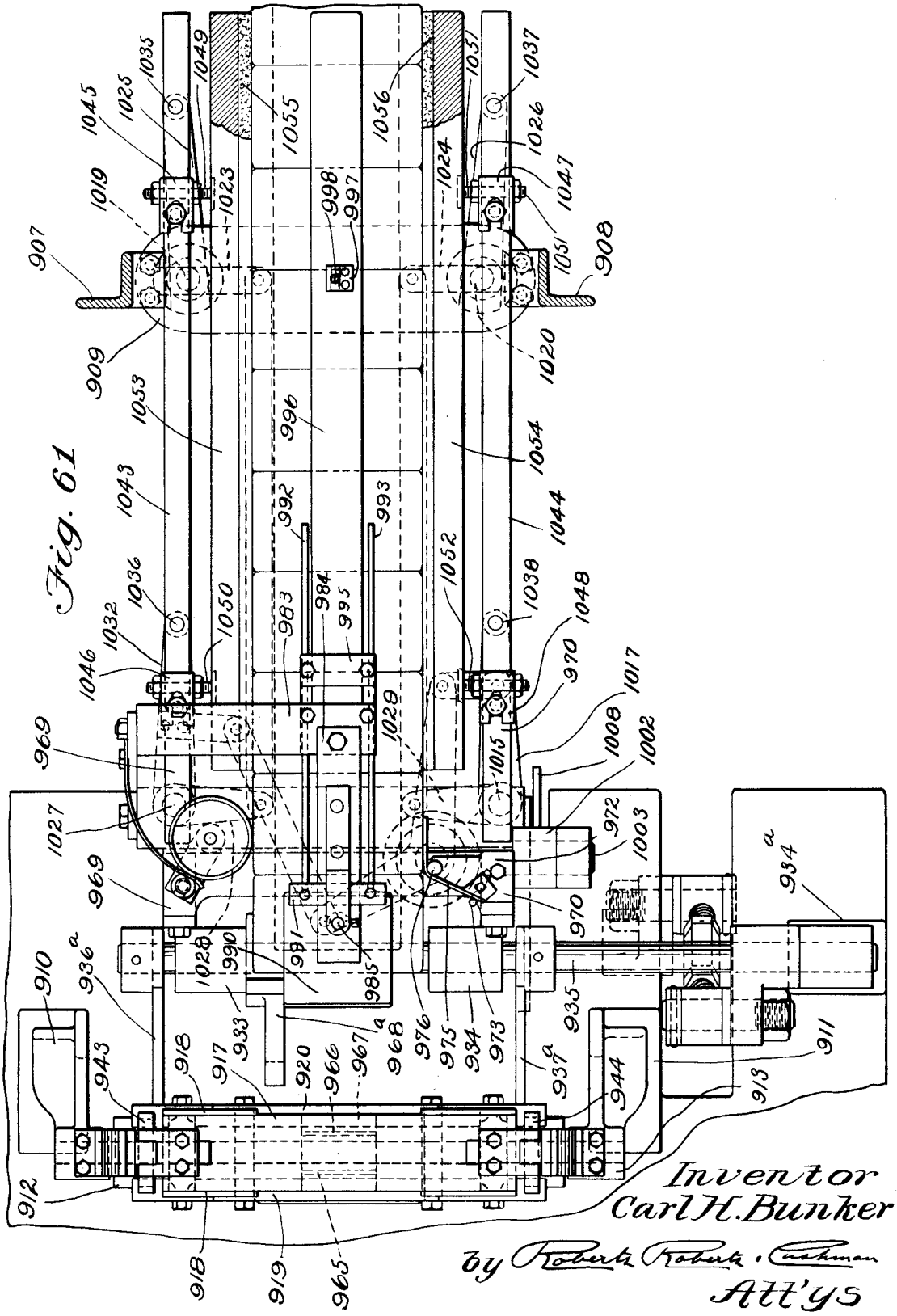


Fig. 61

Inventor
Carl H. Bunker
by Roberts Roberts & Cushman
Att'ys

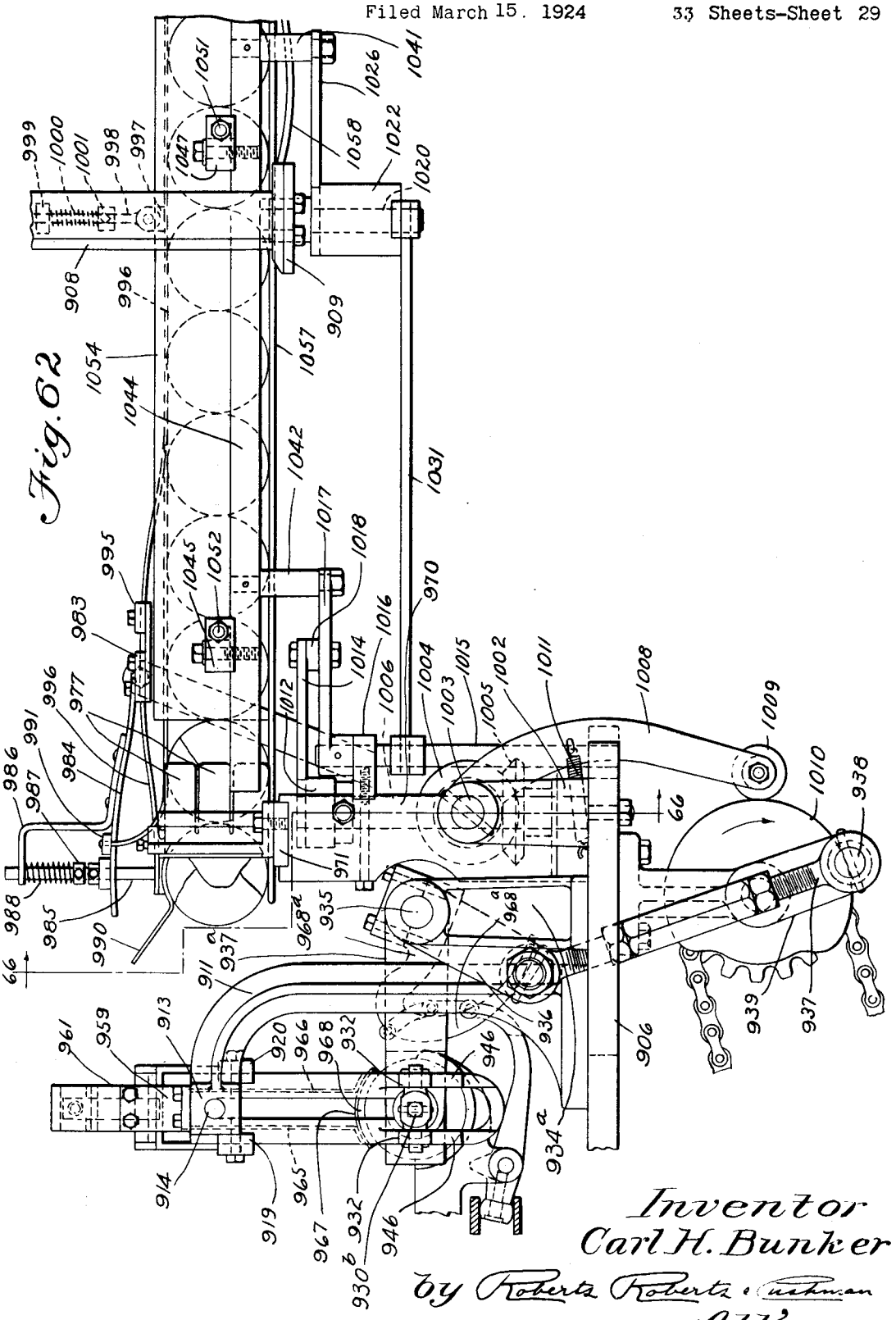
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Fig. 62



Inventor
Carl H. Bunker
by Roberts Roberts & Cushman
Att'ys

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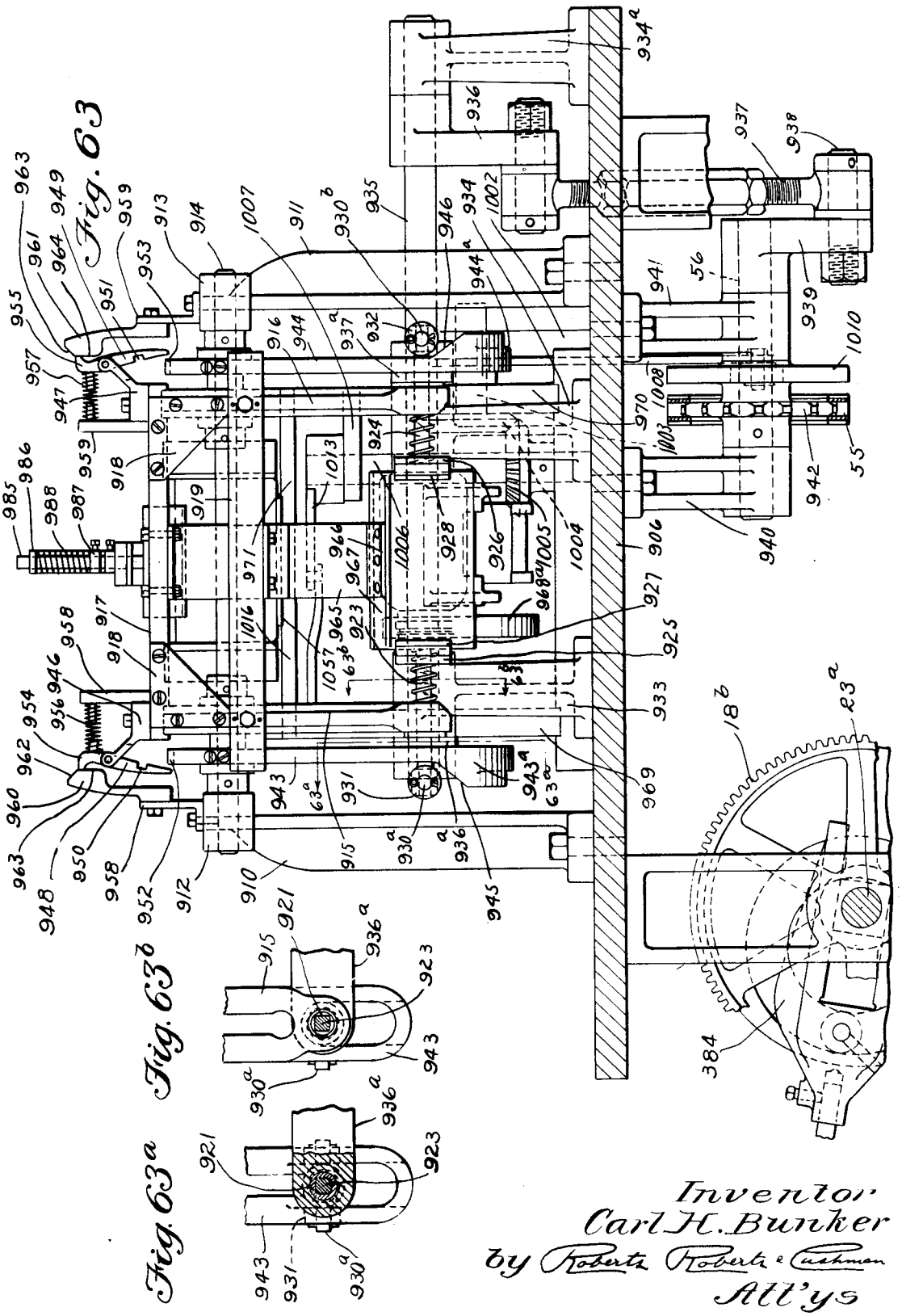


Fig. 63

Fig. 63b

Fig. 63a

Inventor:
Carl H. Bunker
by Roberts Roberts & Cushman
Att'ys

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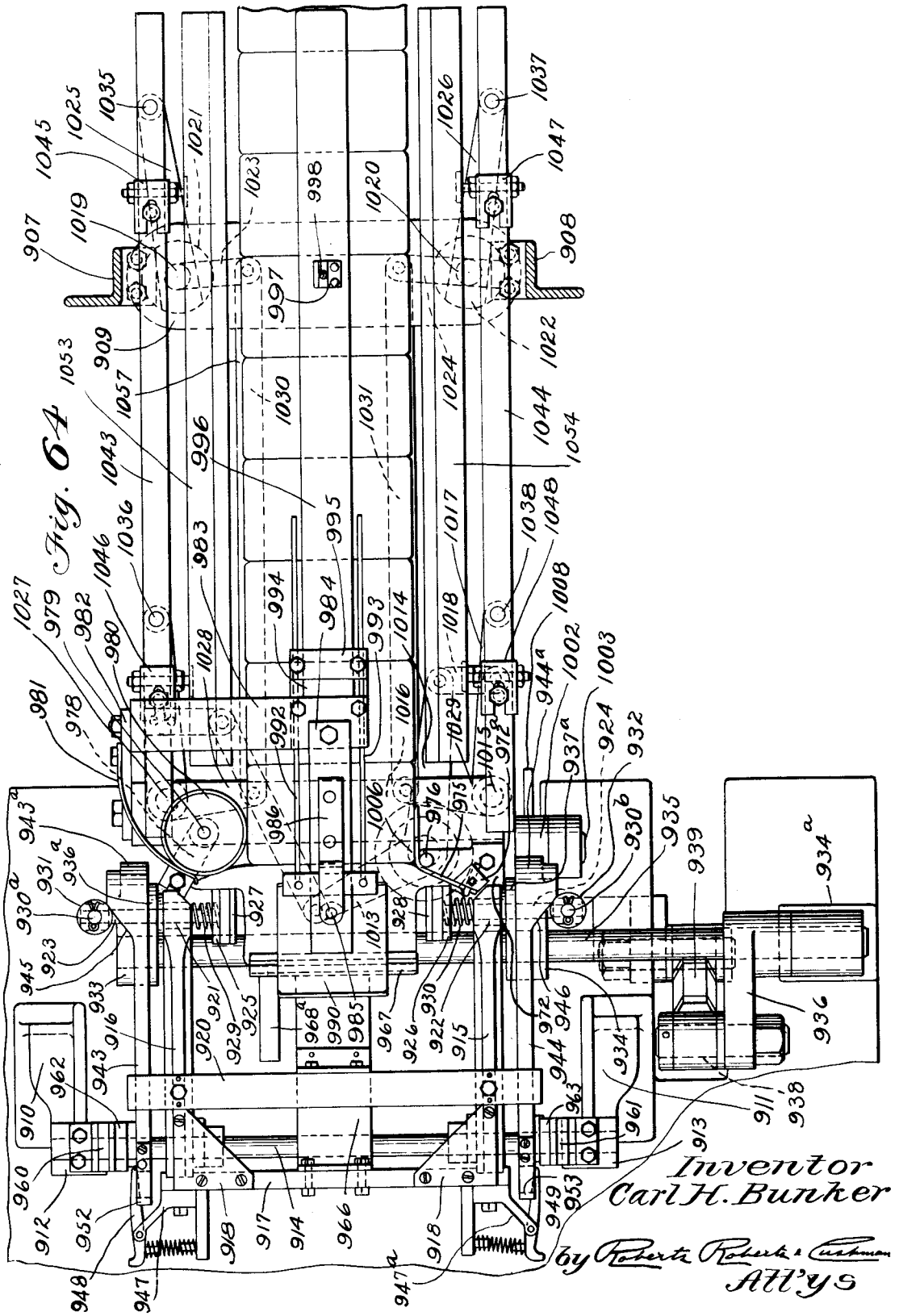


Fig. 64

Inventor
Carl H. Bunker
by Roberts Roberts & Cushman
Att'ys

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C. H. BUNKER

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Fig. 66

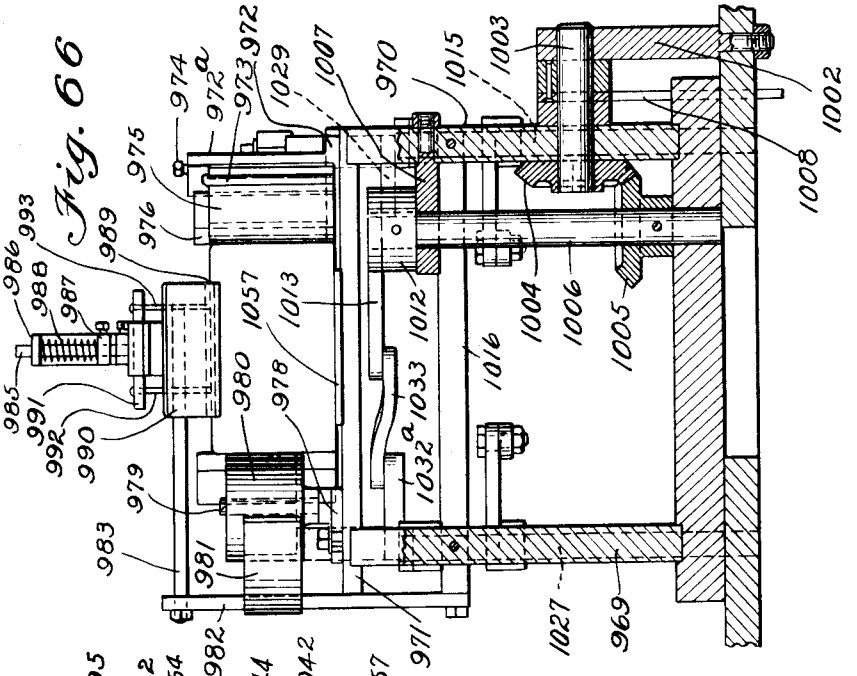
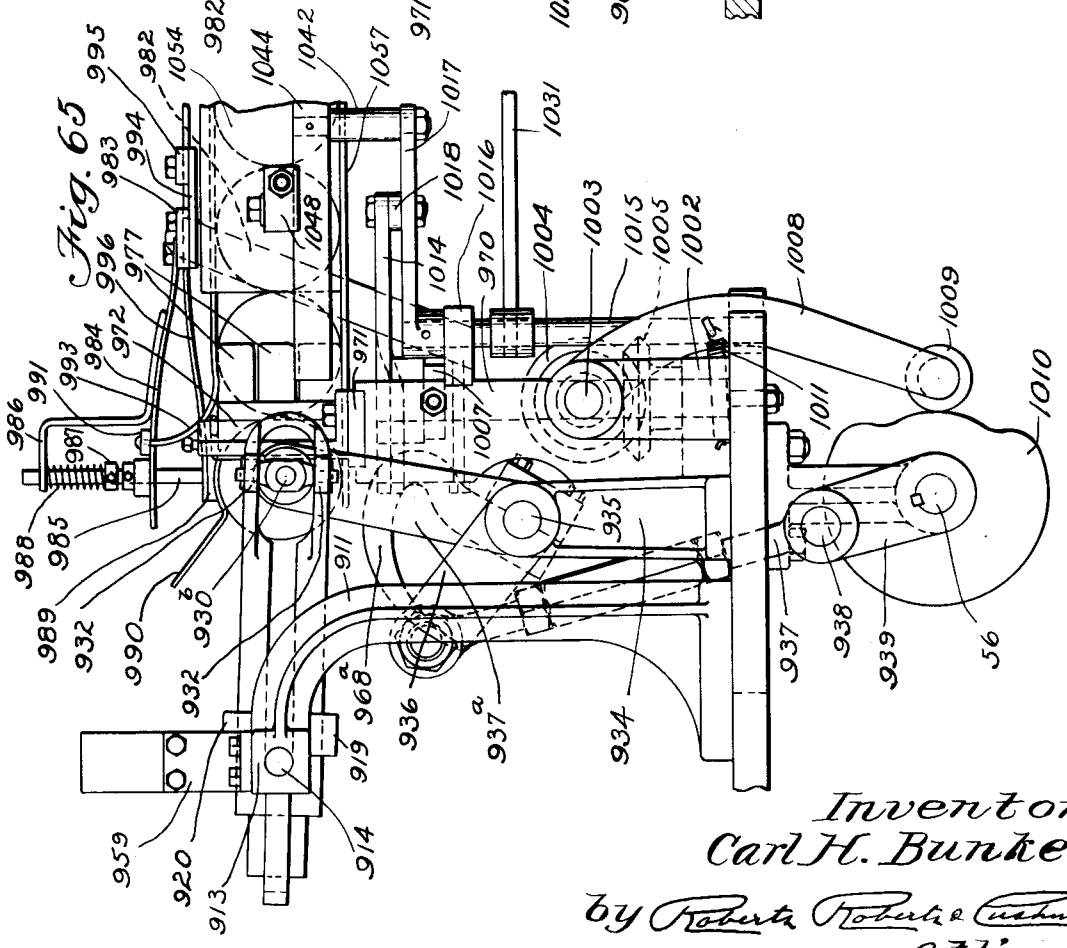


Fig. 65



Inventor
Carl H. Bunker
by Roberts Roberts & Cushman
Att'ys

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Fig. 68

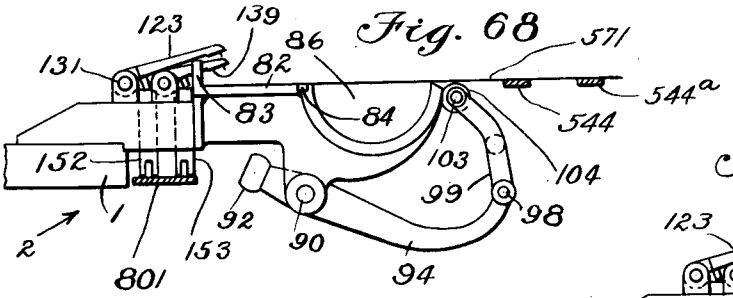


Fig. 69

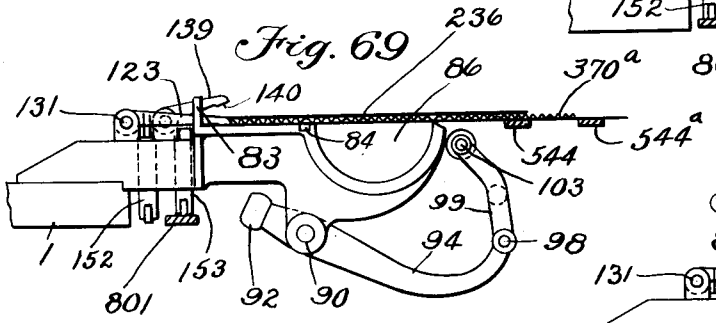


Fig. 70

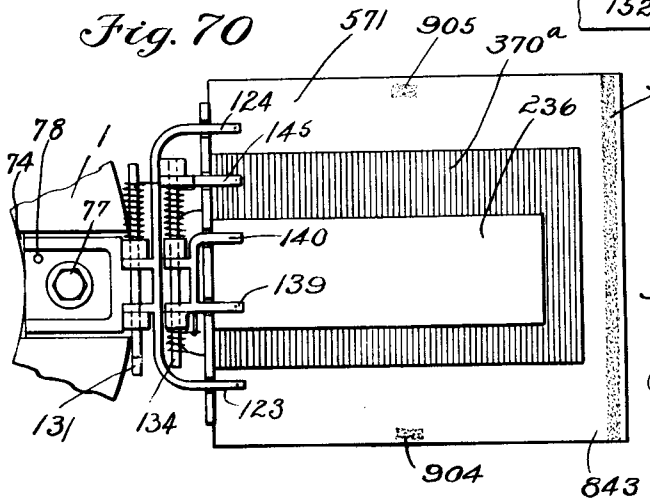


Fig. 71

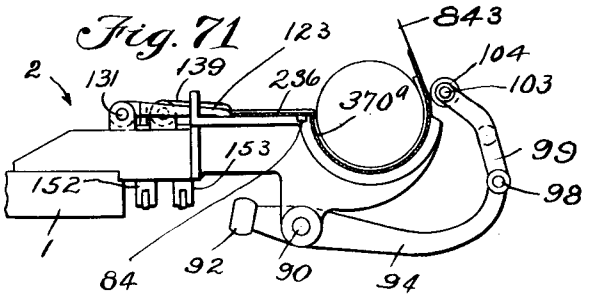


Fig. 72

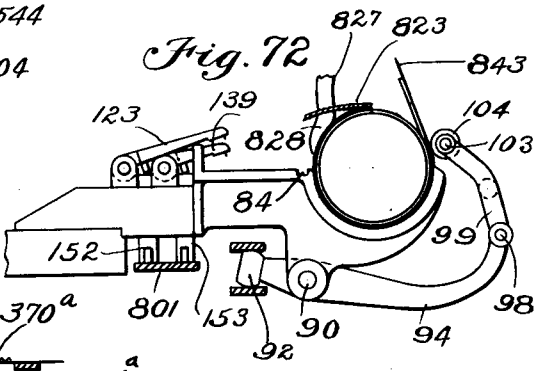


Fig. 73

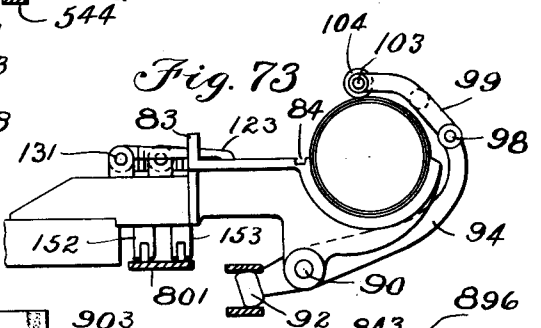


Fig. 74

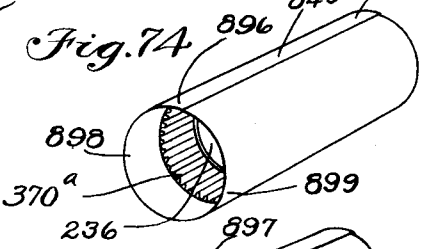


Fig. 75

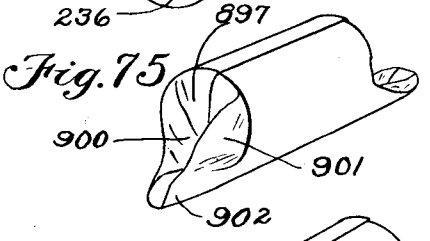
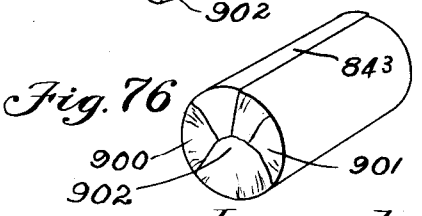


Fig. 76



Inventor

Carl H. Bunker

by Roberts Roberts & Cushman

Att'ys

Patented May 10, 1927. 1,628,111

UNITED STATES PATENT OFFICE.

CARL H. BUNKER, OF ARLINGTON, MASSACHUSETTS, ASSIGNOR TO MELLINS FOOD COMPANY OF NORTH AMERICA, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WRAPPING MACHINE.

Application filed March 15, 1924. Serial No. 699,547.

This invention pertains to package wrapping machines, its principal object being to provide a machine for rapidly and automatically wrapping generally cylindrical articles, for example bottles, using sheet wrapping material in contradistinction to the preformed boxes or cartons frequently employed.

More specifically stated, the object of the invention is to provide automatic means capable of completely enveloping such a cylindrical article in a wrapper comprising an outer sheet of tough paper or other suitable material and an inner layer of corrugated board or similar cushioning substance, and, if desired, with the inclusion, preferably between the corrugated board and article, of other wrapping material, for example a printed circular, card, or other advertising or informative material, the several wrappings being wound cylindrically about the article and the outer wrapping being folded in at its ends and secured by means of adhesive at its ends and along its side seam, the completed package being substantially cylindrical in form and having an appearance similar to that of packages wrapped by hand.

Briefly stated the invention consists in the provision of a substantially horizontal rotary table which is intermittently turned step by step by appropriate means and which has a series of article supporting cradles mounted in spaced relation about its peripheral portion. Surrounding the table is a plurality of mechanisms actuating in timed relation to the movements of the table and which operate successively with respect to any selected cradle of the series in performing respectively the several steps included in the wrapping operation. The functions of the several mechanisms may be stated in general terms as follows, the specific details being more fully set forth hereinafter.

The first mechanism in the order of operation feeds the outer sheet of wrapping paper to the empty cradle, the latter being provided with gripping means for holding the sheet in proper position. The cradle with this outer wrapper is then moved to the next mechanism which places a piece of corrugated board upon the central part of the outer wrapper. If desired this mechanism also places an advertising circular card or similar material on top of the corrugated board, the board and circular also being clamped to the cradle. The cradle is then moved to a point adjacent to the next mechanism which applies glue or other adhesive to the upper face of the outer wrapper at points adjacent to its lateral edges and also along its outer end.

The next mechanism in order forces a bottle or other article to be wrapped down into the cradle upon the circular, corrugated board and outer wrapper, and initiates the winding of the several wrappings cylindrically about the bottle. The next mechanism completes the cylindrical wrapping and smooths down the side seam, while the following mechanism in order initiates folding of the ends of the outer wrapper.

The next mechanism removes the wrapped bottle from the cradle, completes the folding of the ends of the outer wrapper and subjects the folded ends to pressure while the adhesive sets and while conveying the package to the delivery point.

In the accompanying drawings a preferred embodiment of the invention is illustrated by way of example.

Fig. 1 is a diagrammatic plan view illustrating the entire machine;

Fig. 2 is a horizontal section taken below the work supporting table and showing the principal parts of the main drive mechanism; certain parts being omitted;

Fig. 2^a is a horizontal section immediately below the machine table, showing parts omitted from Fig. 2;

Fig. 2^b is a fragmentary elevation to larger scale, from the left hand side of Fig. 2^a;

Fig. 3 is a fragmentary diametral vertical section through the rotary table and the drive mechanism therefor, showing one of the work supporting cradles in vertical section;

Fig. 4 is a fragmentary horizontal section substantially on the line 4—4 of Fig. 3 showing details of the table driving mechanism, the parts being positioned for locking the table during the interval between successive movements thereof;

Fig. 5 is a fragmentary section similar to

Fig. 4 showing the position of the drive parts while turning the table;

Fig. 6 is a fragmentary plan view of the rotary table showing one of the work supporting cradles carried thereby;

Fig. 7 is a side elevation of the work supporting cradle of Fig. 6, a portion of the table being shown in vertical section;

Fig. 8 is an enlarged vertical section substantially on the line 8—8 of Fig. 6 showing one of the wrapper clamping arms in operative position;

Fig. 9 is a view similar to Fig. 8 but showing the arm lifted to permit introduction or withdrawal of the wrapper;

Fig. 10 is a diagrammatic plan view showing the rotary table and certain cam tracks associated therewith;

Fig. 11 is a plan view of the mechanism for feeding the outer wrapper, also showing a portion of the rotary table and a work supporting cradle carried thereby;

Fig. 12 is a fragmentary side elevation of the mechanism shown at the central part of Fig. 11;

Fig. 13 is a plan view of the mechanism for feeding the inner wrapping material;

Fig. 14 is a side elevation of the mechanism shown in Fig. 13;

Fig. 14[a] is a fragmentary side elevation to larger scale of the parts shown at the upper left hand side of Fig. 14;

Fig. 15 is a rear end elevation of the mechanism shown in Fig. 13;

Fig. 16 is a transverse cross section substantially on the line 16—16 of Fig. 13 but to larger scale;

Fig. 17 is a fragmentary section similar to Fig. 16 but showing the parts in a different position;

Fig. 18 is a fragmentary longitudinal vertical section through the central part of the structure shown in Fig. 13 illustrating the means for picking off successive wrapper sheets from the magazine;

Fig. 18[a] is a fragmentary detail in elevation of parts shown in section in Fig. 18;

Fig. 19 is a diagrammatic side elevation illustrating the drive mechanism for the feeding devices shown in Fig. 13;

Fig. 20 is an elevation from the opposite side from that of Fig. 19 showing details of the drive mechanism for the inner wrapper feed together with certain associated parts;

Fig. 21 is a rear end elevation of the mechanism for applying adhesive to the wrapper;

Fig. 22 is a plan view of such mechanism;

Fig. 23 is a side elevation of the adhesive applying mechanism, certain parts being omitted;

Fig. 24 is a vertical diametral section through one of the supporting posts upon which the adhesive containers for the movable applicators are mounted;

Fig. 25 is a plan view of the device shown in Fig. 24, the adhesive receptacle being omitted;

Fig. 26 is a horizontal section on the line 26—26 of Fig. 24;

Fig. 27 is a horizontal section on the line 27—27 of Fig. 24;

Fig. 28 is a horizontal section on the line 28—28 of Fig. 24;

Fig. 29 is a horizontal section on the line 29—29 of Fig. 24;

Fig. 30 is a fragmentary perspective view illustrating portions of a stop mechanism employed for stopping the operation of one of the applicators in the absence of a wrapper from the wrapper support;

Fig. 31 is a view similar to Fig. 30 but showing the parts as occupying another position;

Fig. 32 is a plan view to larger scale corresponding to Fig. 30, certain parts being omitted;

Fig. 33 is a plan view corresponding to Fig. 31 also omitting certain parts;

Fig. 34 is a vertical diametral section through one of the adhesive containers and its tubular arm showing one of the applicators mounted upon the lower end of the arm;

Fig. 35 is a side elevation of the applicator roll together with the receptacle in which it is journalled, the means for driving it, and a portion of the lower end of its supporting arm;

Fig. 36 is an elevation from the left-hand side of Fig. 35;

Fig. 37 is a vertical section on the line 37—37 of Fig. 35;

Fig. 38 is a fragmentary vertical section substantially on the line 38—38 of Fig. 36;

Fig. 39 is a horizontal section to larger scale substantially on the line 39—39 of Fig. 24;

Fig. 40 is a fragmentary elevation of the device shown in Fig. 39 looking substantially in the direction of the arrow A;

Fig. 41 is a view similar to Fig. 40 but showing certain parts in a different position;

Fig. 42 is a fragmentary vertical section substantially on the line 42—42 of Fig. 22;

Fig. 43 is a view similar to Fig. 42 but showing the applicator as differently positioned;

Fig. 44 is a view similar to Fig. 43 but showing the wrapper support moved out of normal operative position;

Figs. 45 and 46 are side elevations illustrating the mechanism for operating the feed roll shown in Figs. 42 and 44 inclusive;

Figs. 47 and 48 are vertical sections partly in elevation showing the wrapper clamping device co-operating with the adhesive applying mechanism, the clamping device

being shown in inoperative and operative position in the respective figures;

Fig. 49 is an elevation showing the inner end of the bottle feeding mechanism;

Fig. 50 is a fragmentary side elevation from the left-hand side of Fig. 49 showing the bottle feeding mechanism together with associated parts of the machine;

Fig. 51 is a fragmentary plan view of one of the bottle supporting brackets of the feed chain;

Fig. 52 is a vertical section substantially on the line 52—52 of Fig. 49;

Fig. 53 is a fragmentary section on the line 53—53 of Fig. 52;

Fig. 54 is a vertical section substantially on the line 54—54 of Fig. 49 showing portions of the bottle cushioning device;

Fig. 55 is a side elevation of the mechanism for winding the wrapper circumferentially about the bottle, showing the parts at the initiation of the wrapping operation;

Fig. 56 is a side elevation of the same parts shown in Fig. 55 but at the completion of the wrapping operation;

Fig. 57 is a vertical section through the article supporting cradle illustrating the means for initially turning the wrapper up about the article prior to the operation of the other wrapping elements shown in Figs. 55 and 56;

Fig. 58 is a plan view of the mechanism for folding in the ends of the wrapper;

Fig. 59 is a side elevation of the mechanism shown in Fig. 58, the parts being in their normal inoperative position;

Fig. 60 is a side elevation similar to Fig. 59 but showing the parts as positioned at the end of the folding operation;

Fig. 61 is a plan view of the mechanism for completing the end folding and for delivering the wrapped article;

Fig. 62 is a side elevation of the parts shown in Fig. 61;

Fig. 63 is an end elevation partly in section of the structure shown in Fig. 61 looking from the inner end of the same;

Figs. 63^a and 63^b are fragmentary sections to larger scale substantially on the lines 63^a—63^a and 63^b—63^b respectively of Fig. 63;

Fig. 64 is a plan view similar to Fig. 61 but showing the parts as occupying another position;

Fig. 65 is a fragmentary side elevation corresponding to Fig. 64 showing the parts in the position of said latter figure;

Fig. 66 is a fragmentary vertical section substantially on the line 66 of Fig. 62;

Fig. 67 is a perspective view showing the actuating mechanism for the movable sides of the delivery chute;

Fig. 68 is a fragmentary diagrammatic view showing one of the work supporting cradles in position for receiving the outer wrapper;

Fig. 69 is a similar view showing the outer and inner wrappers mounted upon the supporting cradle;

Fig. 70 is a plan view of the parts shown in Fig. 69;

Fig. 71 is a view similar to Fig. 69 but showing a bottle positioned within the trough-like depression in the cradle and showing the wiper carried by the cradle as occupying its first operative position;

Fig. 72 is a view similar to Fig. 71 showing a further step in the process at which the wipers of Figs. 55 and 56 have been operatively positioned;

Fig. 73 is a view similar to Fig. 72 but showing the completion of the circumferential wrapping, the wiper carried by the cradle occupying its final position;

Fig. 74 is a perspective view showing the appearance of the wrapped article at the completion of the circumferential wrapping operation;

Fig. 75 is a perspective view showing the same article with the ends of the wrapper partially folded in at the completion of the operation of the mechanism shown in Figs. 58 to 60 inclusive; and

Fig. 76 is a perspective view showing the wrapped article as delivered from the delivery chute.

Principal parts and general operation.— The entire machine is shown diagrammatically in Fig. 1 wherein the numeral 1 designates a horizontal rotary table provided with a series of combined wrapper and article supports 2 hereinafter termed "cradles" arranged adjacent to its peripheral edge. The successive steps involved in wrapping the article are performed by appropriate mechanisms disposed in convenient juxtaposition to the edge of the table and before which the cradles are successively stopped while the corresponding step in the operation is performed.

These operating mechanisms are designated in the order of their action in wrapping any selected article by the numerals 3, 4, 5, 6, 7, 8, and 9 respectively (Fig. 1) and suitable drive means hereinafter described is provided for turning the table intermittently to move the cradles from one mechanism to the other and to hold each cradle stationary opposite to each mechanism for the requisite interval. To assist in a proper understanding of the purpose and mode of the action of the parts hereinafter described, the general operation of the machine may be stated briefly as follows.

Beginning with the empty crable 2^a which has just been positioned opposite to the outer wrapper feed mechanism 3, the outer wrapper is automatically fed by said feed mechanism onto the crable where the wrapper is secured by appropriate means hereinafter described. The table now moves to bring

the cradle 2^a opposite to the inner wrapper feed mechanism 4 where suitable inner wrapping material such for example as corrugated board, a printed circular or both is laid upon the outer wrapper and retained in position by suitable clamping means. The table then turns to bring the cradle 2^a opposite to the adhesive applying mechanism 5 where adhesive is applied to the outer wrapper at points adjacent to its lateral margins and also along its outer end margin. The table then turns to bring the cradle 2^a opposite to the article feed mechanism 6 where the article, for example a bottle, is deposited upon the wrapper. The cradle 2^a moves on to the cylindrical wrapping mechanism 7 where the wrapper is wound about the periphery of the article resting upon the cradle. The cradle then moves to the primary end folding mechanism 8 where the ends of the outer wrapper are partially folded and then to the final end folder and delivery mechanism 9 where the partially wrapped article is removed from the cradle, the folding of the ends of the outer wrapper is completed, and the wrapped article is moved along while under restraint until the adhesive has set sufficiently to secure the wrapper in place.

Main drive mechanism (Figs. 2, 2^a, 2^b, 14, 20 and 50).—The machine comprises a main base 10 provided with upstanding posts 11, 12, 13, and 14 respectively which support a stationary table 15 at a convenient height. The base is also furnished with a pair of upstanding brackets 16 and 17 provided with bearings for the main drive shaft 18. This shaft is provided with a pulley 19 over which a belt 20 passes. This belt may receive its motion from any convenient source of power, as for example an electric motor. Shaft 18 is furnished with a pinion 21 which meshes with a gear 22 upon a secondary drive shaft 23 mounted to turn in bearings in the uprights 13 and 14 respectively. The pinion 18^a is secured to the shaft 23 and this pinion meshes with a gear 18^b secured to a shaft 23^a also journalled to turn in bearings in the uprights 13 and 14, the shaft 23^a being directly above the shaft 23.

The lower end of a vertical shaft 25 turns in a step bearing 26 carried by the base 10. The upper end of the shaft turns in a flanged bearing sleeve 27 (Fig. 3) secured by bolts 28 in an opening in the stationary table 15. The rotary table 1 is secured to the upper end of the shaft 25 where the latter projects above the bearing sleeve 27.

A shaft 29 arranged substantially at right angles to the shaft 23^a is supported in suitable bearings, one of which is provided in a bracket 30 depending from the lower side of the stationary table 15. This shaft is furnished at one end with a beveled pinion 31 meshing with a beveled pinion 32 fixed on the shaft 23^a and is also provided with a beveled pinion 33 which, by means of a Geneva drive, turns the shaft 25 intermittently. This Geneva mechanism (Figs. 3, 4 and 5) comprises the wheel 34 having the hub 35 secured to the shaft 25 just below the lower end of the bearing sleeve 27. The wheel 34 comprises the upper web portion 36 and the peripheral flange 37, the latter being suitably shaped to provide arcuate indentations 37^a and the interposed elongate indentations 38. In the wheel shown there are eight of the arcuate indentations spaced equally about the periphery of the wheel and a like number of indentations 38.

A vertical stub 39 is secured to the stationary table 15 by means of a pin 40 and a locking nut 41. This shaft is arranged parallel to the shaft 25 at a distance from the latter substantially equal to the outer diameter of the wheel 34. A locking sector 42 is journalled upon the shaft 39. This sector is furnished with a radial arm 43 having an anti-friction roller 44 mounted at its extremity. A beveled gear 45 is mounted upon the lower end of the shaft 39 and is fixedly secured to the sector 42 in any desired manner as for example by screw-threaded engagement therewith. A collar 46 retains the gear 45 and the sector 42 in operative position upon the shaft. The beveled gear 45 meshes with the gear 33 above described and is constantly driven thereby.

The sector 42 comprises the arcuate portion 49 which cooperates with the several arcuate recesses 37^a in the wheel 34 for temporarily locking the wheel, and the recess 48 which is of a suitable width to receive the opposed horns or corners 50 of the flange 37 which define the entrances to the several elongate recesses 38. The parts thus described cooperate in the usual manner of a Geneva mechanism intermittently to lock the wheel 34 in fixed position and then to impart a partial rotation to the wheel with subsequent locking in its new position. With the arrangement described the shaft 25 is turned forwardly eight times and is held stationary during eight intervening periods for each complete revolution.

A beveled gear 51 is also mounted upon the shaft 29 and meshes with a beveled gear 52 secured to a shaft 53 journalled in the uprights 11 and 12 respectively. Upon this shaft are mounted certain cams and other devices for actuating parts of the cylindrical folder 7 and the end folder 8, as well as elements of the bottle feed and certain other devices hereinafter described.

The shaft 29 also carries a sprocket wheel 54 actuating a sprocket chain 55 trained about a sprocket wheel upon a shaft 56 mounted in suitable bearings and which drives the mechanism of the final end folding and delivery appliances. The shaft 29 also carries

the sprocket wheel 57 which, through a chain 58, drives the shaft 59 which also actuates certain parts of the bottle feed mechanism.

A beveled gear 60 is mounted upon the shaft 23ª and meshes with a beveled gear 61 upon a shaft 62 turning in bearings carried by bracket 63 depending from the table 15. This shaft actuates certain parts hereinafter described associated with the adhesive applying mechanism and also certain elements of the inner wrapper feed.

Another beveled pinion 64 on the shaft 23ª meshes with a beveled pinion 65 upon a shaft journalled in a bracket 66 depending from the table 15 and carrying a gear 67 which through a suitable train of mechanism actuates the outer wrapper feed apparatus.

Upon the secondary drive shaft 23 is mounted a pinion 68 which meshes with a gear 69 carried by a shaft 70 mounted in brackets 71 and 72 respectively supported by the uprights 13 and 14. The gear 69 is the primary driving element of a train of gears which actuates the principal parts of the inner wrapper feed mechanism.

Wrapper and article supporting cradle (Fig. 6, 7, 8 and 9).—The rotary table 1 is provided with circumferentially spaced recesses 74 in its upper surface near its edge for positioning the wrapper and article supporting cradles.

Each cradle comprises a base member 75 having an inwardly extending flange 76 which fits within one of the recesses 74 of the table and which is furnished with an opening for the reception of a bolt 77 by means of which the cradle is secured to the table. To prevent lateral play of the cradle relatively to the table a pin 78 is provided which passes down through the member 76 into an opening in the table.

The base 75 projects outwardly beyond the end of the table and its outer end is defined by an elongate flange 79 which extends laterally beyond the sides of the base and substantially tangent to the table. A bracket comprising substantially parallel flanges 80 and 81 projects from the outer surface of the flange 79. This bracket also comprises the substantially horizontal platform 82 supported on the upper edges of the flanges 80 and 81. This platform constitutes the fixed jaw of a wrapper clamping device hereinafter described. The inner edge of the platform 82 is defined by an upwardly projecting stop flange 83 while its outer edge is provided with a groove 84 extending substantially parallel to the flange 83. If desired, this groove may be arcuate and concentric with the axis of the table, but for convenience in manufacture, it is ordinarily made as here shown.

Beyond the groove 84 the bracket comprises a part 85 having a downwardly concave face forming a substantially semi-circular trough-like cavity 86 for the reception of the article to be wrapped. If desired a pair of buffer members 87 may be provided of friction material, for example rubber, for compelling the article deposited in the cavity 86 to partake of the movement of the cradle as the latter starts to rotate. These buffers are in the form of pins seated in suitable pockets in the surface 85 from which they project to a predetermined distance.

Each flange 80 and 81 is provided with a downwardly directed ear, said ears having aligned openings for the reception of a shaft 90 which is held against rotation in any desired manner. Upon this shaft is mounted an infolder frame comprising the inwardly extending arm 91 having a cam follower roll 92 at its extremity, such roll being mounted on a shouldered pin 93 secured in an opening in the end of the arm. The infolder frame also comprises a pair of substantially parallel outwardly extending arms 94, 95 provided at their outer extremities with bearings 96 and 97 respectively in which a shaft 98 is mounted. Upon this shaft, which forms the outer end of the main portion of the infolder frame, a secondary or outer member of such frame is pivotally mounted. This outer frame member comprises a pair of substantially parallel arms 99 and 100 connected along a part of their length by a transverse web 101.

The arms 99 and 100 are pivotally mounted upon the shaft 98 and at their outer or free ends are furnished with bearings for the shaft 103 upon which a wiper roll 104 is mounted to turn freely. This roll is substantially equal in length to the length of the trough-like cavity 86 and constitutes a wiper element for wiping in the end of the wrapper as will be described hereinafter. Preferably the shaft 103 extends beyond the arm 100 and supports an auxiliary wiper roll 105 which is retained on the shaft by means of a collar 106 and cotter pin 107. This auxiliary roll may be of the same diameter as roll 104 or of a different diameter if circumstances should make this desirable.

At a point intermediate the length of the arm 100 a pin 108 is secured thereto, projecting laterally from the side of the arm, and on this pin there is preferably mounted an anti-friction cam roll 109. A coiled spring 102 encircles the shaft 98, having one of its ends bearing against the outer or secondary frame member and the other end bearing against the main portion of the infolder frame. This spring tends to swing the outer portion of the frame inwardly against the main portion thereof. The main portion of the frame is furnished with a stop lug 110 which engages an adjustable stop pin 111 having threaded engagement with a lug 112 projecting downwardly from the lower face of the concave member 85. The latter may be

furnished with an opening 113, if desired, to give ready access to the stop pin 111 to permit adjustment thereof.

The length of the main and outer portions of the infolder frame and the strength of the spring 102 are such that when the lug 110 engages the end of the stop pin 111 the wiper roll 104 contacts with the outer surface of the concave member 85 at a point adjacent to the outer edge 114 thereof. The parts as thus positioned are in stable equilibrium and will remain in this position until positively moved therefrom.

Spaced lugs 115 and 116, project upwardly from the base 75 and are furnished with aligned openings for the reception of a shaft 117. Upon this shaft is mounted a clamping frame 118 comprising the inwardly extending arms 119 and 120 pivotally mounted upon the shaft 117 between the lugs 115 and 116. This frame also comprises the oppositely extending arms 121 and 122, which are turned outwardly near the outer extremities of the platform 82 to provide the parallel fingers 123 and 124 respectively. The upwardly extending flange 83 is provided with guide notches 125 and 126 respectively for guiding the members 123 and 124 as the frame 118 swings about its pivot shaft 117. Near their outer extremities the members 123 and 124 are furnished with downwardly projecting pointed pins 127 and 128 respectively. Directly below these pins the platform 82 is provided with openings into which the pins project when the frame is in clamping position.

The shaft 117 projects beyond the bearing 116 and a coil spring 129 encircles this projecting portion of the shaft. One end 130 of the spring engages the upper face of the arm 122 while the other end of the spring passes through an opening in the shaft. The shaft is preferably squared at one end as shown at 131 to receive a wrench by which it can be turned to vary the tension of the spring and it may be secured in position by means of a set screw 132.

Spaced lugs 133 project up from the base member 75 and these lugs are furnished with openings in which is journalled a shaft 134 substantially parallel to the shaft 117. An inner clamping frame 135 is mounted upon the shaft 134. This inner frame comprises the inwardly directed arms 136 and 137 having openings through which the shaft 134 passes and one at least of these arms is furnished with a pin 138 by which it is secured to the shaft. The inner frame also comprises the outwardly extending fingers 139 and 140 which also pass through guiding notches in the flange 83. At their outer ends these fingers are also furnished with penetrating pins or points 140 and 141 respectively, the platform being provided with openings immediately beneath these points for receiving them when the frame is in clamping position.

The shaft 134 projects beyond the lug 133 and the projecting portion thereof is encircled by a coiled spring 142 whose end 143 is secured to a convenient part of the base 75 and whose opposite end bears upon a pin 144 projecting laterally from the inner frame 135. The tendency of this spring is thus to swing the inner frame in a clockwise direction to cause the arms 139, 140 to engage the upper surface of the platform 82.

The other end of the shaft 134 projects beyond the bearing 133 and has an arm 145 loosely mounted upon it. This arm projects outwardly through the guide notch in the flange 83 and is furnished with a pointed pin 146, the platform being provided with a corresponding opening for receiving the pin. The arm 145 is retained in position upon the shaft by means of a collar 147 secured to the end of the shaft and having a pin 148 which projects laterally into an opening 149 in the arm 145 (Figs. 8 and 9). The opening 149 is somewhat larger in diameter than the pin 148 so that a certain degree of lost motion is provided between the pin and the arm. A coiled spring 150 encircles the shaft 134 between the lug 133 and the arm 145. One end of this spring is secured to the lug and the opposite end 151 bears on the upper edge of the arm, the tendency of the spring being to swing the arm downwardly into contact with the platform 82.

The base member 75 is provided with a pair of spaced vertical guide openings in which square bars 152 and 153 respectively are arranged to slide. These bars are prevented from dropping from their guide openings by pins 154 and 155 respectively, extending transversely through their upper ends. The upper ends of the bars are disposed immediately below downwardly projecting lugs 156 and 157 carried by the clamping frames 118 and 135 respectively. At their lower ends the bars 152 and 153 are furnished with cam engaging rollers 158 and 159 respectively.

Without describing in detail the operation of these parts which will appear hereinafter it is sufficient to state that upward movement of the bars 152 and 153 will swing the clamping frames 118 and 135 upwardly and away from the platform 82 sufficiently to permit a wrapper to be placed upon the platform or to be removed therefrom as the case may be, the flange 83 constituting a stop for the edge of said wrapper or wrapping material and the pins carried by the movable clamping arms of the respective frames acting to retain the wrapping material in proper position on the platform during subsequent movement of the latter.

Outer wrapper feeding mechanism (Figs. 1, 2, 11 and 12).—The mechanism 9 for feeding the outer wrappers to the cradles 2 com-

prises a paper feeder 160 of any desired and usual construction such for example as the feeder known in the trade as the "Dexter" feeder. As this feeder forms no part of the present invention it need not be described nor illustrated in detail, such feeder consisting briefly of a reciprocating table 161 having suitably spaced guides between which a stack of outer wrappers is piled. At the forward edge of the reciprocating table a rock shaft 162 is journalled in suitable bearings. This shaft has a pinion 163 at one end which is actuated by a rack bar 164 moving with the table. The shaft 162 carries a hollow roller 165 which communicates by means of an axial passage in the shaft with a tube 166 leading to a suction pump or other suitable source of reduced pressure. The peripheral surface of the roller 165 is furnished with inlet openings 167 through which air is sucked either continuously or intermittently in accordance with the nature of the low-pressure producing devices employed. The surface of the roller 165 is also furnished with a plurality of shallow grooves for belts 168. In the present instance four such belts are employed. These belts are suitably guided at their outer or rear ends, and their upper runs, after engaging the roller 165, pass downwardly below a roller 169 turning in suitable bearings substantially parallel to the roller 165. In the operation of this portion of the device the reciprocating table carries the lowermost wrapper of the pile into contact with the peripheral surface of the roller 165. The suction produced at the openings 167 causes such lowermost wrapper to adhere to the roller which thus picks the lowermost wrapper from the pile and carries it forwardly and between the roller 169 and the belts 168. The wrapper is thus positively gripped and fed forwardly beneath the roller 169 and onto the upper surfaces of the belts 168 which in the present instance also constitute elements of a transferring mechanism arranged intermediate the feeder 160 and the wrapper receiving position of the cradle.

This transfer mechanism comprises a support or table 170 which is arranged substantially radially with respect to the rotary table 1 and opposite to the wrapper receiving position of the cradles 2. This table or support 170 has an upper surface 170^a and is supported upon suitable uprights 171. The upper surface 170^a of the table or support is continued beyond the support proper by means of a plate 172 bolted or otherwise secured to the support 170.

The upper surface 170^a of the support as well as a portion of the plate 172 is furnished with longitudinal openings or slots through which the upper runs of the forwardly extending portions of the belts 168 are exposed. These upper runs of the belts 168 lie substantially in the plane of the upper surface of the table member 170^a and at their forward ends the belts pass around a roller or rollers 174 mounted upon a shaft 173 journalled in the support 170. The lower runs of the belts, after leaving the rollers 174, pass over a roller or rollers 175 mounted upon a shaft 175^a provided with a gear wheel which is constantly driven by means of a gear wheel 176 carried by a shaft 177. The latter shaft receives its motion through a suitable train of mechanism (not shown) from the gear 67 previously described, see Fig. 2.

After passing over the rollers 175 the belts pass beneath a tension roller 178 mounted upon a shaft 179 carried in spring-pressed bearings 180 sliding in guides in a block 181 secured to the support 170. The lower runs 168^a of the belts then pass rearwardly beneath the reciprocating table 160 and over a suitable guide or guides (not shown) and thence forwardly and back to the roller 165. The reciprocating table 161 is driven by means of a suitable train of connections (not shown) from the gear wheel 67.

Three supporting rods 182^a, 182^b, and 182^c are secured to the support 170 at points adjacent to the roll 169 and extend forwardly over the surface 170^a of the support and also over the extension member 172. These rods carry brackets 183 upon which lever arms 184 are pivotally mounted. Upon the ends of these arms pressure rolls 185 are journalled, such rolls bearing upon the upper surface of the outermost belts 168 and holding the wrappers firmly against the upper surfaces of the belts as the latter convey the wrappers toward the forward end 186 of the transfer mechanism.

The forward ends of the rods 182^a, 182^b, and 182^c are disposed closely adjacent to the upper surface of the table extension 172 and flattened as shown in 187 to press the wrappers into contact with the upper surface of the member 172. Preferably the flattened extremities of these rods are spaced from the upper surface of the table 172 a distance substantially equal to the thickness of the wrapper being fed. If desired the central rod 182^c is provided with a bracket 190 carrying brushes 188 having bristles 189 which engage the surface of the wrapper intermediate the flattening members 187 and prevent rebound of the wrapper as its advancing edge engages the abutment 83 of the cradle.

At the left hand side of the feeding mechanism near its delivery end 186 a scraper plate 191 is secured. This scraper plate is of substantially semi-circular contour and of a size to pass freely through the trough-like depression 86 in the cradle as the latter moves into wrapper receiving position. This scraper is for the purpose of removing any

material, for example an improperly wrapped bottle or portions of an incompleted wrapper, which inadvertently may have escaped the delivery mechanism and which if not removed at this time might interfere seriously with the operation of certain of the subsequent mechanisms or might cause breakage of the latter.

A pair of brackets 192 project upwardly from the support 170 and provide bearings for a transverse shaft 193. A pair of arms 194 are secured at their rear ends to collars carried by this shaft, such arms lying substantially above the innermost belts 168. At their forward ends the arms 194 are provided with yokes 195 furnishing bearings for presser rolls 196 adapted to bear upon the surfaces of the inner belts 168.

An arm 197 is secured to the end of the shaft 193 and is connected by means of a link 198 to an arm 199 secured to a shaft 200 journalled in bearings in the support 170.

Arms 201 are secured at their rear ends in openings in the shaft 200 and project forwardly to points adjacent to the rollers 196 respectively where they are turned upwardly to form stop fingers 202. These fingers are adapted to move upwardly through suitable openings formed in the extension plate 172, such openings being disposed immediately below the rods 182[a] and 182[b] respectively. These rods are provided with depressions or notches such as 203, Fig. 12, to receive the ends of the stop fingers 202 when the latter are elevated.

The shaft 200 is furnished with an arm 204 which extends downwardly and is provided with a cam engaging roll 205 at its lower extremity. This roll engages the peripheral surface of a cam 206 carried by a shaft 207 which receives its motion from the gear 67 through suitable connections (not shown) so that the cam 206 turns in timed relation to the movement of the table 1. This cam is furnished with a substantially concentric dwell portion 208 and a second concentric dwell portion 209 of a smaller diameter. The cam also includes the active portions 210 uniting the ends of the dwell portions.

The operation of the mechanism thus far described is briefly as follows.

As a cradle approaches its receiving position before the outer wrapper feeding mechanism its parts occupy substantially the position indicated in Fig. 7 with all of the clamping fingers engaging the platform 82 and with the wiper roll 104 engaging the outer surface of the end of the cradle. Before reaching its final position, the cradle swings over a vertically movable cam plate (Fig. 10) comprising the wide part 158[a] succeeded by the relatively narrow part 159[a]. This cam plate is moved vertically by mechanism hereinafter described. The part 158[a] is of such a width as to engage both rolls 158 and 159 and as the cam plate moves up the bars 152 and 153 are lifted, thereby swinging all of the clamping fingers away from the platform 82. The latter is thus left clear for the reception of the wrapping material.

The feeder 160 delivers the wrappers at a predetermined rate onto the upper surfaces of the transfer belts 168 which are constantly moving and which tend to carry the wrappers as received forwardly on to the extension table 172 where they come to rest with their forward edges overlapping the platform 82 of the now stationary cradle. When thus delivered the extreme edge of the wrapper comes into engagement with the flange 83 of the cradle which constitutes a stop for positioning the wrapper, the parts as thus positioned being shown in Fig. 68. The rate of feed of the wrappers from the feeder 160 is substantially such as to deliver one wrapper to each of the cradles 2 as the latter are successively brought opposite to the delivery end of the feed mechanism.

As there is some difficulty in securing absolute accuracy in timing the feeder, the stop fingers 202 and the presser rolls 196 are provided. During the time when the cradle 1 is turning and there is no cradle opposite the delivery end of the feed mechanism the lever 205 rests upon the outer dwell surface 208 of the cam 206, thus holding the stop fingers 202 in their operative position and at the same time raising the presser rolls 196 from the belts. As a cradle is brought opposite the delivery end 186 of the feed mechanism the roller 205 rides down one of the faces 210 of the cam on to the dwell 209 of the latter. This permits the fingers 202 to drop and at the same time the rollers 196 come into contact with the upper surfaces of the corresponding belts. If during the interval when the table 1 is turning, a wrapper is delivered by the feeder 160, such wrapper is brought to rest upon coming into engagement with the stop fingers 202, but immediately upon the dropping of said fingers it is pressed into contact with the belts by the presser rolls 196 and is thereby caused positively to feed forward onto the cradle which is now properly positioned to receive it.

After the outer wrapper has been placed upon the platform of the cradle by the mechanism just described, the table is turned to move the cradle to a position before the inner wrapper feeding mechanism. Just prior to this movement the vertically movable cam plate 158[a] is lowered, permitting the clamping arms of the cradle to drop into operative position, the arms 123 and 124 clamping the outer wrapper securely to the platform with its inner edge abutting the flange 83.

The table is now turned to bring the cradle into receiving position at the inner end of the inner wrapper feeding mechanism. As the table stops in the latter position, the vertically movable cam plate 158[a] is again raised, but only the narrow part 159[a] is now operative, engaging the roll 159 and lifting the inner clamping fingers 145, 139 and 140 to permit the inner wrapping material to be delivered to the cradle.

Inner wrapper feed mechanism (Figs. 2, 13, 14, 15, 16, 17, 18, 19 and 20).—The inner wrapper feed mechanism 4 comprises in general a feeder 211 (Fig. 13) adapted to feed corrugated board and a feeder 212 adapted to feed other wrapping material such, for example, as printed circulars 236 or the like, together with a transfer mechanism 213 for simultaneously conveying pieces of corrugated board 370[a] and circulars 236 respectively from the feeders to a cradle properly positioned at the forward end of the transfer mechanism.

The inner wrapper feed mechanism 4 is provided with a frame comprising the supporting posts 215 connected at their bottoms by a cross bar 215[a] and a pair of inclined brace members 215[b] secured to the main base 10 and carrying substantially parallel rails 214 held in proper spaced relation by suitable transverse bars. The circular feed mechanism is mounted directly on the rear ends of the bars 214 while the corrugated board feed mechanism is mounted upon a shelf or table 216 supported at its inner edge upon the lower rail 214 and at its outer end upon a post 217.

A pair of posts 218 is mounted upon each of the rails 214 and these posts support inwardly directed members or brackets which carry the spaced, substantially parallel bars 219. Shafts 220 and 221 (Fig. 14) are journaled in openings at the opposite ends of the bars 219 and these shafts carry rollers 222 and 223 respectively for guiding an endless belt conveyor 224.

Pairs of uprights 225 and 226 rise from the bars 219 and 220, respectively, and these members 225 and 226 support substantially parallel guide rails 227 and 228.

At a point adjacent to the guide roller 222, supporting posts 229 (Fig. 18) are arranged in parallel relation, one at each end of the roller, and these posts support an abutment plate 230. A guide roll 231 is mounted upon a shaft 232 supported at the upper ends of the posts 229. This roll is so arranged that its peripheral surface is substantially tangent to the inner face of the plate 230.

A follower comprising an upright member 233 and a heavy foot 234 is disposed between the guide rails 227 and 228 and rests upon the upper run of the belt 224. In order to prevent sagging of the belt, a supporting plate 235 is disposed immediately beneath the upper run of the belt. The circulars, cards, or other wrapping material indicated at 236 are arranged on end in the rectangular space or magazine defined by the abutment plate 230 at one end, the follower 233 at the other, and the side rails 227 and 228. As the follower member 233 is free from connection to other parts of the apparatus it may readily be removed at any time for the insertion of a fresh supply of circulars, the follower then being placed against the rearmost of the circulars and being gradually moved forward to feed the circulars toward the delivery end of the feed apparatus by the movement of the belt 224.

Near the forward end of the lower rail 227 a bracket 237 (Fig. 14) is secured thereto. This bracket carries a shaft forming a support for a plate 238 which extends forwardly and has a hooked extremity 239 (Fig. 18) normally positioned over the edge of the foremost circular in the magazine. This hook prevents the foremost circular from tipping forwardly until it is positively pulled from beneath the hook by means hereinafter described. The plate 238 is preferably provided with a central recess or opening 240 and an arm 241 also mounted upon the shaft carrying the plate 238 reaches inwardly and over the opening 240 and carries a brush 242 having bristles 243 which project downwardly into contact with the edge of the foremost circular in the magazine. This brush has a function more or less similar to that of the hooked extremity of the plate 238.

The shaft 220 of the roller 222 projects to the right beyond its bearing as viewed in Fig. 15 and is furnished with a gear wheel 244 meshing with a pinion 245 carried by a sleeve turning upon a short stub shaft secured in an upward extension of one of the legs 215. This sleeve also carries a ratchet wheel 246 which is secured to the sleeve and a lever 247 (Fig. 19) which turns freely upon the sleeve. This lever is furnished with a spring pressed pawl 248 cooperating with the ratchet wheel 246 for driving the latter. A link 249 connects the end of the lever 247 with a crank pin 250 carried by a disk 251 mounted upon a shaft 252. The shaft 252 is journalled in bearings provided in spaced plates 253 and 254 held in spaced relation by means of blocks 255 and 256 upon either side of an upward extension 257 of the right hand leg 215 of the frame.

The shaft 252 is hollow and its right hand extremity enters a stuffing box 258. A pipe 259 enters the stuffing box 258 from the opposite side, and this pipe communicates with a valve casing 260. From the valve casing 260 a pipe 261 leads to an air pump cylinder 262 supported in a casing 263 mounted upon the right hand side of the frame 9 as viewed in Fig. 15. The cylinder 262 contains a re-

ciprocable piston (not shown) actuated by the connecting rod 264 (Figs. 14 and 20) which receives its motion from a crank pin 265 carried by a disk 266 mounted upon a shaft 267.

A valve of any suitable type (not shown) is provided in the valve casing. As the hollow shaft approaches its limit of turning movement in one direction this valve opens an air inlet to permit free admission of air to the hollow shaft whereby to break the partial vacuum normally existing therein.

A tubular goose-neck 268, (Fig. 18) is secured to the peripheral edge of the disk 251 and this goose-neck projects laterally to a point substantially midway of the length of the roller 222. The end of the goose-neck is provided with a suction nozzle 269 and the goose-neck communicates by means of a passage through the disk 251 with the tubular shaft 252. Thus at each stroke of the piston in the cylinder 262 a powerful suction is created at the nozzle 269, for a purpose hereinafter described.

The forward ends of the rails 227 are bent downwardly at 270 and 271, respectively, on a curved line substantially constituting a circular arc having its center at the shaft 231. A stripper plate 272 is attached to the curved portion 270 of the lower rail and this stripper plate is furnished with an opening 273 for the passage of the nozzle 269, as will hereinafter be described.

A pair of posts 274 and 275 is mounted at a suitable point upon the frame, the upper parts of said posts being spaced by means of a sleeve 276. A stub shaft 277 is supported between posts 274 and 275 and projects to the left of the post 275, as viewed in Fig. 15. A sleeve 278 is arranged to turn freely upon the shaft 277, and is retained in position thereon by means of a collar 279. A handle 280 is clamped to the sleeve 279 in a convenient position to permit the sleeve to be turned manually at will.

Substantially parallel spaced arms 281 and 282 are also clamped to the sleeve 278. At a point adjacent to their free extremities, these arms are connected by a spacer member 283 and the ends of the arms are furnished with journal openings in which a shaft 284 is mounted to turn. This shaft carries a roller 285 and at its left-hand end is furnished with a gear 286 (Figs. 13 and 18[a]) which pitch diameter is substantially the same as that of the roller.

At a point intermediate its length the arm 281 is furnished with a stub shaft 286[a] upon which a cam follower roll 287 is mounted which normally engages the peripheral surface of a cam 288 secured to a shaft 289 mounted in suitable bearings in the posts 274 and 275, respectively. A gear 290 (Figs. 15 and 19) is fixed to the shaft 289 at a point between the posts 274 and 275 and this gear meshes with a gear 291 carried by a shaft 292 mounted in suitable bearings in the frame.

The gear 291 meshes with a gear 293 mounted upon a shaft 294 journalled in bearings carried by the members 214. Upon the same shaft a gear 295 is also mounted which meshes with a gear 296 secured to the shaft 267 previously referred to. The gear 296 also meshes with the gear 69 which receives its motion from the main drive shaft of the machine as already pointed out.

Upon the shaft 289 a second cam 297, (Figs. 15 and 19) is also mounted. A cam roll 298 bears against the periphery of the cam 297. This cam roll is carried by one arm of a lever 299 which is fulcrumed to swing about the axis of a shaft 300 turning in suitable journals carried by the frame. The opposite arm of the lever 299 is connected by means of a link 301 with a crank pin 302 also carried by the disk 251. The cam 297 is so shaped that at each revolution of the shaft 289 the lever 299 is rocked, thereby oscillating the disk 251 and actuating the pawl 248 to step the ratchet wheel 246 forwardly, thereby intermittently advancing the belt 235.

At each oscillation of the disk 251 the sucker nozzle 269 is also swung upwardly toward the foremost circular 236[a] (Fig. 18) in the magazine and as it comes into contact with the latter the piston in the cylinder 262 is actuated to produce a strong suction in the nozzle which causes the foremost circular to attach itself firmly to the nozzle so that it is carried back by the nozzle as the latter makes its return swing. As the nozzle swings downward it bends the circular about the roller 232 and brings it down into contact with an endless conveyor belt 301[b] which passes about a roller 301[a] carried by a shaft 300 suitably journalled in the frame immediately below shaft 284. At substantially the instant the circular contacts with the belt conveyor, the valve in casing 260 is actuated to admit air to the hollow shaft, thus breaking the vacuum of the nozzle and permitting it to drop the circular.

As the free end of the circular is brought into contact with the belt, the cam 288 permits the roller 285 to swing downwardly into contact with the upper surface of the circular so as to press the latter against the belt. Preferably the central part of the roller 285 is provided with a shallow groove 285[a] for the reception of the belt 301[b] so that the circular may be pressed very firmly into contact with the belt.

The belt 301[b] extends toward the forward or inner end of the transfer mechanism where it passes around a guide roll 303 (Fig. 19) carried by the shaft 304. The upper run of the belt is preferably supported by a plate 305 to prevent it from

sagging, and this plate near its forward end is bent downwardly toward the roller 303 to bring the delivery end of the belt substantially into the plane of the cradle when the latter is in wrapper receiving position. The lower run of the belt is preferably carried about a guide roll 306 and a tension roll 307, the latter being adjustable to vary the tension of the belt.

The shaft 300 upon which the roller 301^a is mounted is furnished with a gear 301^e (Fig. 18^a) having a pitch diameter equal to that of the roller and with which the gear 286 meshes when the rollers 285 and 301^a are brought into contact. This arrangement insures the positive driving of the roller 285 when in contact with the roller 301^a, the latter being positively driven by the train of mechanism shown in Fig. 19. This train comprises a gear 308 carried by shaft 309 and meshing with a gear 309 which in turn meshes with a gear 310 carried by a shaft 311 which also is furnished with a gear 312. The latter gear meshes with a gear 313 carried by a shaft 314 furnished with a gear 315 which meshes with the gear 291 previously described.

Supporting rails 3010 and 3011 are arranged above and at opposite sides of the belt 301^b and carry brackets 3012. These brackets support freely swinging arms carrying presser rolls 3013 adapted to press the wrapping material firmly against the belt to insure its proper movement with the latter. The train of gears extending from the gear 69 to the gear 315 is preferably although not necessarily enclosed in a suitable casing indicated at 316, Fig. 13.

A drive roller 317 (Figs. 18 and 19) is mounted upon the shaft 311 and a pair of endless conveyor belts 318 pass about the drive roller 317. At their opposite ends the belts pass around a guide roller 319 mounted upon a shaft 320 journalled in bearings carried by bars 321 which are adjustable longitudinally for tensioning the belts. The upper runs of the belts 318 rest upon a supporting plate 322 which prevents them from sagging. Guide rails 323 and 324 are arranged at opposite edges of the supporting plate 322, these rails being spaced apart a distance substantially equal to the width of the pieces of corrugated board which are fed along by the belts 318 as will hereinafter be described.

A supporting bar 325 extends longitudinally above the supporting plate 322 substantially midway between the belts 318. This supporting bar is secured to the frame of the machine in any desired manner and carries a plurality of brackets 326 supporting transverse shafts having lever arms 327 and 328 (Fig. 16) mounted upon their opposite ends. Lever arms 327 are furnished with pressure rolls 329 while lever arms 328 are furnished with pressure rolls 330. The pressure rolls bear upon the upper surfaces of the belts 318 and hold the wrapping material in firm contact with the belts to insure the proper feeding of the wrapping material toward the delivery end of the feed apparatus.

The supporting plate 322 is curved downwardly at its delivery end as indicated at 322^a, Fig. 14, and the guide bars 323 and 324 are likewise curved to correspond as indicated for example at 323^a, Fig. 14. The plate and bars terminate substantially above the inner edge of the trough-like depression 86 of a cradle 2 disposed in receiving position at the inner end of the wrapper feeding mechanism.

As above described the supporting plate 305 for the upper belt 301^b which is directly above but spaced from the supporting plate 322 is inclined downwardly at its delivery end and terminates substantially in the same horizontal plane as the supporting plate 322. The supporting rails 3010 and 3011 associated with the upper belt 301^b are continued down along the sloping portion of the plate 305 and terminate in flattened parts 331 and 332 respectively which are spaced just above the terminal portion of the plate 305 so as to confine the circulars fed forward by the belt 301^b as the latter move down the inclined portion of the supporting plate beyond the extremity of the belt. The terminal portions of the plate 305 and of the supporting rails project beyond the end of the lower plate 322^a and into substantially the same horizontal plane as the latter, being disposed closely adjacent to the stop flange 83 of a cradle 2 when the latter is in receiving position. Preferably although not necessarily the upper supporting plate 305 is provided with a guide rail 332 at one side, see Fig. 16, to keep the circulars in proper alignment as they move along with the belt 301^b.

Posts 333 and 334 are arranged on opposite sides respectively of the supporting frame being secured in any desired manner to the rails 214. The lower ends of these posts are furnished with bearings in which the shaft 267 above described is journalled.

A shaft 335 (Figs. 14 and 14^a) is mounted in bearings in the upper ends of the posts 333 and 334 respectively and is provided with a forwardly and downwardly extending arm 336 which supports a pair of pressure rollers 337 and 338. The bearings for these rollers are preferably so arranged that the rolls have capability of slight relative movement in a vertical direction to permit them to accommodate themselves to inequalities in the thickness of the wrapping material passing beneath them. The shaft 335 is also provided with an arm 339 which is connected by a spring 340 with one arm 341

of a bell crank lever mounted upon a stub shaft 342 secured to the post 334. The other arm 343 of the bell crank bears upon a pin 345 carried by a rod 346 while the arm 339 bears against a second pin 344 also carried by the rod 346. This rod is forked at its lower extremity as indicated at 347 and straddles the shaft 267. Above its forked portion the rod is provided with a cam engaging roller 348 which rests upon the peripheral surface of a cam 349 secured to the shaft 267. If desired a spring may be provided for holding the roll 348 in contact with the periphery of the cam 349.

A shaft 350 is journalled in bearings in the posts 333 and 334 respectively at a point below the supporting plate 305 and is furnished with an arm 352 normally resting upon a pin 353 carried by the rod 346. The shaft 350 also carries an arm 354 whose forward end is turned upwardly to form a stop finger 355. The inclined portion of the plate 305 is provided with an opening through which the stop finger 355 may pass, and the rod 3010 is furnished with a notch in its under surface into which the end of the finger may project when the finger is fully elevated.

A shaft 356 is journalled in the posts 333 and 334 at a point below the supporting plate 322 and is provided with an arm 357 which is pivotally connected to the rod 346. The shaft 356 is also provided with a forwardly extending arm 358 having an upturned extremity 359 constituting a stop finger which may be projected up through a suitable opening in the plate 322 at a point intermediate the belts 318.

The mechanism for feeding the pieces of corrugated board to the lower belts 318 is mounted upon the support 216 as above stated. Supporting posts 362 and 365 extend upwardly from the support 216 and carry a pair of substantially parallel guides 364 and 364ª which extend at right angles to the rails 214 of the frame. A post 365 is supported upon the guide member 364 and a similar and parallel post 366 rises from the guide 364ª. The post 365 carries a bracket 367 and the post 366 carries a bracket 368. Uprights 369 are mounted upon the forward ends of the brackets 367 and 368 while corresponding uprights 370 are carried upon the rear ends of said brackets. The four uprights define a magazine in which a stack of pieces 370ª of corrugated board may be piled.

A push plate 371 (Figs. 15, 16 and 17) is guided to slide horizontally between the guide rails 364 and 364ª. The inner end of this push plate is thinned down to form the supporting portion 372 defined by the shoulder 373, the latter being of a depth substantially equal to the thickness of the sheet of corrugated board which is to be fed. Preferably the upper surface of the supporting portion 372 of the push plate is slightly concave in a transverse direction as indicated at 374 to accommodate the natural curvature of the corrugated board as usually supplied by the manufacturer.

A plate 375 is secured to the inner faces of the uprights 370 and defines the rear wall of the magazine. This plate terminates at its lower edge substantially in the horizontal plane of the upper surface of the thicker part of the push plate 371 so as to provide a space for the ejection of the lowermost piece of corrugated board from the magazine.

A pair of links 376 (Figs. 13 and 15) connect the outer part of the sliding push plate 371 with the free ends of a pair of lever arms 376ª secured to a shaft 377 journalled in suitable bearings carried by the support 216. This shaft is provided with a beveled pinion 378 which meshes with a beveled pinion 379 carried by a shaft 380 supported in brackets 381 carried by the support 216. The shaft 380 is provided with an arm 382 to which one end of a connecting rod 383 is pivotally secured. The opposite end of the connecting rod 383 is forked at 384 (Figs. 2 and 14) and straddles the shaft 23ª. The forked end of the rod is provided with a cam engaging roll 386 engaging a cam groove in a cam 385 secured to the shaft 23ª.

The outer portions 387 and 388 respectively of the guide rails 364 and 364ª are somewhat deeper vertically than the inner portions of said rails and these deepened portions of the guide rails are connected at their outer ends by a plate 389. A gage plate 390 rests upon the push plate 371 and is guided to slide between the upper parts of the members 387 and 388. This gage plate is furnished with a downwardly projecting flange 390ª (Fig. 13) at its outer end to which are secured the stop pins 391 which pass freely out through openings in the plate 389 and which are furnished with heads at their outer ends to limit the inward movement of the gage plate. Coil springs 392 encircle the stop pins 391 between the inner surface of the plate 389 and the flange 390ª and tend to press the gage plate inwardly toward the magazine. The inner portion of this plate is of reduced width to permit it to enter the magazine and the thickness of the plate is substantially equal to that of one of the pieces of corrugated board to be fed so that with the arrangement shown, the inner edge of this plate normally bears against the edge of the second piece of board from the bottom of the stack and resiliently presses the latter against the rear wall 375, thus preventing the stack from descending until the plate 390 is retracted.

The flange 390ª is also furnished with an adjustable abutment pin 393 which extends

freely through an opening in the plate 389. This pin, preferably has threaded engagement with the flange 390[a] and its inner end may be caused to project to varying distances from the inner face of the flange. The pin 393 is so disposed that its inner end is engaged by the rear edge of the push plate 371 as the latter moves outwardly and when such engagement takes place the gage plate is suddenly moved outwardly compressing the springs 392, releasing the stack of board in the magazine and at the same time jarring the entire magazine structure to some extent by the blow which it imparts to the plate 389 in compressing the springs 392. This release of the stack of board and the jarring action together cause the stack of board to descend in the magazine until the lowermost piece of board rests upon the surface of the supporting portion 372 of the push plate and in a position to be engaged by the shoulder 373 upon the next forward reciprocation of said plate.

The operation of the above feeding mechanism is briefly as follows: Circulars are removed successively from the circular containing magazine by means of the sucker nozzle 268 and clamped against the belt 301[b] by the presser roll 285. Each circular is then picked up by the belt and carried forwardly and down along the inclined portion of the belt and supporting plate 305 until it comes into contact with the stop finger 355. Likewise the lowermost piece of corrugated board is fed laterally inward by the reciprocation of the push plate 371 until positioned directly above the belts 318.

As the piece of board emerges from the magazine it raises a pair of stop fingers 394 which normally rest upon the left-hand guard rail 323 as viewed in Fig. 16. These stop fingers are provided with angular shoulders 395 and with pointed extremities 396. After the piece of corrugated board has been moved out into the position shown in Fig. 17 so that it lies above the plane of the belts 318, the push plate 371 is retracted. The fingers 394 which now engage the piece of corrugated board prevent the latter from moving back with the push plate and as the plate is withdrawn from beneath the piece of board, the latter drops directly onto the belts 318 and is moved forwardly thereby and beneath the pressure rolls 329 and 330.

While the push plate 371 is moving outwardly to deliver a piece of board to the conveyor belts 318, the forward edge of the gage plate 390 is resiliently pressed against the edge of the next to the lowest piece of board in the magazine preventing the latter dropping onto the lowermost piece of board as the latter is being ejected from the magazine. When the push plate is retracted, it strikes against the abutment pin 393 of the gage plate and retracts the latter, permitting the stack of board to drop until the piece previously engaged by the gage plate rests on the concave surface of the part 372 of the push plate, the gage plate returning to normal position and engaging the edge of the next higher piece of board in the magazine at the beginning of the succeeding forward movement of the push plate.

The piece of board which is delivered by the push plate to the belts 318 is fed forwardly until it comes into contact with the stop finger 359 whereupon its motion ceases temporarily. At this time the cam roll 348 rests upon concentric dwell portion of the cam 349 so that both stop fingers are held in elevated position and the pressure rolls 337 and 338 are held out of contact with the belt 301[b]. At the same time the engagement of the pin 345 with the arm 343 tensions the spring 340 thus holding the arm 339 in contact with the pin 344. As the cradle 2 is brought around into the radial plane of the feeding mechanism and is stopped at the delivery end of the latter, the cam roll 348 runs off of the dwell portion of cam 349 permitting rod 346 to drop thereby retracting both stop fingers 355 and 359. The piece of corrugated board and the circular are thus simultaneously released and are immediately fed forward by their respective belts so that they are delivered onto the cradle substantially simultaneously, the corrugated board being placed beneath the circular and both being stopped by engagement of the flange 83 of the cradle as shown in Fig. 69.

The table now turns to carry the cradle with the wrapping material to the adhesive applying mechanism but before it begins its movement the clamp actuating cam plate descends, thus separating its narrow part 159[a] from the roll 159 and permitting the clamping fingers 139, 140 and 145 to return to operative position. The fingers 138 and 140 thus clamp the circular to the cradle as shown in Fig. 70 while the finger 145 engages the corrugated board and holds the latter firmly in position. As the latter finger is free to move slightly relatively to the fingers 139 and 140 it can securely engage the corrugated board regardless of the thickness of the circular with which the fingers 139 and 140 engage.

Adhesive applying mechanism (Figs. 2, and 21 to 48 inclusive).—The principal parts of the adhesive applying mechanism are mounted upon an extension 15[a] of the main supporting table 15. A transversely extending bar 399 (Fig. 23) is secured in spaced relation to the under side of the extension 15[a] and this bar supports a pair of downwardly projecting bracket members 400 and

401 (Fig. 21) provided with bearing openings for a shaft 402. This shaft is furnished with a gear 403 which meshes with a gear 404 carried by the shaft 62 (Fig. 2) above described, and which receives its motion from the secondary drive shaft 23ª through bevelled gears 60 and 61. The shaft 402 is provided adjacent to its opposite extremities with substantially like cams 405 and 406, each cam having a concentric dwell portion and a depression in its peripheral surface, the depressions of the two cams being correspondingly disposed relatively to the shaft.

The supporting bar 399 is furnished with an opening directly above each of the cams 405 and 406 and these openings receive the lower ends of vertically disposed guide sleeves 407 and 408, respectively. Each guide sleeve is provided with an enlargement forming a shoulder 409 (Fig. 24) which rests upon the upper surface of the bar 399. The portion of the guide sleeve below the bar 399 is externally screw threaded for the reception of a locking or clamping nut 411 by means of which the sleeve is securely clamped to the bar 399. A plunger or tappet member 412 is disposed within the lower portion of each of the guide sleeves 407 and 408 respectively and slides freely therein. Each plunger is provided at its lower end with spaced ears 413 and 414 supporting a transverse shaft 415 upon which a cam follower roll 416 turns freely.

The interior surface of each sleeve is provided with a longitudinally extending slot 416ª for the reception of a pin 416ᵇ projecting from the plunger 412. The pin and slot are so arranged as to prevent the plunger from rotating within the lower end of the sleeve and so as to maintain the cam follower roll 416 in proper operative relationship to the corresponding cam upon the shaft 402. With this arrangement rotation of the latter shaft causes the plungers 412 in the guide sleeves 407 and 408 to rise and fall simultaneously.

An axially movable rock shaft or post 418 is arranged within the upper part of each of the guide sleeves 407 and 408, respectively. The bore of said sleeves is of smaller diameter at the upper parts of the sleeves than at the lower ends thereof, and the main body of each shaft 418 is of a diameter to fit this smaller portion of the bore. The lower end of each shaft 418 is furnished with a flange 419 which fits within the larger part of the bore and supports a compression spring 420 whose upper end bears against the shoulder 421 at the junction of the larger and smaller portions of the bore in the guide sleeve. This spring presses the lower end of the post or rock shaft 418 against the upper end of the corresponding plunger 412, and thus holds the cam engaging roll 416 of the latter in contact with its corresponding cam.

The upper end of each rock shaft 418 is provided with an axial, internally screw threaded bore 422 (Fig. 34) for the reception of the threaded stem 423 of a bearing pin or spindle which may be locked in adjusted position in the bore 422 by means of a lock nut 424. The upper end of the pin is provided with a conical head 426 which may be of hardened steel or other suitable wear-resistant material.

Containers 427 and 428 (Figs. 21 and 34) for liquid adhesive are mounted to turn freely upon the conical heads 426 of the bearing pins carried by the respective rock shafts 418. These containers are furnished with downwardly directed sleeves 429 and 430, respectively, which fit snugly over the upper ends of the respective shafts 418. The inner ends of these sleeves form conical sockets which rest upon the heads 426 respectively.

The containers are of like construction and of substantially cylindrical form, and each container is furnished with a removable cover 429 at its upper end through which the adhesive may be poured in. Diametrally opposed arms 430 and 431 rise from the upper end of each container. These arms are turned inwardly at their upper ends and meet in a bearing boss 432 having an axial opening for the reception of a centering or guiding pin 433.

The pins 433 corresponding to the respective receptacles are mounted upon bracket arms 434 (Fig. 23) projecting forwardly from a cross bar 436 mounted upon the upper ends of a pair of posts 437 and 438, (Fig. 21) whose lower ends are supported upon a member 439 carried by an extension 440 (Fig. 23) secured to the extreme rear end of the member 15ª of the table. Preferably the brackets 434 are connected by a brace rod 441 and, if desired, the upper parts of the posts 437 and 438 may be braced by members 442ª which are anchored to any suitable part of the frame. With the arrangement just described, it is possible to lift each of the containers 427 and 428 from its supporting pin without disturbing other parts of the mechanism, as each boss 432 is free to slide upwardly from off its guide pin 433. This freedom of removal is a desirable feature as it permits the containers to be removed for cleaning when necessary.

The containers 427 and 428 are furnished with applicator supporting arms 442 and 443 respectively. These arms are of tubular construction and inclined downwardly from the lower parts of the respective containers. Each arm is provided with a radial flange 444 near its lower extremity and with a nipple member 445 (Fig. 37) projecting below the flange and fitting snugly within an opening

in the upper end of a receptacle 446. Each receptacle is furnished with a flange 447 which is secured to the corresponding flange 444 by means of bolts 448. Preferably a packing washer 449 is disposed between the flanges 444 and 447.

The body portion of each receptacle is of generally rectangular form tapering slightly in a downward direction and the lower rear edge of each receptacle is cut away to provide a discharge opening 450.

An applicator roll 451 (Figs. 36, 37 and 38) is mounted upon the receptacle with a portion of its peripheral surface projecting through the opening 450 into the interior of the receptacle. This applicator roll does not tightly fill the opening but is of such diameter that a thin film of adhesive may be picked up by the roll where it projects inside the receptacle and may be carried outwardly by rotation of the roll. The applicator roll is mounted upon a shaft 452 turning in bearings 453 depending from the lower edge of a plate 454 secured by screws 455 to the rear face of the receptacle.

An angle plate 456 is secured by screws 457 to the forward face of the receptacle and this angle plate has a flange 457ª projecting substantially at right angles to the forward face of the receptacle.

A pinion 458 is secured to one end of the shaft 452 of the applicator roll and this pinion meshes with a gear 459 turning freely upon a stub shaft 460 fixed in a boss 461 projecting from one side of the receptacle 446. A lever 462 is also journalled to turn freely upon the shaft 460 and is retained in position thereon by a collar 463 fixed to the shaft by means of a pin 464.

The lever 462 is provided with a pin 465 upon which a driving pawl 466 is mounted to swing. This pawl is provided with an outstanding lug 467 provided with a centering pin 468 which is disposed within the lower end of a coiled compression spring 469. The upper end of this spring encircles a similar centering pin 470 projecting from a swivel block 471 mounted upon a pin 472 also carried by the lever 462. The action of the spring 469 tends to hold the end of the pawl 466 in operative position between adjacent teeth of the gear 459 which also acts as a ratcheht wheel, but permits the pawl to be retracted to enter between an advanced pair of teeth.

The lever 462 is furnished with a hook 473 to which one end of a tension spring 474 is attached. The opposite end of this spring is secured to a pin 475, which is fixed in an opening in the flange 457ª. Another pin 476 also secured to the flange 457ª is provided with a forwardly directed arm 477 arranged in the plane of the lever 462, and which constitutes a stop for limiting rearward swinging of the lever. A third pin 478 projecting from the flange 457ª furnishes a support for a retaining pawl 479 which turns freely on the pin and which is urged into engagement with the teeth of the gear 459 by means of a spring 480 encircling the pin and having one end fixed to the latter and the other bearing against the upper surface of the pawl.

The free end of the lever 462 is furnished with a laterally directed stub shaft 481 upon which a contact roller 482 is mounted to turn freely. This roller is retained in position by means of a collar 483 and as the containers are swung upon their bearing spindles as will hereinafter be described these rolls 482 are brought into contact respectively with fixed abutment fingers 484 and 485 (Figs. 22 and 23) carried by arms 486 supported in any desired manner upon the frame of the machine. Such contact of each roll with its abutment finger causes the lever 462 to move to the position indicated in broken lines in Fig. 36. The pawl 466 thus turns the gear 459 and, through the pinion 458, causes the applicator roll 451 to make a partial rotation. At the end of this movement the retaining pawl 479 engages between teeth of the gear 459 to prevent reverse rotation of the latter and as the container swings in the opposite direction the spring 474 retracts the lever 462 to its normal position against the stop 477 causing the pawl 466 to engage between an advanced pair of teeth of the gear 459.

Split collars 490 (Figs. 24 and 34) are clamped securely to the sleeve members 429 and 430 of the respective containers. Each collar is provided with a radial arm 491 (Figs. 24 and 25) to which a block 492 is secured. Each block 492 is furnished with an opening for the reception of an axially adjustable arm 493 secured in adjusted position by a set screw 494. Each arm 493 is provided with spaced fixed collars 495 and 496 between which a swivel member 497 is mounted upon the arm. This swivel member is provided with an outstanding ear which is pivotally secured by means of a pin 498 to the forked extremity of a connecting rod.

The connecting rod for one of the arms 493 is designated 500 (Fig. 25) while that for the other arm is designated 501. These connecting rods extend rearwardly and are secured by swivel connections 502 and 503 respectively to the upper ends of rock arms 504 and 505 respectively secured to a rock shaft 506. The rock shaft 506 is journalled in bearings in supporting brackets 507 and 508 projecting rearwardly from the supporting posts 437 and 438 respectively. The shaft 506 is furnished with an arm 509 (Figs. 21, 22 and 23) connected by a link 510 with an arm 511 secured to a transverse shaft 512. The shaft 512 is journalled in a sleeve 512ª carried by a bracket

512[b] mounted upon the rear part of the member 15[a] of the table, see Fig. 21. The shaft 512 is also provided with a downwardly extending arm 513 which is pivotally connected to the rear extremity of a connecting rod 514 (Fig. 23) whose opposite end is secured to a crank pin 515 at one end of the shaft 62 previously described.

Each of the guiding sleeves 407 and 408 is provided near its upper end with an adjustably fixed collar 516 (see Fig. 24) having an arcuate cam wall 517 (Figs. 40 and 41) furnished with an elevated cam surface 518, the latter surface lying in a plane substantially perpendicular to the axis of the shaft. A plate 519 is mounted upon the collar 516 concentric with the guiding sleeve and carries a second arcuate cam member 520 which normally forms a continuation of the cam member 517. The plate 519 is rotatable relatively to the collar 516 so that the cam member 520 may be moved away from the cam member 517 under certain circumstances.

The cam member 520 is provided with a high or dwell portion 521 lying substantially in the same plane as the cam surface 518. It is also furnished with a low portion 522 (Figs. 24, 39 and 41) united with the high portion 521 by a slope. Normally the plate 519 is held in fixed position, with the cam 520 abutting the cam 517, by means of a retaining pin 523 (Fig. 41) which slides vertically in a guide 524 carried by the collar 516 and enters an opening 525 in the plate 519.

A split collar 526 (Figs. 24 and 29) is secured to each post or shaft 418 at a point above the cams 517 and 520 and is provided with a radial arm 527 carrying a cam roller 528 so disposed that when the rock shaft 418 is permitted to descend from its most elevated position the cam roll will engage the cam surfaces 518, 521 or 522 in accordance with the angular position of the shaft, the cam surfaces thus constituting stops for determining further descent of the shaft.

Above the collar 526 another split collar 529 is clamped to each of the rock shafts 418. Each of the collars 529 is provided with a radial arm 530 (Figs. 24 and 28) having spaced fixed collars 531 and 532 secured thereto. A swivel member 533 is mounted upon each arm 530 between the fixed collars and has a lug which is connected by a pivot pin 535 to a shackle upon the end of a connecting rod. The connecting rods corresponding to the respective arms 530 are designated 537 and 538 (Fig. 22) respectively and at their rear ends these connecting rods are secured by swivel connections 539 and 540 respectively to the ends of a bar 541 secured at its central portion to the upper end of an adjustably extensible lever arm 542 (Figs. 21 and 23). The length of this arm may be varied to vary the throw of the connecting rods 537 and 538. The lower end of the arm 542 is secured to the shaft 512 and partakes of the motion of the latter.

A pair of arcuate guiding and supporting rails 544 and 544[a] (Figs. 22 and 23) extend from the inner wrapper feeding mechanism to the adhesive applying mechanism. These rails carry a wrapper support or table 543 at the front or inner end of the adhesive applying mechanism. This support or table 543 is relatively thin so that as a cradle carrying a wrapper is moved from the wrapper feeding mechanism to the adhesive applying mechanism, the cradle will pass beneath the table 543 as indicated in Fig. 23, and the outer free portion of the wrapper elements will ride up onto the table and come to rest thereon as the cradle stops.

In order to hold the wrapping material securely in position upon the table or support 543 while the adhesive is being applied a movable clamp plate 545 is provided. This clamp plate is pivotally secured at 546 (Fig. 23) to the forward end of a curved lever arm 547. The rear portion of this lever arm is bifurcated to form an open frame (Fig. 22) having substantially parallel side members 548 and 549 which are pivotally supported upon a shaft 550 whose opposite ends are secured in bracket members 561 and 562 respectively secured to the supporting bar 439. The members 548 and 549 of the frame are extended beyond the shaft 550 and are then brought closely adjacent to each other providing the parallel members 564 and 565 which support a pin 566 (Figs. 21 and 23) upon which a cam engaging roll 567 is mounted. This roll rests upon the periphery of a cam 568 secured to the shaft 512 at a point closely adjacent to the lower end of the arm 542. A spring 569 is secured at one end to the member 564 and at its other end to a hook 570 projecting from the rear end of the extension member 440 of the table, the spring thus holding the cam roll 566 resiliently against the cam 568.

Referring to Figs. 42 to 46, it may be noted that the extreme rear edge of the outer wrapper 571 when resting upon the table 543 projects beyond the outer or rear margin of the table and to sustain this edge while adhesive is being applied thereto a movable support is provided. This support comprises an elongate bar 572 preferably provided with a groove or channel in its upper surface for the reception of a strip 573 of resilient material, such for example as felt or rubber. The upper substantially flat surface 574 of the strip 573 constitutes the actual support for the projecting edge of the wrapper.

The bar 572 is supported at its ends by posts 575 and 576 (Figs. 23 and 42) respec-

tively, which are adjustably secured to the forward extremities of a pair of lever arms 577 and 578 respectively. These arms are pivotally supported at their rear ends upon a shaft 579 (Figs. 21 and 42) secured in bearing brackets 580 and 581 mounted upon the extension member 440. Each of the lever arms 578 is provided with a cam-engaging roll 582 near its outer or forward extremity. These rolls engage cams 583 and 584, each having a high portion 583[a] and a low part 583[b] respectively, mounted upon a shaft 585 mounted in bearing brackets 587 and 588 projecting downwardly from the lower surface of the member 15[a]. At the left-hand end of this shaft as viewed in Fig. 21 a bevel pinion 589 is secured. This bevel pinion meshes with a bevel pinion 590 upon a vertical shaft 591 having a lower bearing in a lug projecting laterally from the edge of the member 15[a] and having an upper bearing in a bracket 592 secured to the post 437.

Referring particularly to Figs. 21 and 30 to 33 inclusive, the shaft 591 has a split collar 593 clamped thereto at a point below the upper bearing bracket 592. This collar is furnished with a radial arm 594 from which an abutment pin 595 depends.

The left-hand rock shaft 418 as viewed in Fig. 21 is furnished with a fixed collar 596 (Fig. 32) provided with a radial arm 597 carrying a pin 598 which projects upwardly therefrom. Upon this pin a collar 598[a] is arranged to turn freely. A pin 599 projects upwardly from the collar and engages one end of a coiled spring 600 encircling the pin 598 and whose upper end is secured to a castellated nut 601 engaging the upper end of pin 598 by means of which the tension of the spring may be adjusted. A stop pin 602 projects upwardly from the arm 597 for engagement with a tappet arm 603 carried by the collar, the pin limiting rotation of the collar under the action of the spring 600. The tappet arm 603 is of a length such that as it swings it intersects the axis of the abutment member 595, but in the normal operation of the machine the post 418 is near the lower limit of its movement as the arm 603 swings past the abutment pin 595 in a counter-clockwise direction so that the tappet arm 603 passes below the lower end of the pin itself without engaging the latter. In making the return or clockwise stroke the tappet arm 603 is free to move away from the pin 602 so that on this stroke regardless of the vertical position of the post 418 the abutment pin 595 is not moved by the tappet 603.

A substantially rectangular receptacle 604 (Figs. 23 and 42 to 46) for liquid adhesive is mounted between adjusting screws 605 and 606 carried by supporting plates 607 secured to the lateral edges of the member 15[a] of the table. Adjusting screws 608 are interposed between the bottom of the receptacle 604 and the upper edges of the plates 607, thus permitting vertical adjustment of the receptacle. The receptacle is provided with a lateral extension 604[a] at one end (see Figs. 21 and 22) which communicates by means of a pipe with a valve housing 604[b]. The latter in turn is connected to a vertical standpipe 604[c] which may constitute or may lead to a reservoir or other supply of fluid adhesive.

A shaft 609 is mounted in bearings in the opposite ends of the receptacle 604 and carries a roller 610 whose peripheral surface projects upwardly through an elongate opening in the top of the receptacle. At one end the shaft 609 is furnished with a ratchet wheel 611, and a lever arm 612 is pivoted to turn upon the shaft adjacent to the ratchet wheel. This lever arm carries a spring-pressed pawl 613 which enters between teeth of the ratchet wheel for turning the latter. The free end of the arm 612 is connected by a link 614 to an arm 615 secured to the rock shaft 512 above described, the arrangement being such that at each oscillation of the rock shaft the pawl 613 imparts a partial rotation to the shaft 609 and the roller 610.

A pair of substantially parallel links 616 and 616[a] are disposed between the spaced side members 548 and 549 of the clamp carrying lever 547 above described. These links are pivoted upon a shaft 618 supported at its opposite ends by spaced arms 619 secured to the shaft 550 previously described.

At their rear ends the links 616[a] and 616 are connected by a bar 617. The link 616 is somewhat longer than the link 616[a] and projects rearwardly beyond the bar 617. Its projecting rear end is pivotally connected to an arm 617[a] secured to the rock shaft 512 at a point closely adjacent to the arm 542, said arms being substantially parallel to each other.

The forward ends of the links 616 and 616[a] support a transverse bar 620 (Fig. 22) which extends laterally beyond the links 616 and 616[a] and which supports adjustable brackets 621 and 622 which carry an elongate applicator bar 623 preferably having a downwardly convex bottom face. The relative lengths of the arms 617[a] and 619 is such that as the arm 617[a] is oscillated, the applicator bar 623 is moved from a position where it rests upon the surface of the roller 610 as shown in Fig. 42 upwardly and forwardly in an arcuate path and then downwardly into contact with the edge of a wrapper resting upon the movable support 573. The width of the applicator bar 623 is such that the desired quantity of adhesive is carried from the roller and deposited upon the wrapper, the length of the bar being at least as great as the width of the wrapper to which the adhesive is to be applied.

The shaft 294 previously described and which carries the gear 295 projects outwardly beyond the gear casing 316 in the direction of the adhesive applying mechanism and its projecting end is furnished with a cam 625 (Fig. 21) with which a cam follower roll 626 engages. This cam follower roll is carried by a bar 627 having a forked lower extremity straddling the shaft 294 and connected at its upper end by a pivot pin 628 to the rearwardly extending arm 629 of a lever fulcrumed upon a pin 630 carried by the supporting post 374 above described. The forward arm 631 of this lever is curved downwardly to overhang the edge of the wrapper supporting table 543. The end of the arm 631 is furnished with an insulated resilient contact finger 631[a] (Fig. 23) forming one terminal of an electrical circuit and adapted upon downward oscillation of the lever arm to make contact with the metallic table 543. An insulated conducting wire 632 connected to the fingers 631[a] extends upwardly along the arm 631 and is connected near the fulcrum pin 630 by a flexible connection with a conductor wire forming part of the electrical circuit.

This circuit includes the coils of a solenoid 633[a] (Figs. 21 and 23) supported from a shelf 634 carried by brackets 635 and 636 depending from the plate 439. The circuit of the solenoid is supplied with current from any suitable source of power such for example as a battery and its other terminal is grounded upon the frame of the machine.

The solenoid is provided with a freely movable core 637 which is normally retracted within the casing of the solenoid but which rises and projects from the upper end of the casing when the solenoid is energized.

A lever arm 638 is disposed with its rear end in the path of movement of the core 637 so that as the latter rises the lever arm is swung upwardly. This lever arm is secured to a shaft 639 mounted in bearings in brackets 640 and 641 projecting rearwardly from the brackets 400 and 401 above described. At the opposite ends of the shaft 639 arms 642 and 643 are secured thereto at points closely adjacent to the lower ends of the guide sleeves 407 and 408 respectively. A spring 638[a] secured at one end to a fixed part of the frame is connected at the other to a bracket 638[b] secured to the lever arm 638, the action of the spring being such as to swing the arm 638 downwardly toward the solenoid 633[a].

Rods 644 and 645 are secured to the forward extremities of the arms 642 and 643 respectively. These rods extend upwardly substantially parallel to the sleeves 407 and 408 and their upper ends constitute the retaining fingers or pins 523 above described. These rods are normally held in elevated position by the spring 638[a] so that the retaining pins 523 engage the openings 525 in the plates 519 and prevent rotation of the latter.

The upper end of each of the guide sleeves 407 and 408 projects above the corresponding plate 519 and is screw-threaded for the reception of a collar 646 (Fig. 24). Each collar 646 is internally threaded for engagement with a retaining ring 647 which bears upon a flange 648 at the lower end of a sleeve 649 encircling the rock shaft.

This sleeve 649, see Figs. 24 and 39, is provided with a key 649[a] which slides freely in a longitudinal keyway 650 in the shaft or post 418. The arrangement of the parts just described permits the post 418 to reciprocate axially while the sleeve 649 remains stationary, the sleeve however being connected to the shaft to turn therewith regardless of the longitudinal position of the shaft. A ring 651 encircles the upper part of the sleeve 649 and is secured thereto by a set screw 652. This ring is provided with an abutment pin 653 projecting substantially radially therefrom, the pin having an abutment shoulder 654.

This shoulder is adapted to engage the nose 655 of a latch carried by a pivot pin 656 mounted in ears 657 projecting upwardly from the plate 519. A spring 658[a] is seated in a pocket in the nose end of the latch lever and the lower end of this spring bears against the upper face of the plate 519, thus tending to swing the latch nose into the position shown in Fig. 40 where it is engaged by the surface 654 of the abutment. The tail 656[a] of the latch lever is normally disposed above the opening 525 in the plate 519 and is furnished with an adjustable stop pin 657[a] which normally rests upon the upper end of the retaining finger 523. The pin 657 is so adjusted that when resting upon the top of the retaining finger 523 the latch nose is held in depressed position as shown in Fig. 41 with its surface 658 in a plane below the lower surface of the abutment member 653.

The ring 651 is also furnished with a radially extending arm 659 provided with a depending member 660 whose lower end is disposed closely adjacent to the upper surface of the plate 519 and is adapted under certain conditions to engage an abutment member 661 projecting upwardly from said surface.

The operation of the above described mechanism is briefly as follows. Upon each rotation of the shaft 62 the rock shaft 512 is oscillated and this shaft through the connections described brings the clamping plate 545 down into engagement with the wrapping material resting upon the support or table 543. The applicator bar 623 is moved upwardly from the roller 610 and pressed downwardly upon the rear edge of the

wrapper where the latter rests upon the resilient movable support 573 which at this time is in its upppermost position, supported by the rollers 582 resting upon the high part 583[a] of the cams 583 and 584.

At substantially the same time the containers 427 and 428 are oscillated in opposite directions swinging their arms 442 and 443 outwardly and rearwardly in arcuate paths over the surface of the wrapper. During this movement the shaft 402 is turned so that the cams 405 and 406 permit the rock shafts 418 to descend bringing the rollers 528 into contact with the high portions 518 of the stationary cams 517.

Concomitantly with such movement the rock shafts are oscillated in opposite directions by their connections to the bar 541 and as the shafts continue to descend, each roller 528 moves downwardly along the cam inclines of the movable part of the corresponding cam 520, finally passing down on to the low part 522 of said cam. As the rollers engage the low parts of the cams the applicator rolls 541 come into engagement with the surface of the wrapper at points adjacent to its opposite lateral edges, thus rolling the adhesive from the surface of the rollers onto the wrapper. Toward the latter end of this stroke of the applicator rolls the contact rolls 482 come into engagement with the fixed abutment fingers 484 and 485 respectively, thus swinging the levers 462 and producing a partial rotation of the applicator rolls such as to provide the latter with a fresh coating of adhesive. The shafts 418 are immediately raised by their cams 405 and 406 and the rock shaft 412 returns the containers 427 and 428 to their normal position.

On the active swing of the left-hand shaft 418, the tappet finger 603 passes beneath the lower end of the abutment pin 595 so that the latter is not disturbed, and as the tappet finger is inoperative on the return or idle swing of shaft 418, its vertical position relative to abutment pin 595 is then immaterial. During the return movement of the rock shaft 512 the pawl 613 imparts a partial rotation to the roller 610 in the receptacle 604 to provide a fresh coating of adhesive on the exposed part of the roller. At the same time the applicator bar 623 is restored to its normal position in contact with the exposed surface of the roller and the clamp plate 545 is raised.

During each cycle of operations as above described the feeler finger 631[a] carried by the lever 631 is swung downwardly toward the table 543. If a wrapper is present upon the table when the feeler finger swings downwardly the wrapper acts as an insulater and prevents completion of the circuit through the finger and table. If through failure of the feed mechanism to supply the cradle with a wrapper, a wrapper is absent from the table 543 when the feeler swings downwardly, the finger completes the electrical circuit through the machine frame, and energizes the solenoid 633[a] thus causing the core 637 to project upwardly, thereby raising the lever 638. This swings the lever arms 642 and 643 downwardly pulling the rods 644 and 645 down sufficiently to release the retaining fingers 523 from the plates 519. This permits the plates 519 to turn freely and at the same time allows the spring 658 to project the corresponding latch levers into the path of movement of the respective abutment members 654.

Upon the next cycle of operations the partial rotation of each rock shaft 418 acting through the abutment member 653 and the latch nose 655 causes each plate 519 to turn at the same rate as the shaft. This carries the movable cam member 520 with the shaft so that the high part 521 of the movable cam is maintained below the roller 528 as the shaft turns thus preventing the shaft from dropping to the usual extent. The first result of failure of the shaft to move downwardly to the full extent is to prevent the applicator rolls 451 from coming into contact with the surface of the empty table 543 so that the table is not daubed with the adhesive.

The second result of failure of the rock shaft to descend to the full amount is to cause the tappet finger 603 to engage the abutment pin 595 upon the outward or active oscillation of the left-hand shaft 418. As the tappet finger 603 engages the pin 602 it acts as a rigid member and by engagement by the abutment pin 595 turns the shaft 591. This shaft through the connections described rocks the transverse shaft 585 thereby swinging the cams 583 and 584 rearwardly permitting the rollers 582 to pass down on to the low parts 583[b] of the cams. This allows the support 572 to drop so that as the applicator bar 623 moves forwardly the supporting surface 574 of the movable support is below the lower limit of movement of the applicator and the support is not daubed with adhesive. This position of the parts is illustrated in Fig. 44.

The arrangement thus described provides for the orderly application of adhesive at points adjacent to the opposite lateral margins of a wrapper resting upon the table 543 as well as for applying it to the extreme edge portion of the wrapper but prevents the application of adhesive to the table or the support for the rear edge of the wrapper when for any reason a wrapper is absent from such table or support.

The electrical circuit including the solenoid 633 may if desired include a stop mechanism for discontinuing the operation of the machine. This stop mechanism may

be of any usual type and is not illustrated herein. When the machine is again started into operation as for example when a wrapper has been placed upon the table 543 so as to insulate the contact finger 632, the electrical circuit is deenergized and the core of the solenoid is forced downwardly by the spring 638ª. This spring at the same time tends to raise the rods 644 and 645 so as to bring the retaining fingers 523 into position to engage the openings 525.

Upon starting the machine upon the first reverse movement of the shaft 418 which is still in elevated position the tappet arm 603 again contacts with the abutment pin 595 but as the tappet is free to swing away from the pin 602 it does not impart any movement to the abutment 595, the shaft 591 and associated parts being restored to normal position by means of a spring (not shown) connected to an arm projecting from the shaft 585.

As soon as the left hand post 418 starts on the return or idle oscillation the depending finger 660 carried by the collar 651 swings into engagement with the abutment 661 and turns the plate 519 in a direction to restore the cam 520 to its normal position. At the same time the abutment member 653 swings away from the latch nose 655 and as the plate 519 resumes its normal position, the pins 523 enter the openings 525 and raise the ends 656ª of the latches so as to render the latter inoperative. As soon as the tappet arms 603 are raised from the abutment pins 595, the post 591 may be restored to its normal position by its controlling spring, thereby swinging the cams 583 and 584 to restore the movable support 573 to its operative position. The table now turns another step, carrying the cradle with its wrapping material into operative relation to the article bottle mechanism.

Bottle feeding mechanism. (*Figs. 2, 2ª, 2ᵇ, 10 and 49 to 54*).—The principal parts of the bottle feeding mechanism are mounted upon a lateral extension 670 (Fig. 50) of the table 15. This extension is provided with a tongue 671 which underlies the edge of the table and is bolted thereto. The outer edge of this extension is supported by a pair of braces 672 and 673 whose lower ends are bolted to the base plate 10.

Supporting posts 674 and 675 (Fig. 49) are secured to the extension member 670. Spacer sleeves 676 and 677 are secured in spaced relation to the outer face of the post 675 and a plate 678 is bolted to the outer ends of the spacer sleeves by bolts which extend through the sleeves into the post.

A shaft 679 is journalled in bearings in the posts 674 and 675 respectively and the hub 680 of a sprocket wheel 681 is secured to the shaft where the latter projects inwardly beyond the post 675. A sprocket chain 682 is trained about the wheel 681 and passes about a driving sprocket 683 (Fig. 50) upon the shaft 59 above described. This shaft 59 is mounted in bracket arms 684 and 685 secured to the braces 672 and 673 respectively. A tension sprocket 686 is mounted upon a shaft 687 carried by brackets 688 and 689 adjustably secured to the braces 672 and 673. This tension sprocket bears against the chain 682 and may be adjusted properly to tension the latter.

A sprocket 690 is mounted upon the shaft 679 at a point intermediate the posts 674 and 675 and a link chain 691 is trained about this sprocket to be driven thereby. This chain extends to any convenient point, being guided by suitable sprockets or guide wheels not shown. At intervals the chain 691 is furnished with brackets 692 having laterally directed arms which support substantially semi-circular yoke members 693 and 694 respectively. These yoke members are adapted to receive the articles to be wrapped and to convey them from a supply point to the feeding mechanism. Preferably the curved yoke members are so designed that their forward arms terminate in a plane below that of their rearmost arms to facilitate the delivery of the articles at the proper time.

Preferably the upper run of the chain 691 is supported by rails 695 and 696 which underlie the oppositely directed arms of the brackets upon which the yokes are mounted. If desired similar guide rails may be provided for the idle run of the chain. Guard rails 697 and 698 are disposed at opposite sides respectively of the upper run of the chain 691, such rails being spaced apart a distance substantially equal to the length of the articles to be supported by the chain. These rails thus prevent endwise movement of the article while being transported and insure their proper delivery in desired position at the end of the chain conveyor.

The upper ends of the posts 674 and 675 are connected by a cross bar 699 from which bracket arms 700 and 701 extend forwardly. Bracket members 703 and 704 are secured to the posts 675 and 674 respectively and carry at their forward ends a cross bar 702 upon which are mounted forwardly extending bracket members 705 and 706. The bracket members 700 and 705 are provided with aligned guide openings while the bracket arms 701 and 706 are also provided with aligned guide openings.

A bar 707 is arranged to slide vertically in the openings in the bracket members 700 and 705, while a similar bar 708 slides in the openings in the bracket members 701 and 706. The upper ends of the bars 707 and 708 are connected by a cross rail 709 while their lower ends are connected by a cross rail 710, the bars with their cross rails

thus constituting a vertically reciprocating plunger frame. To limit downward movement of this frame, the bars 707 and 708 are furnished with stop collars 711 engageable with the upper surfaces of the guiding brackets.

A bracket 712 is secured to the lower cross rail 710 and this bracket is pivotally connected to the lower end of a link 713 whose upper end is connected to the forward end of a lever arm 714 projecting forwardly from a rock shaft 715 journalled in bearings in the supporting posts 674 and 675.

The shaft 715 projects beyond the post 675 and its projecting end is furnished with a crank arm 716 pivotally connected at its outer end to a link 717 connected at its lower end to a crank arm 718 secured to a shaft 719. The shaft 719 is aligned with the shaft 679 and its inner end 720 is journalled in an axial bore in the end of the latter shaft. The outer end of the shaft 719 is journalled in a bearing in the plate 678.

Upon the outer end of the shaft 719 a crank arm 721 is secured which is connected by a link 722 to a bracket 723 fixed to a vertically sliding rod 724 which passes downwardly through an opening in the extension 670 of the table and is guided by a sleeve 725 secured to the upper surface of the table extension. The lower end of the sliding rod 724 is enlarged at 726 and forked to straddle the shaft 53. The enlargement of the sliding rod is furnished with a laterally projecting cam stud or roll 727 (Fig. 20) which engages a cam groove in a cam 728 secured to the shaft 53. This cam through the connections described imparts vertical reciprocating movement to the plunger frame.

The lower rail 710 of the plunger frame carries a plunger 729 having an upwardly concave under surface provided with a pair of spaced resilient pads 730 and 731. These pads are also upwardly concave and adapted to engage the peripheral surface of a bottle or other cylindrical article to be wrapped.

Blades 733 and 734 are secured to the lower rail 710 of the plunger frame and extend downwardly in substantially parallel relation at either end of the plunger 729. The function of these blades will hereinafter be described.

Substantially parallel vertical side bars 735 and 736 (Fig. 49) are secured at their upper ends respectively to lateral projections 737 and 738 carried by the bracket members 700 and 701 respectively. These parallel side members 735 and 736 are also secured to brackets projecting forwardly from the rail 702. A movable guide rail 739 is disposed parallel to the member 735 in spaced relation thereto while a similar guide rail 740 is arranged parallel to the bar 736.

The guide rail 739 is connected to the fixed side bar 735 by links 741 and 742 while the guide rail 740 is connected to the fixed bar 736 by the links 743 and 744 respectively. Bolts 745 are secured to the movable guide rails 739 and 740 and extend inwardly through vertically elongate openings in the bars 735 and 736 respectively. Certain of these bolts are provided with coiled springs interposed between the outer fixed bars and the inner movable guide rails, the springs tending to move the inner guide rails towards each other while the bolt heads limit such movement. The lower ends of these spring pressed guide rails engage the ends of the bottles as the latter are moved down toward the cradles as hereinafter described.

Brackets 747 and 747ª project forwardly from the posts 674, 675 respectively. These brackets provide bearings for a pair of substantially parallel spaced shafts 748 and 749. These shafts 748 and 749 project outwardly beyond the bracket 747ª carried by the post 675 and are furnished with toothed sectors 751 and 750 respectively which mesh with each other and thus constrain the shafts 748 and 749 to turn equally and in opposite directions. These sectors are provided with stop members 753 and 754 herein shown as untoothed portions which limit movement of the sectors in one direction. The shafts 748 and 749 also project beyond the other bracket 747 where they are furnished with adjustable coiled springs 755 so arranged that they tend to turn the shafts in opposite directions so as to bring the stop members 753 and 754 into engagement.

The shafts 748 and 749 support downwardly converging plates 756 and 756ª respectively which at their lower edges are furnished with bearings for anti-friction rollers 757 and 758. These shafts with their plates and rollers constitute a resilient receiver for the bottles or other articles as they are discharged from the conveyor chain 691. In order properly to direct the bottles or other articles from their point of discharge by the chain into the resilient receiver, a guide plate 759 is disposed in the space between the shaft 679 and the shaft 749. This guide plate is of a width such as to permit the bottle supporting yokes 694 and 693 of the chain to pass upon opposite sides of it and is inclined in such a manner as to support the bottles as they are dropped from the yokes and to direct them into the resilient receptacle. To prevent the bottles from jumping out of the receptacle due to their momentum, a guard rail 760 is provided which extends transversely across the receptacle above the horizontal plane of the shaft 748. This rail is supported in brackets 761 and 762 carried by the brackets 747 and 747ª.

The lower ends of the guard members 697

and 698 are formed of resilient material and are curved downwardly as indicated at 763, Fig. 52, to correspond to the path of movement of the bottles as they pass from the delivery chain into the resilient receptacle. These lower parts of the guard members lie substantially in the vertical planes of the resilient blades 733 and 734 of the plunger frame. The latter fingers normally extend to a point below the resilient receptacle when the plunger frame is in its upper position, and move downwardly with said frame as the latter is depressed.

The bottle herein illustrated as the article to be wrapped is indicated in Fig. 53 as comprising the substantially cylindrical body portion 766 provided with a short neck 767, the entire height of the bottle being substantially equal to the distance between the guide plates 697 and 698.

The chain 691 is continuously driven and is fed with bottles manually or by suitable feeding mechanism of any usual type, the plunger frame is reciprocated in time with the other elements of the wrapping mechanism, and as a bottle is discharged from the chain and rolls down into the resilient receptacle, the plunger frame is depressed toward the bottle, the pads 730 and 731 engaging the peripheral surface of the body portion of the bottle. Continued downward movement of the plunger frame pushes the bottle down, forcing the rollers 757 and 758 apart and finally pressing the bottle forcibly down into the trough-like cavity 86 of the cradle 2 which has previously been placed in position. During the downward movement of the plunger the bottle is kept in proper position by the blades 733 and 734 which move downwardly with the plunger, the bottles being supported and prevented from dropping freely by the resilient pressure of the guide rails 739 and 740 respectively, the blades passing upon opposite sides of the cradle as the bottle is deposited in the depression 86.

When the cradle 2 arrives at the position shown in Fig. 52 it has already been provided with the outer wrapper 571, the corrugated board 370[a] and the circular 236, the inner ends of the several pieces of wrapping material being securely clamped to the platform 82 of the cradle in the manner previously described. As the cradle arrives at the position shown in Fig. 52 the arm 94 with its wiper roll 103 occupies the position shown in this figure with the wiper roll below the plane of the projecting end of the wrapper 571. The arm is held in this position by the action of the spring 102 as previously described.

The cam follower roll 92 of the arm 94 is at this time in elevated position and as the cradle comes into bottle-receiving position this roll enters a slot 768 in a movable cam head 769 carried by a vertically movable post 770. This post projects upwardly through an opening in the table 15 and is guided for vertical movement by a sleeve 771 secured to the table. The lower end of the post 770 is guided in a fixed bracket 772 (Fig. 2[b]) secured to the under side of the table 15.

An arm 773 is fixedly secured to the post 770 and is connected to one end of a link 774 pivotally secured at its other end to a pin 775 projecting from a lever 776 swinging freely upon a shaft 777 (Figs. 2[a] and 2[b]) mounted in brackets 778 and 779, secured to the lower surface of the table. The free end of this lever 776 is provided with the outstanding pin 780 to which the lower end of a link 781 is pivotally secured. The upper end of this link is connected to a lever 782 carried by a shaft 782[a] journalled in bearing brackets 783 and 784 carried by the table. The free end of the lever 782 is pivotally connected to the upper end of a rod 785 whose lower end is forked and straddles the shaft 53. The forked lower end 786 of this rod is provided with a cam roll, 786[a], engaging a cam groove in the cam 787 fixed to the shaft 53.

The shaft 777 is provided with an arm 788 which is rocked by means of a cam 789 carried by the shaft 23[a]. The shaft 777 is also provided with a fixed crank arm 790 connected by a link 791 to the lower end of the post 792 which passes up through an opening in the table and is guided by a sleeve 793 secured to the upper surface of the table. This rod 792 supports the vertically movable clamp actuating cam plate 158[a] and 158[b] hereinbefore described.

The shaft 782[a] is furnished with a crank arm 795 connected by a link 796 to the lower end of a vertical sliding post 797 projecting upwardly through an opening in the table and guided by a sleeve 798. A cam block 799 (Figs. 2[b] and 56) is mounted upon the upper end of this post and is provided with a cam groove 800 for engagement with the cam roll 92 of the cradle lever 94 as will hereinafter be described.

Upper and lower parallel fixed cam plates 801, 801[a] of arcuate form are mounted in spaced relation to the table 15 upon posts 802 and 803. These cam plates extend substantially from the cam block 769 to the cam block 799. A second fixed cam plate 804 of arcuate form concentric with the table 1 extends around from the cam block 799 past the cylindrical wrapping mechanism and the end folding mechanism of a point near the delivery mechanism. This fixed cam plate is supported upon brackets 805, 806 and 807 at a lower level than cam plate 801. Another fixed cam plate 808 is arranged concentric with the cam plate 801. This plate 808 has for its function

the release of the clamping fingers of the cradle to permit the wrapper to be disengaged therefrom, and for this purpose has an upward incline 808ª adjacent to the cylindrical wrapping mechanism. Another fixed cam plate 809 (Fig. 10) extends in substantial continuation of the plate 804 in the neighborhood of the delivery mechanism and is provided with a cam rise 810 for the purpose to be hereinafter described.

When the cradle arrives at the position of the bottle feeding mechanism the wrappers as above described are clamped at their inner ends to the platform of the cradle and extend transversely across the trough 86. As the plunger moves downwardly and pushes the bottle into engagement with the upper surface of the wrapping material the latter is pressed downwardly into trough-like depression in the cradle and as its inner end is held fast the outer projecting end of the wrapping material follows the bottle down into the depression until it partially encircles the bottle, its outer end assuming an upwardly directed position.

At substantially this time the post 770 is depressed thus swinging the arm 94 upwardly and causing the rolls 104 and 105 to rise above the edge of the cradle and into contact with the wrapper. The rolls rise to a height slightly above the horizontal plane of the axis of the bottle so that they not only hold the free end of the wrapper against the bottle but also hold the bottle down in the cradle so that it will not spring out of the latter during its subsequent travel to the cylindrical wrapping mechanism.

Immediately after the bottle has been pressed downwardly into the depression 86 of the cradle as above described, the plunger frame returns to its normal position and the table with the cradle is rotated sufficiently to bring the cradle opposite to the cylindrical wrapping mechanism. At the beginning of this movement of the cradle, the rollers 158 and 159 which control the wrapper clamping fingers of the cradle ride up the incline 808ª of the cam plate 808 thus lifting the clamping fingers and releasing the inner ends of the sheets of wrapping material all of which abut against the flange 83. The cam roll 92 after leaving the cam groove 768 moves along between cam plates 801 and 801ª which maintain the lever 94 and the wiper roll 103 in the position shown in Fig. 55 until the cradle has arrived at the cylindrical wrapping mechanism.

Cylindrical wrapping mechanism (Figs. 55 and 56).—The principal parts of the cylindrical mechanism are mounted upon a bracket 811 bolted to the upper surface of the tabe 15. This bracket comprises an upright 812 having an inwardly directed arm 813 which together with a plate 813ª bolted thereto constitutes a fixed head for the support of certain of the movable parts of the mechanism.

The forward or inner end of the plate 813ª is furnished with an elongate bearing sleeve in which a shaft 814 is mounted. Arms 815 and 816 are pinned to the opposite ends of the shaft 814. The arm 816 is provided with a rearwardly extending portion 817 to which the upper end of a link 818 is pivotally connected. The lower end of this link is connected to a collar 819 fixed upon the vertically movable post 724 hereinbefore described, whose upper end slides in a guide opening in a member forming part of the fixed head.

A rod 820 connects the arms 815 and 816 near their inner ends while a rod 821 connects said arms near their outer ends. The rod 821 supports a wiper plate 823 which has spaced ears encircling the rod. A spring 824 is coiled about the rod 821 between the supporting ears of the plate 823 and has one end 825 engaging the inner surface of the plate while the other end of the spring engages a pin 826 projecting from one of the arms. This spring tends to swing the plate 823 in a clockwise direction, as viewed in Figs. 55 and 56.

An arm 827 is pivotally mounted upon the rod 820 adjacent to each of the arms 815 and 816 and at the inner sides of the latter. These arms 827 terminate in presser feet 828 having concave surfaces 829 adapted to engage the wrapper and to hold the bottle in position during the wrapping operation. Each of the arms 827 is provided with an upstanding member 830 to which one end of a coil spring 831 is secured. The other end of each spring is secured to a post 832 carried by a plate 833 adjustably secured to the adjacent arm 815 and 816 respectively. The springs 831 tend to swing the arms 827 in a counterclockwise direction, the motion being limited by a stop 834 carried by a bracket 835 secured to each of the arms 815 and 816.

A curved arm 839 is secured to the fixed head and extends outwardly and downwardly in the direction of movement of the table and is then turned inwardly and rearwardly providing a wrapper curling finger 840 whose tapering tip is positioned to lie within the slot or groove 84 of the cradle as the latter moves into operative position relatively to the mechanism just described.

The ends 841 of the several sheets of wrapping material which have previously been held against the abutment flange 83 of the cradle and which have just been freed from the clamping fingers by the action of the cam rail 808 are turned upwardly by the finger 840 as the cradle assumes the position shown in Fig. 55. In accomplishing this action the finger 840 entering the advancing end of the

slot 84 engages the advancing edge of the wrapping material and curls its advancing corner upwardly and as the movement progresses the entire inner edge of the wrapping material is curled upwardly to assume substantially the position shown in Fig. 55.

The cradle now comes to rest and the post 724 is moved downwardly thus swinging the arms 815 and 816 down and bringing the concave surfaces 829 of the presser feet 828 into contact with the outer wrapper thus pressing the wrapping material firmly against the peripheral surface of the bottle. At substantially the same time the edge of the wiper plate 823 comes into engagement with the outer wrapper and as the arms complete their movement this wiper plate slides inwardly and over the upper part of the bottle wiping the wrapping material closely into engagement therewith.

As the cradle assumes the position shown in Fig. 55 the cam roll 92 enters the slot 800 of the cam head 799 carried by the post 798, such head then being in elevated position. Immediately after the wiper plate 823 has assumed the position of Fig. 56 the post 798 with its head 799 is depressed swinging the wiper roll 103 up and over the upper part of the bottle thus wiping the free end portion 842 of the inner wrapper into close engagement with the outer surface of the bottle, the motion of the roller continuing until the projecting end 843 of the outer wrapper has been wiped over and into contact with the wiper plate 823. The end 841 and 842 of the inner wrapper substantially abut each other while the projecting end 843 of the outer wrapper overlaps the joint between them.

The post 724 now rises causing the wiper plate 823 to withdraw from beneath the projecting end 843 of the outer wrapper and permitting the roller 103 to press such projecting end firmly over the opposite end of the outer wrapper. As the post 724 resumes its normal position the presser feet are removed from engagement with the wrapper and the wrapper remains held in firm contact with the bottle by the wiper roll 103.

After the cylindrical wrapping of the bottle as just described, the cradle moves onwardly until positioned in operative relationship to the end folding mechanism. During this movement the roll 92 moves along in engagement with the surface of the cam 804 which keeps the roll 103 in firm contact with the wrapper and prevents displacement of the latter.

At the same time the rolls 158 and 159 which control the clamping fingers of the cradle run down the incline of the cam plate 808 and the clamping fingers are restored to clamping position without however affecting the wrapper which now encircles the bottle.

End folding mechanism (*Figs. 50 and 58 to 60*).—The principal parts of the end folding mechanism are supported upon a bracket 843[a] secured by bolts 844 to the edge of the table 15. This bracket is provided with a portion 845 having a vertical guide channel closed by a removable plate 846 and forming a guideway for a vertically movable post 847. The lower end of this post is secured by a link 848 to a crank arm 849 mounted upon a shaft 850 journalled in brackets 851 and 852 (Fig. 50) secured to the under side of the table. This shaft is provided with a second arm 851[a] which is rigidly secured to the arm 849 by a brace member 852[a]. The arm 851 is provided with a pin 854 which connects it to a bar 855 having a forked extremity 856 which straddles the shaft 53. This arm is provided with a cam roll 857 engaging a cam groove in a cam 858 carried by the shaft 53.

The post 847 is provided with a sliding collar 859 which is normally supported by engagement with stop lugs 860 projecting from the post 847. A supporting bar 861 projects upwardly from the collar 859 along the inner side of the post 847 and supports a sliding head 862 having a guide opening for the passage of the post 847. This head comprises substantially parallel inwardly directed arms 863 and 864 having lateral oppositely directed webs 865 and 866 respectively.

A yoke member 867 is secured to the upper end of the post 847 and is provided with oppositely directed arms 868 and 869 to which the upper ends of depending rods 870 and 871 are secured respectively. These rods extend downwardly through guide openings in the webs 865 and 866 of the head. Coiled springs 872 and 873 surround the rods 870 and 871 respectively, the upper ends of the springs bearing against the arms 868 and 869 of the yoke and their lower ends resting upon the webs 865 and 866 respectively.

An arm 874 projects forwardly from the post 847, being provided with a clamping portion 875 by which it is secured to the post. The forward end of this arm supports a plate 876 from which depends a cam member 877 having a wedge shaped lower end 880 whose opposite edges constitute cam elements.

A pair of substantially parallel shafts 881 and 882 are journaled in bearings in the forward ends of the arms 863 and 864 respectively. The ends of these shafts extend beyond said arms and the projecting ends of the respective shafts support pairs of wiper fingers 883 and 884 respectively. The lower portions of these wiper fingers are curved outwardly as indicated at 885 and their central portions are widened to form wiper cheeks 885[a].

The shafts 881 and 882 are provided with upstanding arms 886 and 887 respectively

carrying cam rolls 888 and 889 disposed substantially in the vertical plane of the cam 877. The arms 886 and 887 also support brackets 890 and 891 respectively connected by a spring 892 which tends to turn the shafts in opposite directions and to hold the wiper fingers 883 and 884 in divergent relation as shown in Fig. 59. A fixed wiper plate 893 is secured to the arm 864 of the head, depending between the wiper fingers 883 and 884, but in a plane nearer to the outer face of the arm 864 than that in which the wiper fingers swing. A similar fixed wiper plate 894 is supported by the arm 863 of the head.

The wiper plates 883 and 884 may be so arranged that the opposed edges of their wiper cheeks 885a lie in slightly different planes although this is not essential.

A stop member 895 is secured to the plate 846 and projects upwardly along the outer surface of the post 847 in a position to contact with the collar 859 as the post descends.

When the cradle arrives at the end folding mechanism the wiper roll 103 is holding the wrapper about the bottle as above described, the appearance of the cradle and associated parts being substantially as indicated in Fig. 73. In Fig. 74 the condition of the wrapper at this time is indicated, the ends of the wrapper projecting beyond the ends of the bottle and forming an open ended cylinder.

The post 847 is now depressed, bringing the fixed wiper plates 893 and 894 into engagement with the over-hanging portions 896 of the wrapper and forcing such portions downwardly against the opposite ends of the bottle. As the post 847 continues to descend the collar 859 comes into engagement with the upper end of the stop 895. Further descent of the post causes collar 859 to move away from the stop 860 and thrusts cam 877 downwardly between the rollers 888 and 889. The cam swings the wiper arms 883 and 884 toward each other, wiping in the side portions 898 and 899 (Fig. 74) of the wrapper where the latter projects beyond the ends of the bottle and bringing such side portions into the position shown in Fig. 75 where they are indicated at 900 and 901 as having been wiped in against the bottle ends, thus leaving only the lower part 902 of the wrapper projecting.

As the inner surface of the outer edge 843 of the outer wrapper is that which was coated with adhesive by the action of the applicator 623, such applicator leaving an elongate streak of adhesive 903 (Fig. 70) upon the edge of the wrapper, the continuing pressure of the wiper roll 103 upon this part of the wrapper insures the proper sticking of the edge of the wrapper to the underlying part of the same. Likewise the operation of the applicator rolls 541 produces daubs of adhesive 904 and 905 adjacent to the lateral margins of the outer wrapper and as the wrapper is turned in as indicated in Fig. 75, these daubs of adhesive spread over the folded part of the wrapper and permanently secure such folded parts in position.

Final end folding and delivery mechanism (Figs. 2, 59, and 61–67).—After the wrapper has been folded as shown in Fig. 75 the cradle is moved onwardly to the final folding and delivery mechanism. This mechanism is supported at its inner end upon a lateral projection 906 of the table 15 and at its outer end by a pair of spaced posts 907 and 908 which support a cross rail 909. As here illustrated the posts 907 and 908 are intended to be suspended from the ceiling of the room in which the machine is located or from some other elevated structure, but without substantial change they might be so arranged as to rest upon the floor.

Spaced brackets 910 and 911 are mounted upon the extension 906 of the table and these brackets are furnished with bearings 912 and 913 respectively in which a shaft 914 is mounted.

The shaft 914 supports a swinging transfer frame comprising the side members 915 and 916 connected at their upper ends by a cross bar 917. The bar 917 is secured by bolts to the ends of the side members 915 and 916 respectively and the frame thus constituted is braced by angle plates 918 at its upper corners. The side members 915 and 916 of the frame are provided with elongate slots for the reception of the shaft 914 to permit the frame to move bodily with respect to the shaft as well as to turn thereon. The frame is also provided with parallel guide bars 919 and 920 secured to its inner and outer faces, respectively, such guide bars projecting beyond the side members 915 and 916 of the frame and being furnished on their opposed projecting faces with guide channels for a purpose hereafter described.

The lower ends of the side members 915 and 916 are provided with aligned openings for the reception of bearing sleeves 921 and 922 respectively which project beyond the remote faces of the side members. These sleeves are furnished with square guide passages for the reception of square shafts 923 and 924 respectively. At their inner ends these shafts are furnished with plates 925 and 926 to which are secured resilient clamping pads 927 and 928 respectively. Springs 929 and 930 encircle the shafts 923 and 924 between the plates 925 and 926 and the lower ends of the frame members 916 and 915 respectively, the springs constantly tending to move the square shafts with their clamping pads toward each other.

The outer ends of the shafts 923 and 924

support brackets carrying transverse shafts 930[a] and 930[b] respectively. Cam rolls 931 turn upon the opposite ends of the shaft 930[a] while similar cam rolls 932 are mounted upon the opposite ends of the shaft 930[b].

Bearing brackets 933, 934, and 934[a] are arranged in alignment upon the extension 906 of the table and are provided with journal openings for a rock shaft 935. This shaft is furnished with a crank arm 936 (Fig. 62) connected by an adjustable connecting rod 937 to a crank pin 938 carried by a crank 939 secured to the shaft 56 (Figs. 2 and 63). This shaft, previously described, is mounted in brackets 940 and 941 depending from the under side of the extension member 906 and carries a sprocket wheel 942 which is driven by the chain 55 previously described.

The shaft 935 is provided with a pair of crank arms 936[a] and 937[a] (Figs. 61 and 63[a]) whose outer ends are provided with journal openings for the reception of the projecting portions of the sleeves 921 and 922 respectively carried by the members 916 and 915, the arrangement being such that when the shaft 935 rocks the frame will be swung and also moved bodily with relation to the shaft 914.

Cam carriers 943 and 944 (Figs. 63, 64 and 63[b]) are also supported upon the shaft 914. These carriers 943 and 944 are slotted longitudinally to permit them to slide relatively to the shaft 914 and are received in the guideways provided at the projecting ends of the opposed guide bars 919 and 920. The lower ends of the cam carriers 943 and 944 are provided with thickened heads 943[a] and 944[a] (Fig. 64) having longitudinal slots for the passage of the shafts 923 and 924 respectively. The outer surfaces of these thickened heads are furnished with cam faces 945 and 946 respectively for engagement by the cam rollers 931 and 932 respectively carried by the shafts 923 and 924.

The cross rail 917 of the frame above described is provided with a pair of upstanding brackets 947 and 947[a] to which latches 948 and 949 respectively are pivoted. These latches are furnished with notches 950 and 951 respectively, adapted to engage detent flanges 952 and 953 at the upper ends of the cam carrying bars 943 and 944 respectively. The upper ends of the latches are furnished with heads 954 and 955 respectively having projecting pins for positioning compression springs 956 and 957 respectively, the opposite ends of said springs being centered by pins projecting from brackets 958 and 959 respectively also mounted upon the cross rails 917.

The heads 954 and 955 of the latches are adapted to engage fixed cam abutments 960 and 961 mounted upon the bearings 912 and 913 respectively. These cam abutments are furnished with downwardly converging cam faces 962 and 963 respectively and with substantially parallel vertical faces 963 and 964.

To the central part of the rail 917 of the frame a pair of spaced depending plates 965 and 966 (Figs. 61 and 62) is secured. These plates are furnished with flanges at their lower ends to which an upwardly concave plate 967 (Fig. 62) is secured. This plate supports a resilient pad 968. A hookline cam 968[a] is secured to the shaft 935 and rocks with the latter, the purpose of this cam being hereinafter described.

Delivery chute.—The delivery chute which also takes part in the final end folding operation comprises a main portion having parallel spaced side walls and an entrance which flares outwardly and is constructed substantially as follows.

Substantially parallel supporting posts 969 and 970 (Fig. 61) are mounted upon the outer part of the extension member 906. These posts support a cross bar 971 provided with a bracket 972 having a substantially vertical post 972[a] adjacent to its right hand extremity as viewed in Fig. 66. This post is provided with an opening for the reception of the upper end of a rod 973 whose lower part is bent to lie closely adjacent to and parallel with the post 972[a]. This rod is secured to the post by a set screw 974. The depending portion of the rod constitutes a clamp for holding the inner end of a vertical resilient plate 975 secured against the post 972[a]. This plate constitutes one side wall of the flaring entrance to the main chute and as indicated in Fig. 61 extends inwardly from the bracket 970 being disposed at an oblique angle to the axis of the shaft 935 until it engages a guide post 976 secured to the inner end of the bracket 972 from which point the free end of the plate extends in a plane substantially perpendicular to the axis of the shaft 935. This latter part of the plate is preferably divided by a plurality of slots to form resilient guide fingers 977 (Fig. 65).

An adjustable bracket 978 (Figs. 64 and 65) supports a vertical stub shaft 979 upon which a guide roll 980 is mounted to turn. A spring 981 bears against the face of this roll frictionally to retard its free rotation. This spring is secured to a bracket 982 secured to a post 1016 hereinafter described. The curved face of the guide roll constitutes the other wall of the flaring entrance to the chute.

The bracket 982 also supports a transversely extending arm 983 carrying an inwardly and upwardly directed support 984. This member is provided with a guide opening for a vertically sliding rod 985 whose upper end is guided in an opening in a bracket 986 secured to the support 984. The rod is pro-

vided with a collar 987 forming an abutment for the lower end of a spring 988 whose upper end bears against the under side of the bracket 986. The spring thus tends to move the rod 985 downwardly. At its lower end the rod is provided with a plate 989 having an upwardly concave lower surface and provided with a forwardly and upwardly directed resilient guide member 990. In normal position the plate 989 is spaced from the floor of the chute a distance less than the diameter of the articles being wrapped and this acts as a retainer for such article when the latter is forced beneath it.

The support 984 carries a cross bar 991 to which the forward ends of a pair of guide rods 992 and 993 are secured. These guide rods extend rearwardly any desired distance beyond their point of support.

A resilient hold-down plate 996 is secured at its forward end to the member 983 and extends outwardly in a direction substantially radial to the table 1. The outer part of this plate is furnished with a bracket 997 to which the lower end of a positioning rod 998 is secured. This rod is guided in openings in members such as 999 supported by the posts 907 and 908 and is provided with a collar 1001 forming an abutment for the lower end of a spring 1000 whose upper end bears against one of the guide brackets 999. The tendency of the spring is to push the rod 998 downwardly thus depressing the plate 996.

A bearing bracket 1002 (Figs. 66 and 67) is mounted upon the extension 906 of the table and is furnished with a journal opening for one end of a shaft 1003 whose other end is mounted in a bearing opening in the post 970. At its inner end this shaft carries a bevel gear 1004 which meshes with a bevel gear 1005 fixed to a vertical shaft 1006 turning in a bearing opening in the extension member 906 and journalled near its upper end in a bracket 1007 projecting from the post 970. A crank arm 1008 (Fig. 62) is secured to the shaft 1003 and is furnished with a cam roll 1009 which bears against the peripheral surface of a cam 1010 fixed to the shaft 56. A spring 1011 secured to the arm 1008 holds the cam roll 1009 in operative contact with the cam.

The shaft 1006 is furnished with a collar 1012 at its upper end constituting the hub of a bell crank lever comprising the arms 1013 and 1014 (Fig. 67). A shaft 1015 is journalled at its lower end in a bearing opening in the member 906 and near its upper end in a bearing opening in the cross rail 1016 secured to the rear edges of the posts 969 and 970. The upper end of the shaft 1015 is furnished with a crank arm 1017 which is connected to the arm 1014 of the bell crank lever by a link 1018.

A pair of stub shafts 1019 and 1020 are secured to the under side of the cross bar 909 (Fig. 64) carried by the supporting posts 907 and 908. Upon these stub shafts the hub members 1021 and 1022 (Fig. 67) are mounted to rotate. These hub members are furnished with the arms 1023 and 1024 at their lower ends, these arms being directed toward each other and being normally substantially parallel to the axis of the shaft 935. Arms 1025 and 1026 are secured to the upper ends of the hubs 1021 and 1022 respectively, these arms being substantially parallel to each other and at right angles to the arms 1023 and 1024 respectively.

A shaft 1027 is journalled at its lower end in the member 906 and at its upper end in a bearing opening in the cross rail 1016. This shaft is spaced from the shaft 1015 with which it is parallel, a distance substantially equal to the distance between the shafts 1019 and 1020. The shaft 1027 is furnished with an arm 1028 while the shaft 1015 is furnished with a similar arm 1029, the arms 1028 and 1029 being substantially parallel to the arms 1023 and 1024 respectively. A link 1030 connects the ends of the arms 1028 and 1023 while a similar and parallel link 1031 connects the arms 1029 and 1024.

The upper end of the shaft 1027 is furnished with an arm 1032 substantially parallel to the arm 1017 and having an offset part 1032[a] connected to the arm 1013 of the bell crank lever carried by the shaft 1006 by a link 1034.

The arms 1025, 1032, 1026 and 1017 are provided at their ends with stub shafts 1035 and 1036, 1037, and 1038 respectively. Upon these stub shafts are mounted spacer sleeves 1039, 1040, 1041 and 1042 respectively which support rails 1043 and 1044 disposed respectively upon either side of the chute proper. The rails 1043 and 1044 are substantially parallel and are moved toward and from each other, while maintaining their parallel relation by the mechanism described.

The rail 1043 is furnished with a pair of longitudinally adjustable brackets 1045 and 1046 (Fig. 64) while the rail 1044 is furnished with similar adjustable brackets 1047 and 1048. The brackets 1045 and 1046 are furnished with inwardly extending adjustable supports 1049 and 1050 (Fig. 61) while the brackets 1047 and 1048 carry the inwardly directed adjustable supports 1051 and 1052 respectively.

One side wall 1053 of the delivery chute proper is carried by the supports 1051 and 1052, the other side wall 1054 being carried by the supports 1051 and 1052. The side walls 1053 and 1054 are provided with strips of felt or other suitable resilient material indicated at 1055 and 1056 respectively constituting a lining for the side walls. The floor of the chute consists of a plate 1057 secured at its forward or inner end to the

cross rail 971 while its outer end is supported upon a bracket 1058 carried by the cross bar 909.

The operation of the above mechanism is substantially as follows. When the cradle arrives in position before the final folding and delivery mechanism, the latter occupies substantially the position indicated in Figs. 64 and 65, the wrapper upon the bottle which rests in the cradle being in substantially the condition indicated in Fig. 75, the wiper roll carried by the arm of the cradle being still in the position shown in Fig. 73. As the cradle approaches the delivery mechanism the cam roll 92 of the cradle arm 94 engages the high part 810 of the cam rail 809 thereby swinging the arm downwardly to a position similar to that shown in Fig. 72. As by this time the adhesive along the longitudinal seam of the outer wrapper has at least partially set the withdrawal of the wrapper roll is permissible at this time. The shaft 56 is now rocked in a counter clockwise direction carrying the hook shaped cam 968[a] downwardly into engagement with the roll 109 carried by the main member of the wiper frame of the cradle. This hooked cam by engagement with the roll pulls the member downwardly until the wiper roll is disengaged from the wrapper as shown in Figs. 50 and 62 thus avoiding any interference with the lifting of the wrapped article from the cradle.

During the downward swing of the cam hook 968[a] the crank arms 936[a] and 937[a] swing the frame comprising the side members 915 and 916 together with their associated parts outwardly and downwardly. At this time the latches 948 and 949 engage the flanges 952 and 953 of the cam carrying members 943 and 944 respectively. These members are so positioned at this time that their cam surfaces 945 and 946 engage the rollers 931 and 932, thus holding the shafts 923 and 924 in outer position with the pads 927 and 928 separated to their fullest extent.

During the swinging of the frame it is first pushed outwardly upon the shaft 914 so that as it assumes vertical position the heads 954 and 955 of the latches are above the cam surfaces 962 and 963, but as the frame approaches its final position it moves vertically downward upon the shaft 914 until the upper ends of the slots in the side members 916 and 915 rest upon the shaft. During this final movement the heads of the latches engage the cam surfaces 962 and 963 whereby the lower ends of the latches are swung outwardly releasing the cam carriers 943 and 944. These members now drop under the action of gravity assisted by the springs 929 and 930, thereby permitting said springs to move the shafts 923 and 924 inwardly. This causes the pads 927 and 928 to engage the folded ends of the wrapper at the opposite ends of the article resting in the cradle, the pad 968 at the same time coming down into engagement with the upper part of the article along the longitudinal seam in the wrapper.

At this time the lower parts 902 of the wrapper are projecting as seen in Fig. 75 and are not engaged by the clamp pads 927 and 928.

The rock shaft 935 now starts the swing in a clockwise direction first pushing the frame outwardly upon the shaft 914 and then as the frame approaches the horizontal position shown in Fig. 65 gradually moving the frame outwardly until it is stopped by engagement with the shaft 914. During this movement of the frame the partially wrapped article is turned through a quarter revolution and is thrust into the flaring entrance-opening defined by the plate 975 and the roller 980, and leading to the delivery chute. The plate and roller are spaced apart a distance substantially equal to the length of the finished package so that the projecting ends 902 of the wrapper are wiped in by engagement with the plate and roller respectively and caused to lie snugly against the ends of the article.

As the wrapped article is forced into the entrance of the chute it passes beneath the guide member 990 of the plate 989 forcing the latter plate up against the spring 988 which thus clamps the article against the bottom wall of the chute. During the last part of the movement of the frame toward the entrance to the chute the ends of the slots in the cam carriers 943 and 944 engage the shaft 914 so that their further movement with the frame is terminated. As the frame continues on it moves the shafts 923 and 924 relatively to the heads 943[a] and 944[a] of the cam carriers, thus causing the rolls 931 and 932 to move up along the cam inclines, withdrawing the clamping pads 927 and 928 from the ends of the article and releasing the latter.

When the frame returns with the next partially wrapped article, the above operations are repeated and as the newly arriving article is thrust into the entrance to the chute, the last previously wrapped article is forced along the chute a distance substantially equal to its diameter. As it passes from between the fingers 977 and the roller 990 the side walls 1053 and 1054 of the chute are separated temporarily to permit the article to pass between them but immediately after its entrance the side walls are again moved toward each other so as firmly to compress the folded ends of the wrapper and to hold them in proper position while the adhesive is setting. At the same time the guide rods 992 and 993 and the hold-down plate 996 prevent the wrapped articles from rising

from between the walls of the chute under the pressure exerted upon the end of the series as each new article is forced into the receiving end of the chute.

The articles thus advance along the delivery chute intermittently and at the end of the chute may be removed manually or may be deposited upon a conveyor as may be desired, the length of the chute being determined by the time necessary for the adhesive to set properly and for the pressure exerted by its side walls thoroughly to press and set the folded material at the ends of the wrapper.

At the next forward step of the table the empty cradle is again presented before the outer wrapper feed mechanism ready to start the cycle of operations anew.

While the progress of but one cradle has hereinabove been described it is obvious that each of the cradles carried by the table passes through the same cycle of operations, and that all of the above operations are taking place simultaneously as respects successive cradles of the series.

I claim:

1. A package wrapping machine having a rotary table, means for rotating the table, a supporting cradle mounted upon the table, means for supplying wrapping material to the cradle, mechanism disposed adjacent to the table for depositing spaced daubs of adhesive upon wrapping material carried by the cradle as the latter is brought into operative relation to said mechanism by the rotation of the table, means for depositing an article to be wrapped upon the wrapper carried by the cradle, means for folding the wrapper cylindrically about the article, and means for folding in the ends of the wrapper.

2. A package wrapping machine having a table rotating about a vertical axis, means for successively depositing an outer wrapper and a piece of cushioning material upon the table and means for applying adhesive to spaced areas of the outer wrapper.

3. A package wrapping machine having a single rotary table, a support carried thereby, a plurality of mechanisms including means for presenting a plurality of superposed sheets of wrapper material, means for applying adhesive to spaced areas of the wrapper, and wrapper folding means, disposed at spaced intervals about the periphery of the table, drive means for rotating the table step by step to bring the support successively opposite to the several mechanisms.

4. A package wrapping machine having a movable article supporting cradle comprising a base member, a substantially flat platform, and an article receiving trough adjacent to one edge of the platform, and a fixed wiper finger, and means for moving the cradle, the platform having a groove in its upper surface elongate in the direction of movement of the cradle for the reception of the end of the wiper finger.

5. A package wrapping machine having a movable article supporting cradle comprising a substantially flat platform, an attaching base member at one side of the platform, a trough-like depression at the opposite side of the platform, and a fixed wiper finger, the platform having an arcuate groove extending along the edge of the depression for the reception of the wiper finger.

6. A package wrapping machine having a rotary supporting cradle, said cradle comprising a platform, clamping means associated therewith, an article receiving trough adjacent to one edge of the platform, and a fixed wiper finger, the platform having a channel in its upper surface concentric with the axis of rotation of the cradle for the reception of the end of the wiper finger.

7. A package wrapping machine having a supporting cradle comprising an elongate platform, a rib projecting upwardly from one edge of the platform, said rib having a guide slot therein, and a movable arm disposed within the guide slot, said arm cooperating with the platform to constitute a clamp and being provided with a wrapper penetrating prong and resilient means normally tending to hold the arm in contact with the platform.

8. A package wrapping machine having a supporting cradle comprising an attaching base, a platform projecting from one side thereof, said platform having an opening therein, lugs projecting from the base, a shaft journalled in the lugs, a frame mounted on the shaft, an arm projecting from the frame, a prong carried by the arm, a spring surrounding the shaft normally tending to swing the arm into contact with the platform, and means for guiding the arm in swinging to and from the platform.

9. A package wrapping machine having a supporting cradle comprising a platform having a substantially flat surface, a plurality of spaced clamping fingers independently movable toward and from said surface, said clamping fingers each being provided with a penetrating prong to prevent slipping of the material to be clamped, spring means normally tending to hold said fingers in contact with said surface, and means for moving said fingers in opposition to said spring means.

10. A package wrapping machine having a supporting cradle comprising a platform having an opening therein, a clamping lever arranged to swing toward and from the platform and provided with a projection adapted to enter the opening in the platform, and means normally tending to move the lever to a position such that the projection thereon is disposed within said opening.

11. A package wrapping machine having a supporting cradle comprising a fixed clamping element provided with spaced openings, a movable clamping element having pentrating prongs arranged to enter the respective openings when the movable clamping element is operatively positioned relatively to the fixed element, means tending to hold the movable element in such operative position, and means for retracting the movable element from the fixed element.

12. A package wrapping machine having a supporting cradle comprising an elongate platform having an opening adjacent to each end thereof, a pivoted frame having spaced arms each provided with a penetrating prong, means normally holding the frame in a position such that the penetrating prongs are disposed in the respective openings, and means whereby the frame may be retracted to remove the prongs from said openings.

13. A package wrapping machine having a cradle comprising a fixed clamping member, a plurality of independently movable clamping members cooperable therewith, each clamping member having an anti-slipping device, resilient means normally tending to hold said movable members in operative engagement with the fixed member, and independent means for moving said movable members away from the fixed member.

14. A package wrapping machine having a cradle comprising an elongate fixed clamping element, a pair of pivoted frames, each frame having a pair of spaced clamping arms, the arms of one pair being disposed between those of the other, a prong carried by each arm, means normally tending to swing said frames toward the fixed clamping element, and means for independently retracting said frames.

15. A package wrapping machine having a cradle comprising an elongate platform, and a pair of pivoted frames, each having spaced arms, the arms of one frame being interposed between those of the other, a prong carried by each arm, springs normally tending to hold the arms of each frame in contact with the surface of the platform, and independent means for retracting each frame.

16. A package wrapping machine having a cradle comprising an elongate platform, a pair of pivoted frames each having a pair of spaced parallel clamping arms, the arms of one frame being disposed between the arms of the other, a wrapper penetrating prong carried by each arm, independent springs acting upon the frames normally tending to move their arms into engagement with the platform, and independent means for moving the frames in opposition to their springs.

17. A package wrapping machine having a cradle comprising an elongate fixed clamping element, a pair of parallel shafts, a frame pivotally supported by each shaft, each frame having a clamping arm, penetrating prongs carried by the several arms cooperating with the fixed clamping element to hold a piece of wrapping material, a spring encircling each shaft and reacting upon the corresponding frame to move its clamping arm toward the fixed clamping element, and a slide bar engageable with each frame for retracting the latter with its arm from the fixed clamping element.

18. A package wrapping machine having a cradle comprising a fixed clamping element, a rock-shaft, a clamping arm fast to the shaft, a second clamping arm loose upon the shaft, anti-slipping means carried by each arm, spring means tending to move the arms into contact with the fixed clamping element, means for rocking the shaft, and lost motion connections between the shaft and the second clamping arm.

19. A package wrapping machine having a movable support, and a cradle provided with a base attached thereto, the cradle comprising a platform having a substantially flat upper surface, a shaft journaled in bearings in the base, a frame mounted upon the shaft and secured thereto, said frame having a clamping arm engageable with the upper surface of the platform, an arm loosely mounted on the shaft and also engageable with the upper surface of the platform, said latter arm having a penetrating prong, lost motion connections between the shaft and the last named arm, and means for turning the shaft.

20. A package wrapping machine having a cradle comprising an elongate platform, a pair of rock-shafts having their axes substantially parallel to the platform, a frame mounted upon each shaft, each frame having a pair of spaced clamping arms, one frame with its arms being disposed between the arms of the other frame, springs tending to swing said frames toward the platform, means connecting the inner frame to its shaft, a clamping arm free upon the latter shaft, lost motion connections between said free arm and its shaft, spring means tending to move the free arm into contact with the platform, prongs carried by the clamping arms adapted to enter corresponding openings in the platform, and independent means for rocking the shafts.

21. A package wrapping machine having a cradle comprising a fixed clamping element having an aperture, a shaft journalled to turn freely, a clamping arm fast to the shaft, a second clamping arm loose upon the shaft, said arms having prongs engageable with the apertures in the fixed clamping element,

a pin turning with the shaft and fitting loosely in an opening in the second clamping arm, and means for rocking the shaft.

22. A package wrapping machine having a cradle provided with an open trough, an infolder frame pivoted below the trough, said frame comprising jointed sections, the outer section supporting a wiper element and a cam roll, and an actuating arm projecting from the other section of the frame.

23. A wrapping machine having movable means for supporting a sheet of wrapping material, and means for depositing an inner wrapper upon said sheet comprising a conveyer for the inner wrapper, and means operating in timed relation to the movement of the movable supporting means for determining the delivery of the inner wrapper by the conveyer.

24. A wrapping machine having a movable support for an outer wrapper, an endless conveyer for inner wrapping material, means for moving said support intermittently and for stopping it adjacent to the delivery end of the conveyer, and means operating in timed relation to the support for determining delivery of material by the conveyer to the support only when the support is stopped adjacent to the conveyer.

25. A wrapping machine having a wrapper support movable in a predetermined path, means for moving the support and for stopping it in receiving position, and means operative only while the support is so stopped for simultaneously delivering a plurality of independent pieces of wrapping material to the support.

26. A wrapping machine having a wrapper support movable in a predetermined path, means for moving the support and for stopping it in receiving position, and a plurality of constantly moving conveyers each constructed and arranged to deliver a piece of wrapping material to the support only while the latter is stopped in receiving position.

27. A package wrapping machine having a rotary table, means for rotating the table, a series of spaced supporting cradles mounted upon the table, and mechanism disposed adjacent to the table for simultaneously depositing a plurality of pieces of wrapping material upon each cradle as the several cradles are successively brought into operative relation to said mechanism by the rotation of the table.

28. A wrapping machine having a rotary wrapper support movable in a horizontal plane, means for stopping said support in receiving position, and a plurality of superposed endless conveyers constructed and arranged simultaneously to deliver pieces of material in superposed relation to the support only while the latter is in receiving position.

29. A wrapping machine having a wrapper support movable in a predetermined path, means for stopping the support in receiving position, a substantially horizontal conveyer, a second conveyer disposed above the first, the second conveyer terminating closely adjacent to the delivery end of the first, and means for determining substantially simultaneous delivery of material from both conveyers to the support only while the latter is in receiving position.

30. A wrapping machine having a rotary support for a wrapper, an endless constantly moving conveyer, means for moving the movable support and for stopping it adjacent to the delivering end of the conveyer, and an automatically operating gate for determining delivery of material by the conveyer to the support.

31. A wrapping machine having a rotary wrapper support, an endless constantly moving conveyer, means for moving the support and for stopping it in position to receive wrapping material from the conveyer, a gate member normally positioned to prevent delivery of material by the conveyer, and means operating in timed relation to the support for opening the gate when the support is in receiving position.

32. A wrapping machine having a rotary support for an outer wrapper, an endless constantly moving conveyer, means for moving the support and for stopping it adjacent to the delivery end of the conveyer, means for feeding an inner wrapper to the conveyer, and a movable gate determining delivery of the inner wrapper by the conveyer to the support.

33. A wrapping machine having a rotary wrapper support, an endless constantly moving conveyer, means for moving the support and for stopping it adjacent to the delivery end of the conveyer, means for feeding wrapping material to the conveyer, a gate positioned adjacent to the delivery end of the conveyer and normally preventing delivery of material carried by the latter, and means operating in timed relation to the wrapper support for opening the gate.

34. A wrapping machine having a rotary wrapper support, an endless constantly moving belt conveyer, means for moving the support and for stopping it in a position to receive material from the conveyer, a shaft extending transversely of the conveyer, a lever secured to the shaft, said lever carrying a gate member normally disposed in the path of material moved by the conveyer, and means for rocking the shaft to remove the gate from said path when the support is stopped in receiving position.

35. A wrapping machine having a rotary wrapper support, an endless conveyer, means for moving the support and for stopping it adjacent to the delivery end of the conveyer,

a shaft extending transversely of the conveyer and below its operative run, a lever arm secured to the shaft having an upwardly projecting finger normally disposed in the path of material moving with the conveyer, a cam rotating in time with the means for moving the wrapper support, and means actuated by the cam for rocking the shaft and retracting the finger from the path of the material when the support is stopped.

36. A wrapping machine having a rotary wrapper support, means for moving it to receiving position, a pair of constantly moving endless belts terminating adjacent to the receiving position of the support, a gate determining delivery of material by each belt, and means for simultaneously opening said gate when the support is in receiving position.

37. A wrapping machine having a movable wrapper support, means for moving it to receiving position, a pair of superposed constantly moving endless conveyers, a shaft extending transversely of each conveyer, a gate supporting lever secured to each shaft, a gate member carried by each lever, an actuating lever secured to each shaft, a rod having operative engagement with each actuating lever, resilient means normally holding the rod in inoperative position, and means operating in timed relation to the support moving means to move the rod in opposition to the resilient means and thereby to open both gates.

38. A wrapping machine having a movable wrapper support, means for moving it to receiving position, a pair of superposed constantly moving endless conveyers terminating adjacent to and slightly above the plane of the support when in receiving position, gate members normally disposed to stop material moving with either conveyer before reaching the delivery ends of the latter, a common actuating member for the gates, and a shaft turning in timed relation to the means for moving the support and provided with means for operating the gate actuating member to open both gates when the support is in receiving position.

39. A wrapping machine having a rotary wrapper support, a wrapper feeder, and means for transferring a wrapper from the feeder to the support comprising a continuously moving endless conveyer, means for pressing the wrapper into contact with the conveyer, and resilient means located intermediate the delivery end of the conveyer and the wrapper support for preventing rebound of the wrapping material.

40. A wrapping machine having a rotary wrapper support, means for temporarily stopping the support in receiving position, a wrapper feeder, and means for transferring a wrapper delivered by the feeder to the support comprising an endless constantly moving conveyer, means for pressing the wrapper into contact with the conveyer, and a bristle brush intermediate the delivery end of the conveyer and the receiving position of the wrapper support for preventing rebound of the wrapper as it passes onto the support.

41. A wrapping machine having a movable wrapper support, means for moving it to receiving position, a constantly moving conveyer terminating adjacent to the support when in receiving position, a gate normally preventing delivery of material by the conveyer, a movable presser device for holding material in frictional contact with the conveyer, means normally maintaining the presser in inoperative position, and means for opening the gate and moving the presser into operative position.

42. A wrapping machine having a rotary wrapper support, a wrapper feeder, a constantly moving endless belt upon which wrappers are deposited by the feeder, means for intermittently moving the support and stopping it in a position to receive wrappers from the conveyer, a presser roll normally resting upon the operative run of the belt, a normally inoperative stop finger, a rotating shaft, and means actuated by the shaft simultaneously to separate the presser roll from the belt and for moving the stop finger into the path of movement of a wrapper carried by the belt.

43. A wrapping machine having a movable wrapper support, a conveyer, and means for intermittently moving the support and stopping it in a position to receive material from the conveyer, said conveyer comprising an endless constantly driven belt, a plurality of brackets disposed in spaced relation longitudinally of the belt, a lever journalled in each bracket, and a roller carried by each lever constructed and arranged to rest upon material moving with the operative run of the belt to ensure frictional contact between the material and belt.

44. A wrapping machine having a movable wrapper support, means for moving it to receiving position, a constantly moving belt conveyer terminating adjacent to the receiving position of the support, a pivoted gate normally preventing delivery of the material by the conveyer, a lever overlying the conveyer adjacent to the gate and supporting a presser roll, an actuating arm for the lever, an actuating arm for the gate, a bar engaging both arms, a cam device normally holding the bar in position to maintain the gate closed and the presser roll in raised position, and resilient means for moving the bar to open the gate and drop the presser roll when the bar is released by the cam.

45. A wrapping machine having a rotary wrapper support, means for stopping it in receiving position, an endless conveyer for delivering material to the support while in

said position, means for supporting a vertical stack of sheets of wrapping material adjacent to the conveyer, and means operating in timed relation to the support moving means for successively removing sheets from the stack and delivering them to the conveyer.

46. In a wrapping machine, in combination, a rotary wrapper support, means for intermittently moving the support, superposed conveyers for delivering wrapping material to the support, means for supporting a vertical stack of wrapping elements adjacent to the side of one conveyer, means for supporting a horizontal stack of wrapping elements adjacent to the end of the other conveyer, independent means for feeding wrapper elements from the stack to the respective conveyers, and means for operating the several feeding means in time with the movement of the wrapper support.

47. A wrapping machine having a receiver for articles to be wrapped comprising substantially parallel shafts, a plate secured to each shaft, a roller at the free edge of each plate, and means tending to swing said shafts in opposite direction to cause the plates to converge toward each other.

48. A wrapping machine having a receiver for articles to be wrapped comprising a pair of downwardly converging members pivoted to swing about their upper edges, a resilient roll at the lower edge of each member, spring means tending to swing the lower edges of the members toward each other, and stop means for limiting such movement.

49. A wrapping machine having a receiver for articles to be wrapped comprising a pair of substantially parallel rotary shafts, a plate secured at its upper edge to each shaft, means tending to turn the shafts in opposite directions normally to hold the plates in downwardly converging relation, and intermeshing gears secured to the respective shafts to compel one to turn to the same extent as but oppositely to the other.

50. A wrapping machine having a receiver for articles to be wrapped comprising a pair of substantially parallel rotary shafts, a plate secured at its upper edge to each shaft, the plates normally converging downwardly, a spring coiled about each shaft tending to hold the shafts and plates in normal position, and means operative upon movement of one plate to transmit equal and opposite movement to the other.

51. A wrapping machine comprising a reciprocable plunger, means for presenting an article to be wrapped in the path of the plunger to be moved by the latter, a resilient blade at each end of the plunger engageable with the opposite ends of an article while being moved by the plunger, a movable guide for each blade, and resilient means tending to move the guides inwardly toward the opposite ends respectively of the plunger.

52. A wrapping machine comprising a vertically reciprocating frame, a cushioned plunger carried thereby, means for presenting a substantially cylindrical article in the path of the plunger to be moved by the latter, an article positioning blade at either end of the plunger engageable with the opposite ends respectively of the cylindrical article, an elongate guide member at either edge of the reciprocating frame, links supporting said guide members for parallel motion, and spring means tending to move each guide member inwardly toward the corresponding positioning blade.

53. A wrapping machine for wrapping substantially cylindrical articles comprising a rotary support having a groove in its upper surface, means for laying a wrapper upon the support with one of its ends overlapping the groove, means for depositing an article upon the wrapper, and a finger fixed relatively to the support having its extremity disposed to enter said groove as the support rotates whereby to turn the end of the wrapper up against the article.

54. A wrapping machine for wrapping substantially cylindrical articles comprising means for winding a wrapper circumferentially about the article, means for partially folding in the wrapper at the ends of the article, a chute having a flaring entrance and relatively movable side walls, means for thrusting the partially wrapped articles sidewise into the entrance to the chute thereby completing the wrapping by wiping the projecting portions of the wrapper against the flaring sides of the entrance, and means operative thereafter for forcibly pressing the side walls of the chute proper against opposite ends of the wrapped article to set the folds.

55. A wrapping machine comprising a delivery chute having spaced substantially parallel side walls, means for moving said walls toward and from each other, and resilient material constituting the opposed surfaces of said walls.

56. A wrapping machine comprising a delivery chute having spaced elongate side walls, means supporting said walls for bodily movement in a direction transverse of their length, means for relatively moving the walls toward and from each other alternately to decrease and increase the width of the chute, and resilient material lining the opposed faces of said walls.

57. A wrapping machine comprising a chute having spaced relatively movable side walls, means for successively depositing articles within the chute, and means for relatively moving the walls of the chute apart as each article is deposited therein and for moving the walls toward each other in the

intervals between the deposit of successive articles.

58. A wrapping machine comprising means for winding a wrapper about a substantially cylindrical article, means for folding the margins of the wrapper over the opposite ends of the article, a delivery chute having relatively movable side walls, means for thrusting the wrapped article into the chute, and means for moving the side walls of the chute alternately toward and from each other respectively to subject the folded ends of the wrapper to pressure.

59. A wrapping machine comprising means for winding a wrapper about a substantially cylindrical article, said wrapper having adhesive upon its marginal portions, means for folding such marginal portions in at opposite ends of the article, a delivery chute having spaced relatively movable side walls, means for thrusting the wrapped article into one end of the chute, and means operative thereafter for moving the side walls relatively to each other to compress the folded ends of the wrapper.

60. A wrapping machine comprising a delivery chute having spaced side walls, a transferrer for inserting articles into the entrance to the chute, and means operative in time with said transferrer for alternately increasing and decreasing the width of the chute.

61. A wrapping machine comprising a delivery chute, having relatively movable side walls, a conveyor for articles, a transferrer for removing articles from the conveyor and inserting them into one end of the chute, and means operative in time with said transferrer for abnormally separating the side walls of the chute while the article is being inserted therein.

62. A wrapping machine comprising a conveyor, a series of devices thereon for supporting articles while being wrapped, a delivery chute, and a transferrer for removing wrapped articles from the successive supporting devices and thrusting them into the end of the chute, the chute comprising relatively movable side walls, and means for causing said walls alternately to separate and approach in time with the operation of the transferrer.

63. A wrapping machine comprising a series of cradles for holding substantially cylindrical articles while being wrapped, a delivery chute having substantially parallel relatively movable side walls, a transferrer for receiving the wrapped articles from the cradles and successively depositing them in one end of the chute, and means for moving the walls of the chute apart as each successive article is deposited therein and thereafter causing the walls to approach to exert pressure upon the ends of the said articles.

64. A wrapping machine having a chute comprising a movable side wall, a plurality of rock arms supporting said wall, and means for simultaneously swinging said arms to move the wall bodily in a direction substantially perpendicular to its length.

65. A wrapping machine having a chute comprising a movable side wall, a plurality of rock arms turning about parallel axes, means connecting the arms with the movable wall of the chute whereby to support the latter, and means for simultaneously swinging the rock arms to impart bodily movement to the wall.

66. A wrapping machine having a chute comprising a movable side wall, an elongate supporting bar, means connecting the wall to the bar, a pair of rock arms arranged to turn about axes defining a plane substantially parallel to that of the wall, and means for imparting simultaneous movement to the rock arms.

67. A wrapping machine having a chute comprising a movable side wall, a pair of substantially parallel rock shafts defining a plane substantially parallel to that of the wall, a rock arm carried by each shaft, means connecting the rock arms to the wall to support the latter, and an actuating arm secured to each shaft, said arms being substantially parallel and connected by a link.

68. A wrapping machine having a chute comprising a movable side wall, a supporting bar, brackets adjustably connecting the bar and wall, a pair of substantially vertical rock shafts each provided with a supporting arm, said arms normally being disposed in substantial alignment, means connecting said bar to the ends of the respective arms, an actuating arm secured to each rock shaft, said arms being substantially parallel and at right angles to the supporting arms, a link connecting the actuating arms, a power shaft, a rock shaft actuated thereby, and means connecting the latter rock shaft to one of the supporting arms.

69. A wrapping machine comprising a chute having opposed walls movable toward and from each other, and means for supporting and actuating said walls comprising a pair of rock arms for each wall, pivotal connections between said arms and the corresponding wall for supporting the latter, means constraining the arms appertaining to each wall to move in the same direction simultaneously, a power shaft, a cam, a rock shaft actuated by the cam, a two armed lever secured to the rock shaft, and links connecting the respective arms of the lever to a rock arm of each of the respective pairs.

70. A wrapping machine comprising a delivery chute having a wall, a retaining member disposed adjacent to the entrance to the chute, said member having a concave face opposed to said wall, resilient means urging said retaining member toward said wall of

the chute, and means for thrusting a wrapped article into the entrance to the chute between said wall and the concave face of the retainer.

71. A wrapping machine having a delivery chute provided with a bottom wall, a bracket extending laterally over the chute adjacent to the entrance thereto, guides supported by the bracket, a vertically movable rod sliding in said guides, a downwardly concave retainer secured to the lower end of the rod, said retainer having an upwardly inclined guide portion, and a spring encircling the rod and urging the retainer downwardly toward the bottom wall of the chute.

72. A wrapping machine comprising a delivery chute having a wall, a retainer at the entrance to the chute, resilient means urging the retainer toward the wall, said retainer having a concave face, an inclined guide extending from the concave face of the retainer, and means for forcing an article to be wrapped against the inclined guide whereby to move the retainer away from the wall to admit the article between the wall and retainer.

73. A wrapping machine having a delivery chute provided with a bottom wall, a retainer at the entrance of the chute, said retainer comprising a plate having a concave portion opposed to the bottom wall of the chute and an upwardly inclined guide portion projecting forwardly from the entrance to the chute, a vertically sliding rod supporting the retainer, resilient means urging the retainer toward the bottom wall of the chute, and means for thrusting wrapped articles between the retainer and bottom wall of the chute.

74. A wrapping machine having a rotary conveyor, an article supporting cradle carried thereby comprising a pivoted arm, a spring normally tending to hold said arm in position to retain an article within the cradle, a stud projecting laterally from the arm, a transferrer for removing articles from the cradle, and a cam operative in timed relation to the transferrer and engageable with the stud for moving the retaining arm to inoperative position.

75. A wrapping machine comprising a conveyor, article clamping means carried thereby, a delivery chute, means for transferring articles from the conveyor to the chute, and an oscillatory hook moving in timed relation to the transfer means and engageable with an element of the clamping means for rendering the latter inoperative.

76. A wrapping machine having a rotary table, an article supporting cradle carried thereby comprising a pivoted clamping arm, a resilient means normally tending to hold said arm in position to retain an article within the cradle, a roller stud projecting laterally from one side of the arm, an oscillatory hook-like cam engageable with the stud to retract the arm, and means for operating the table and cam in timed relation.

Signed by me at Boston, Massachusetts, this 13th day of March, 1924.

CARL H. BUNKER.