S. COOPER.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 1.

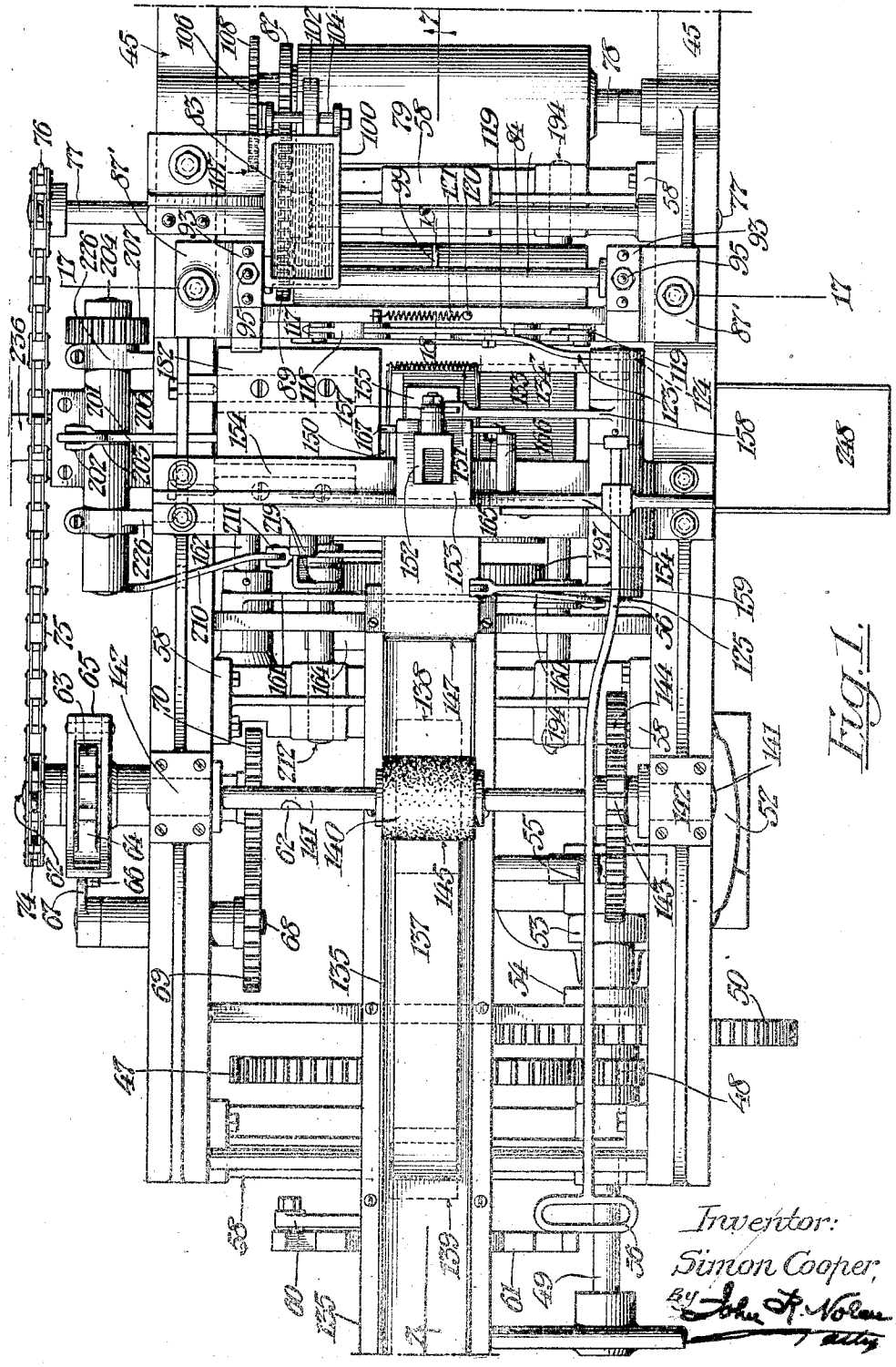


FIG. 1.

Inventor:
Simon Cooper,
By John F. Nolan
Atty

S. COOPER.

PACKAGE WRAPPING MACHINE.

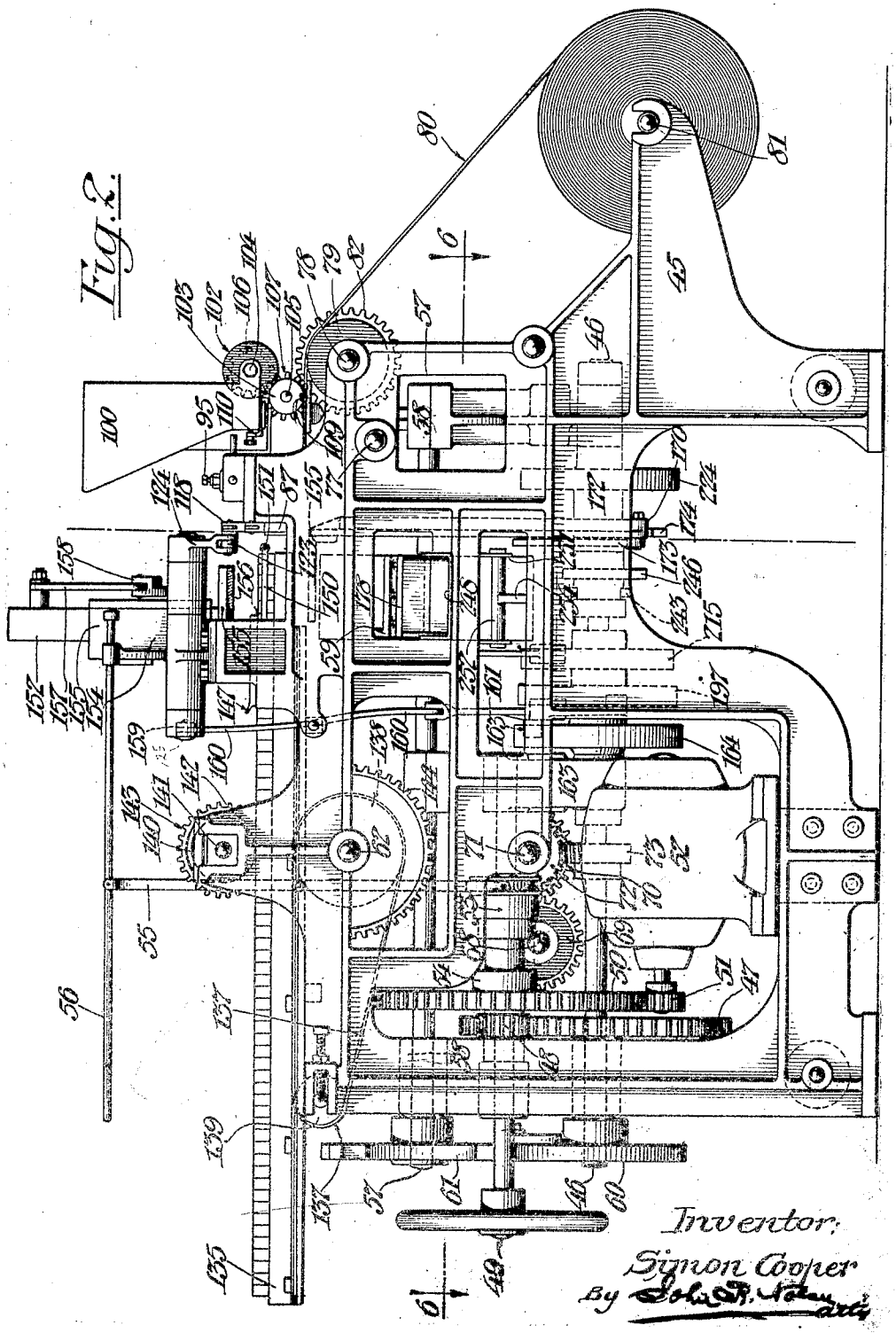
APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 2.

Fig. 2.



Inventor:
Simon Cooper
By John B. Adams
Atty

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PACKAGE WRAPPING MACHINE.

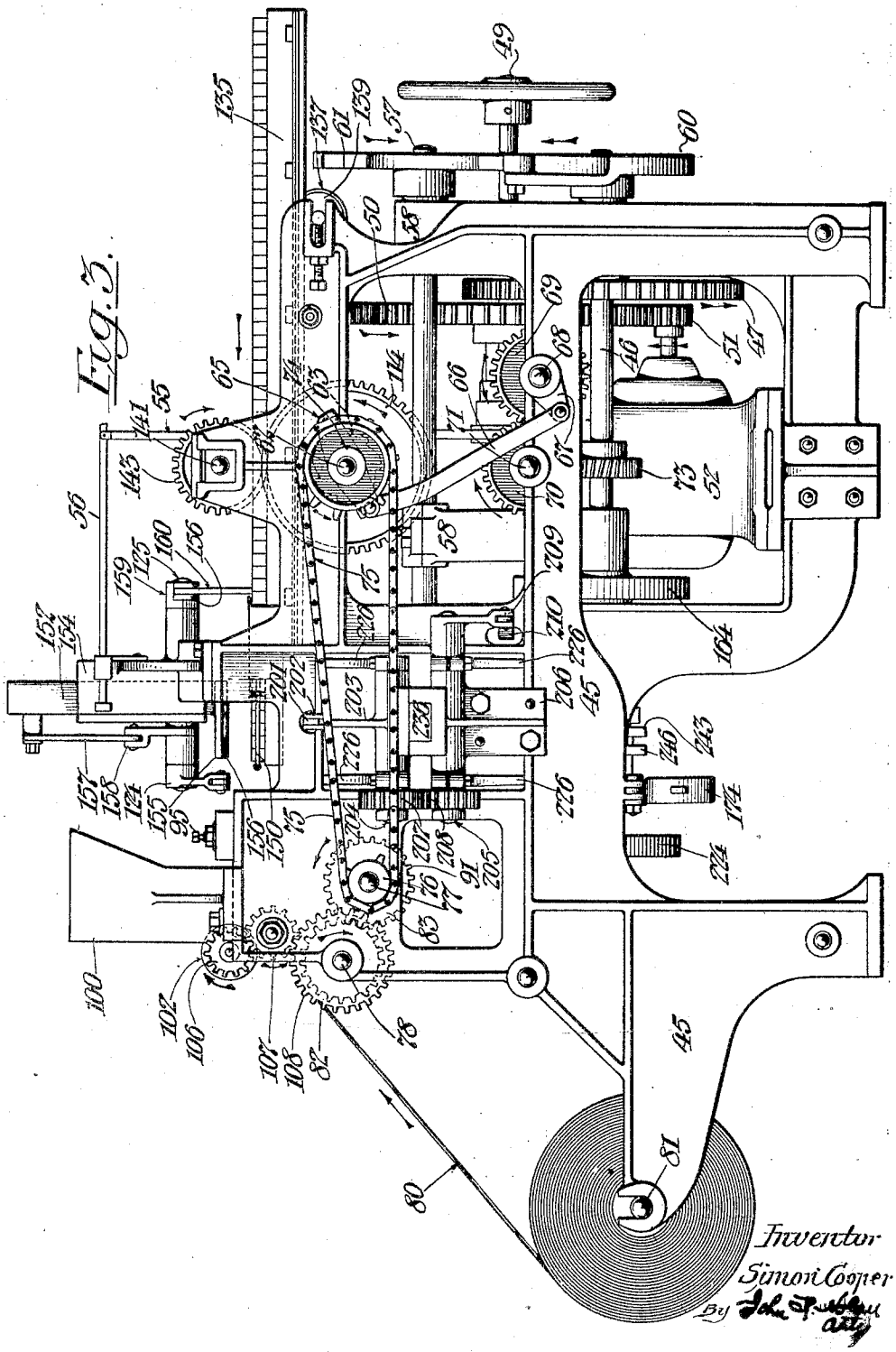
APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 3.

Fig. 3.



Inventor
Simon Cooper
By John T. Hall
Atty

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PACKAGE WRAPPING MACHINE.

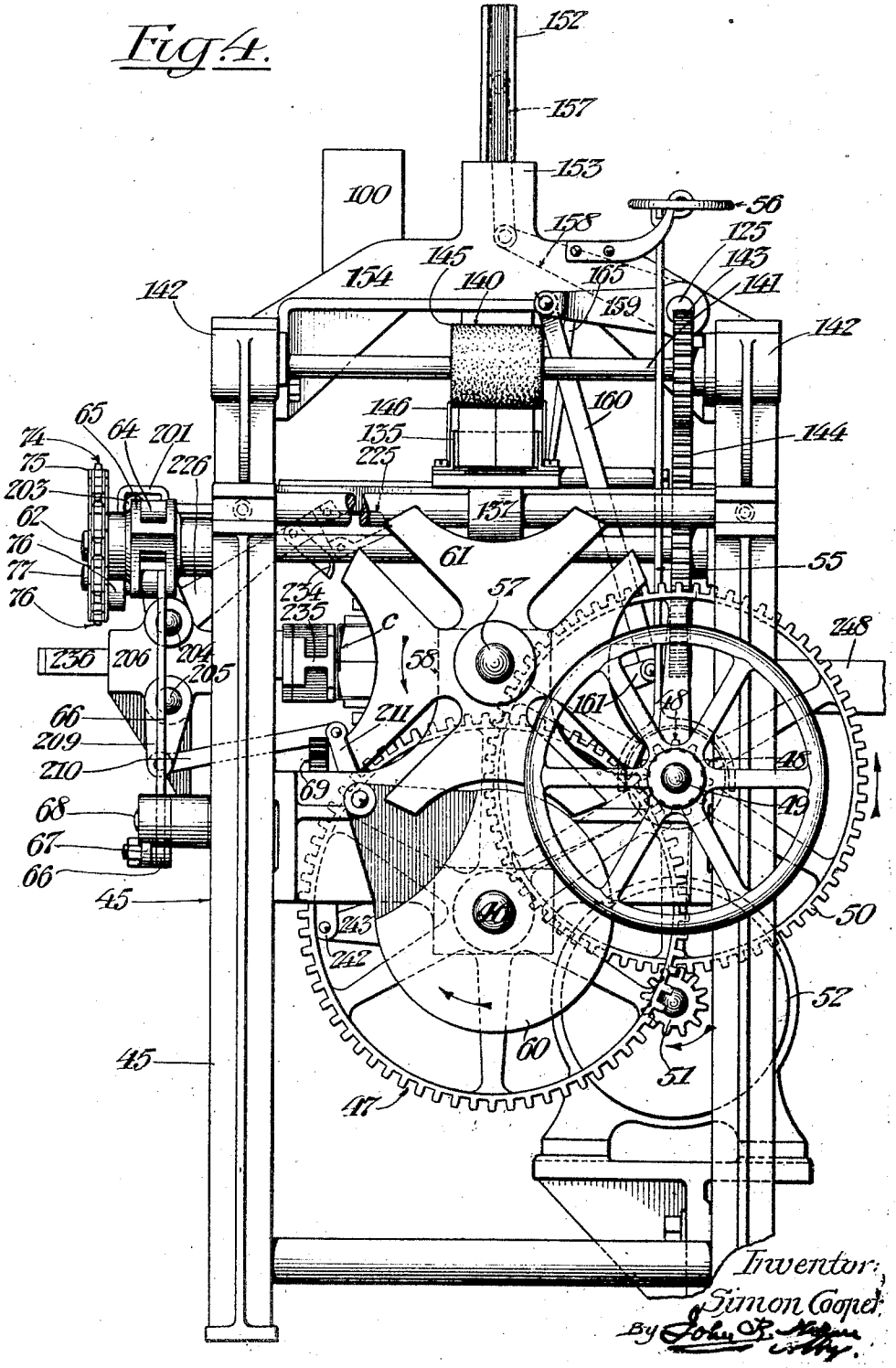
APPLICATION FILED SEPT. 27, 1918.

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Patented Aug. 31, 1920.

18 SHEETS—SHEET 4.

Fig. 4.



S. COOPER.

PACKAGE WRAPPING MACHINE.

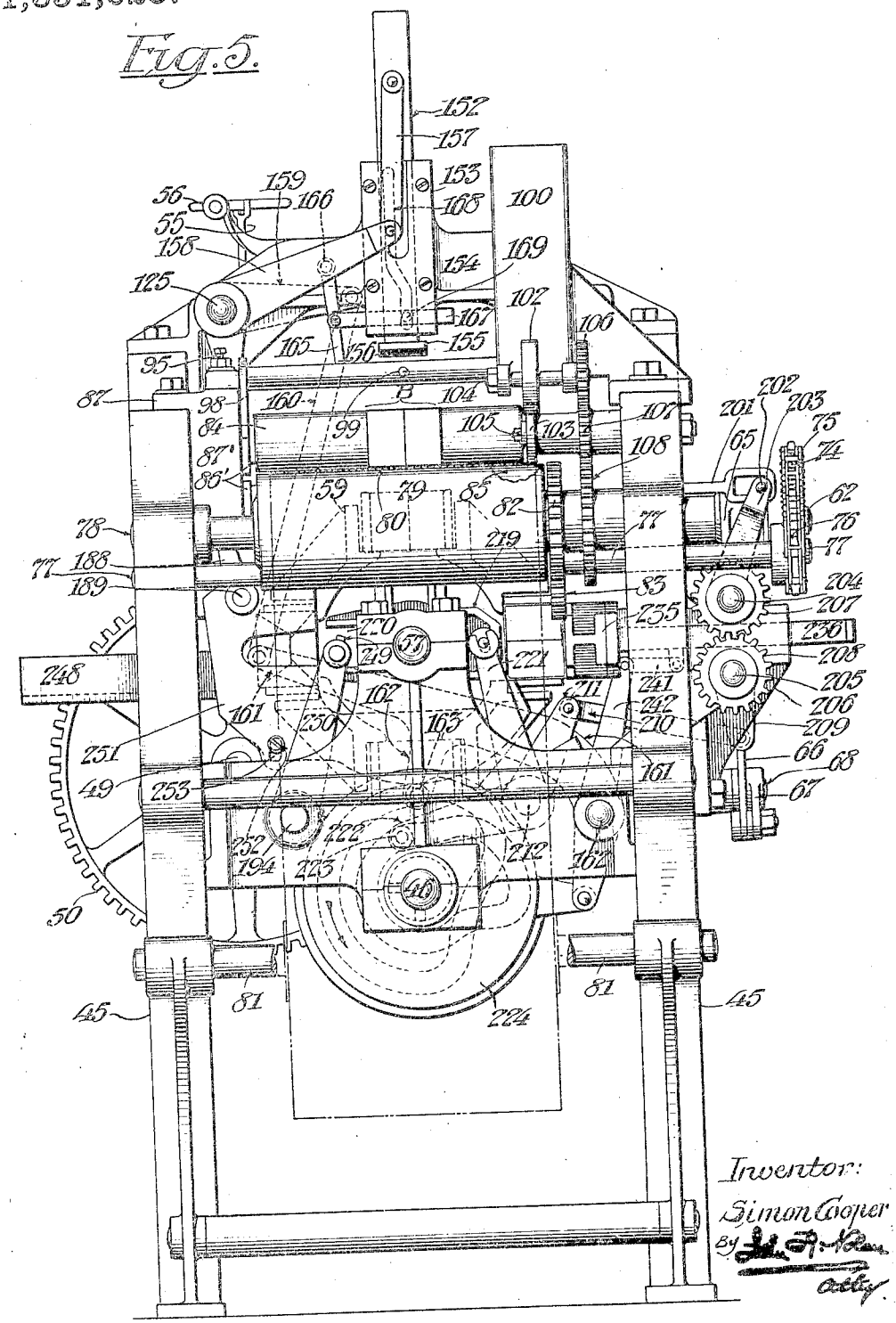
APPLICATION FILED SEPT. 27, 1918.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 5.

1,351,025.

Fig. 5.



Inventor:
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Atty.

S. COOPER.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 6.

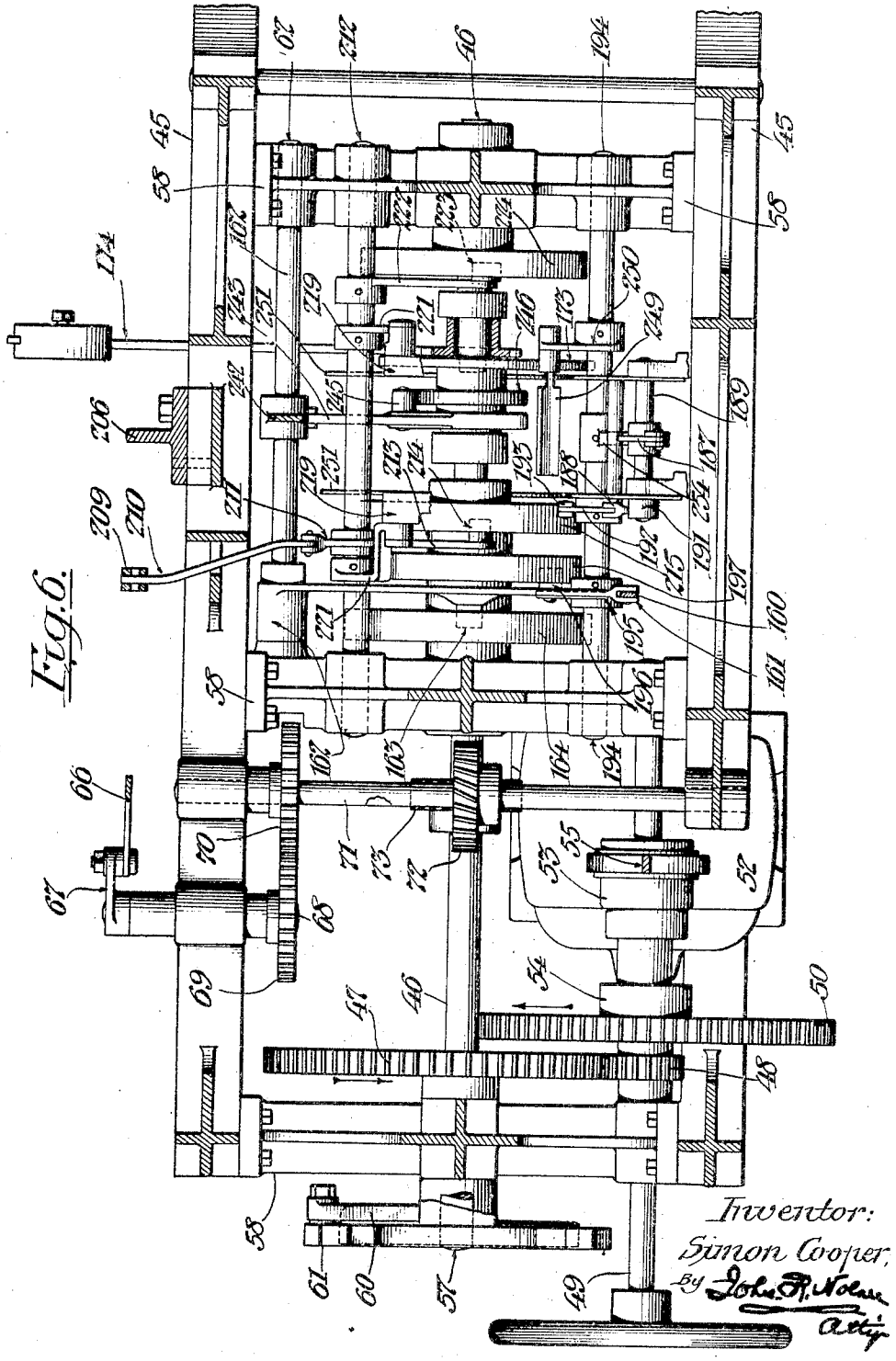


Fig. 6.

Inventor:
Simon Cooper,
By John R. Nolan
Atty

S. COOPER.

PACKAGE WRAPPING MACHINE.

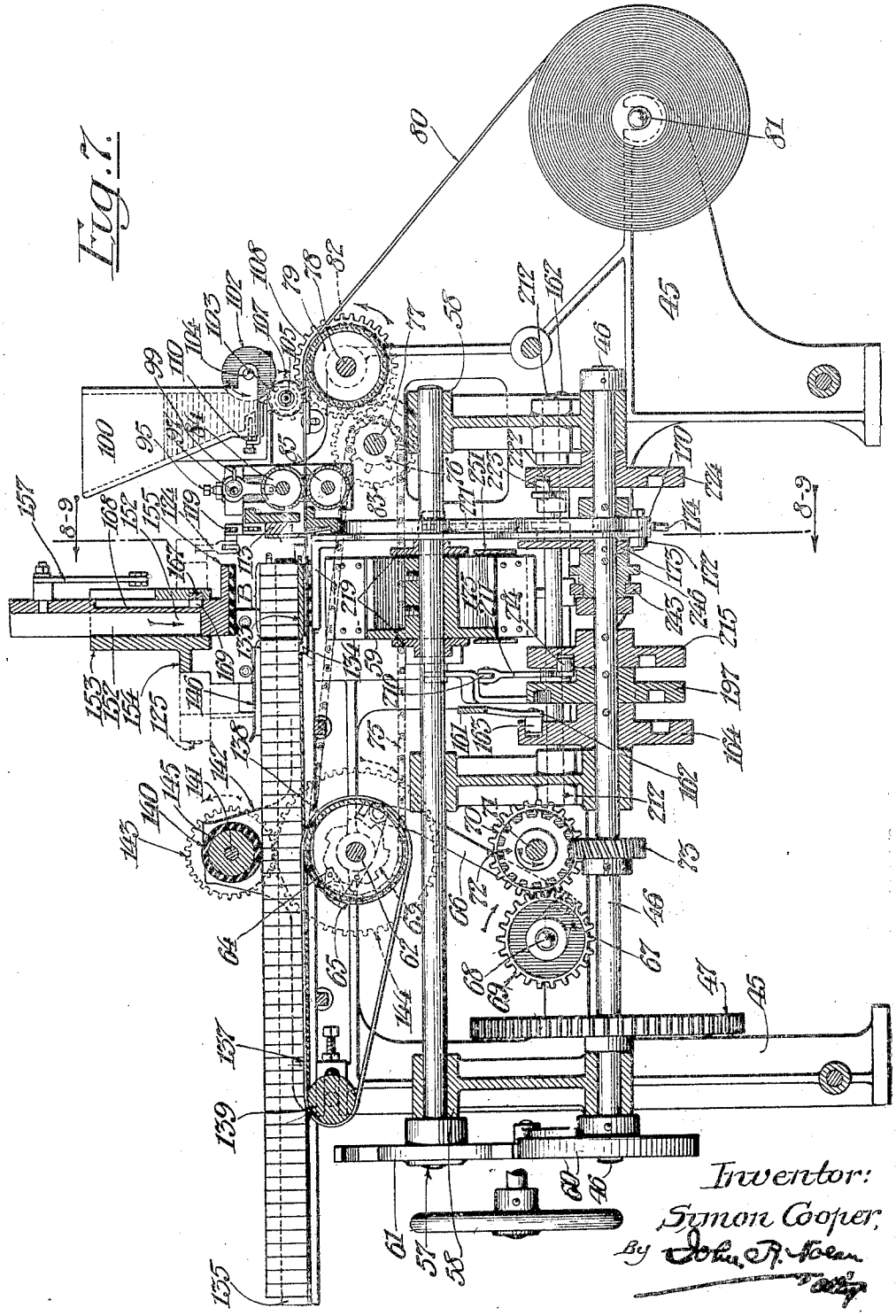
APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 7.

Fig. 7.



Inventor:
Symon Cooper,
By John R. Nolan
Atty.

S. COOPER.

PACKAGE WRAPPING MACHINE.

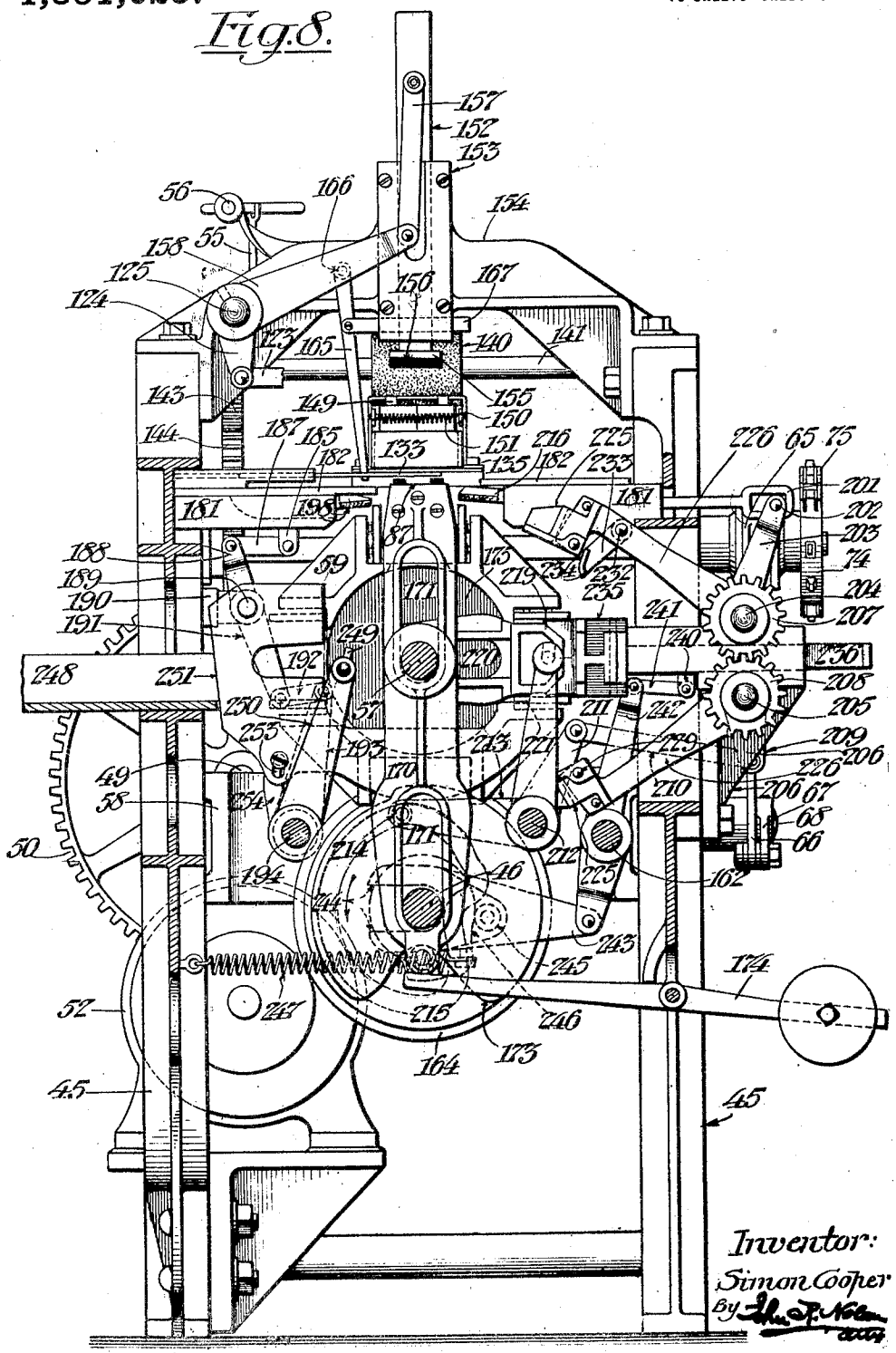
APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 8.

Fig. 8.



Inventor:
Simon Cooper
By

S. COOPER.

PACKAGE WRAPPING MACHINE.

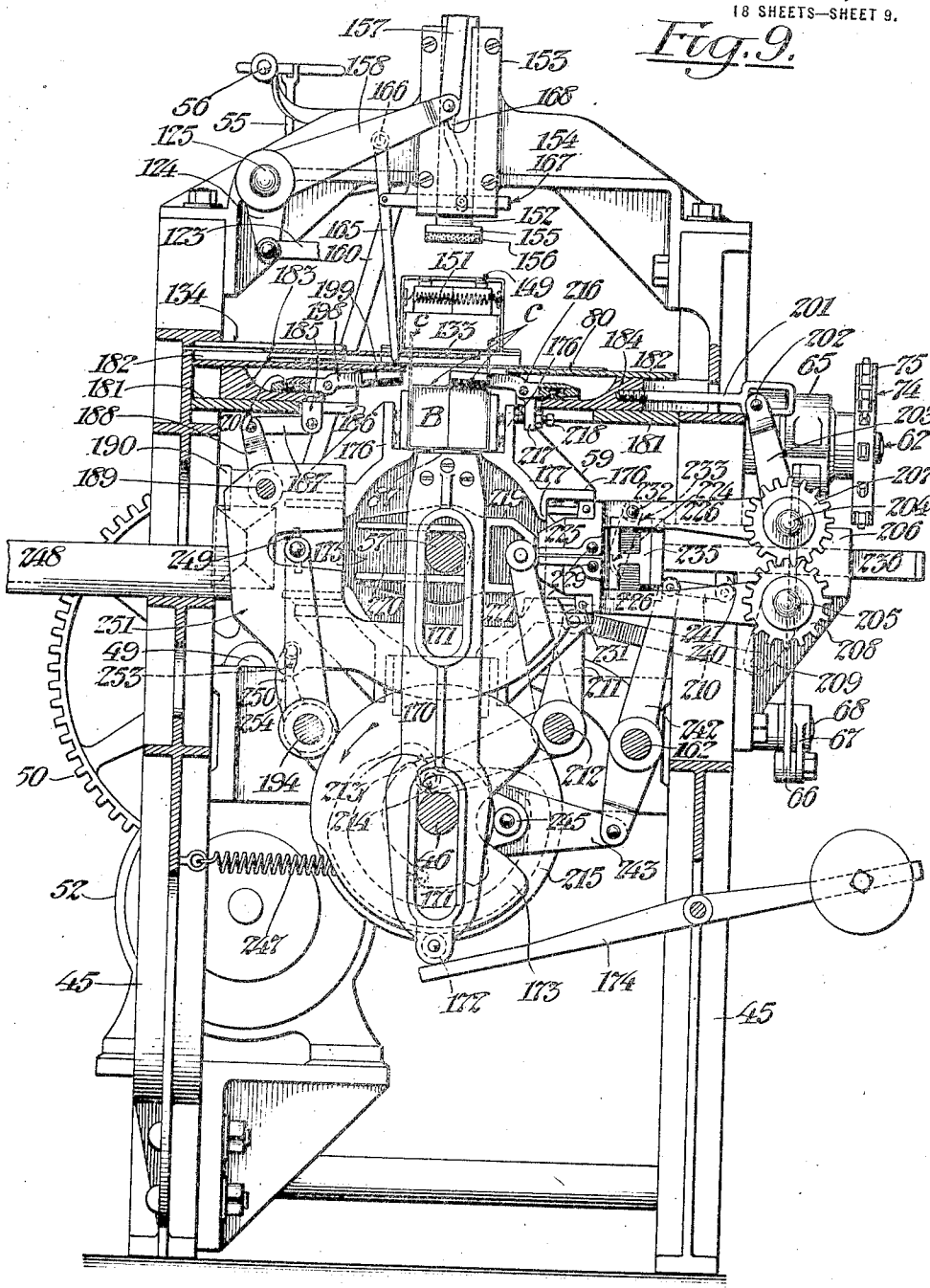
APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 9.

Fig. 9.



Inventor:

Simon Cooper.

By John P. Adams

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S. COOPER.

PACKAGE WRAPPING MACHINE.

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Patented Aug. 31, 1920.

18 SHEETS—SHEET 10.

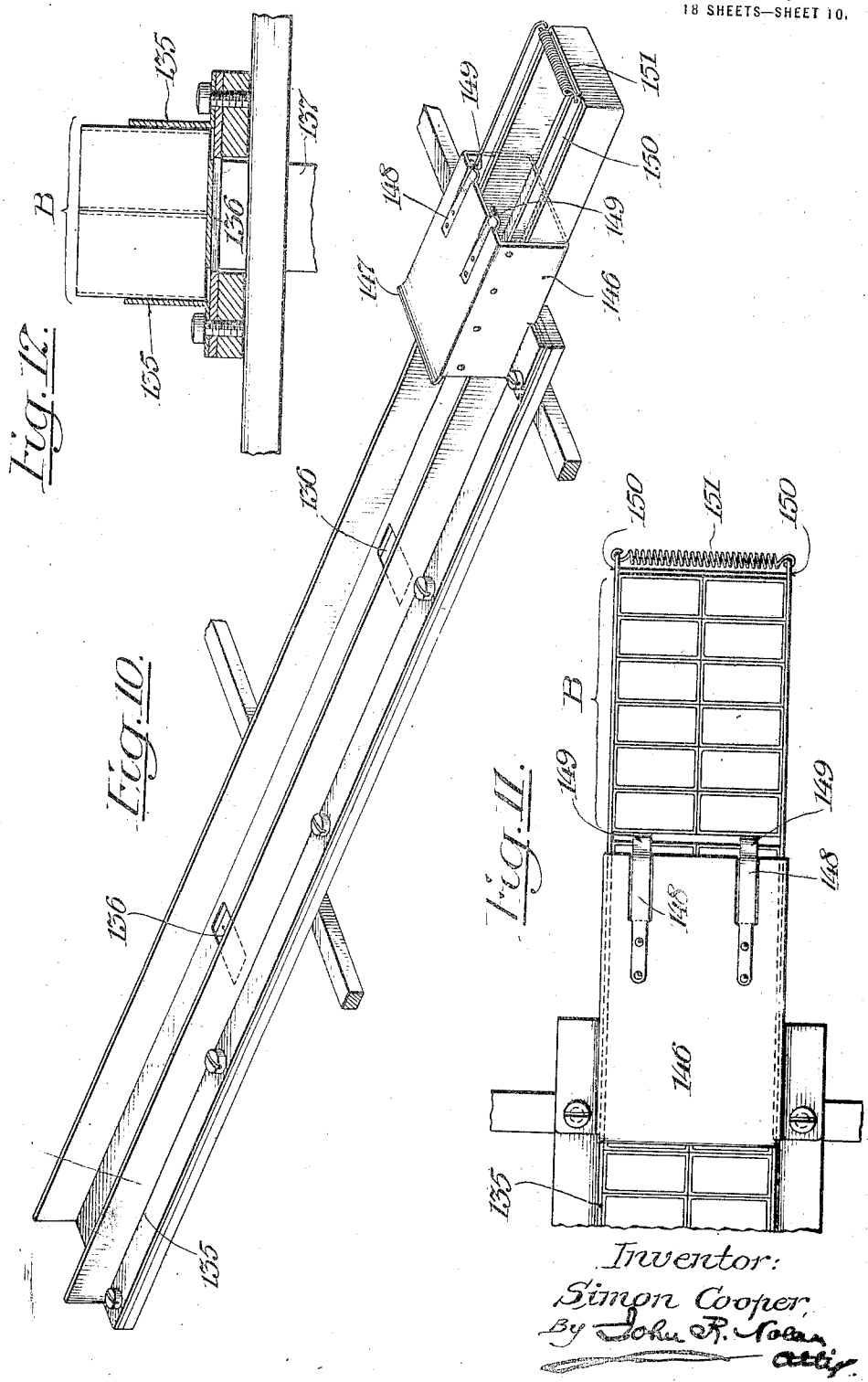


Fig. 12.

Fig. 10.

Fig. 11.

Inventor:
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Atty.

S. COOPER.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

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Patented Aug. 31, 1920.

18 SHEETS—SHEET 11.

Fig. 13.

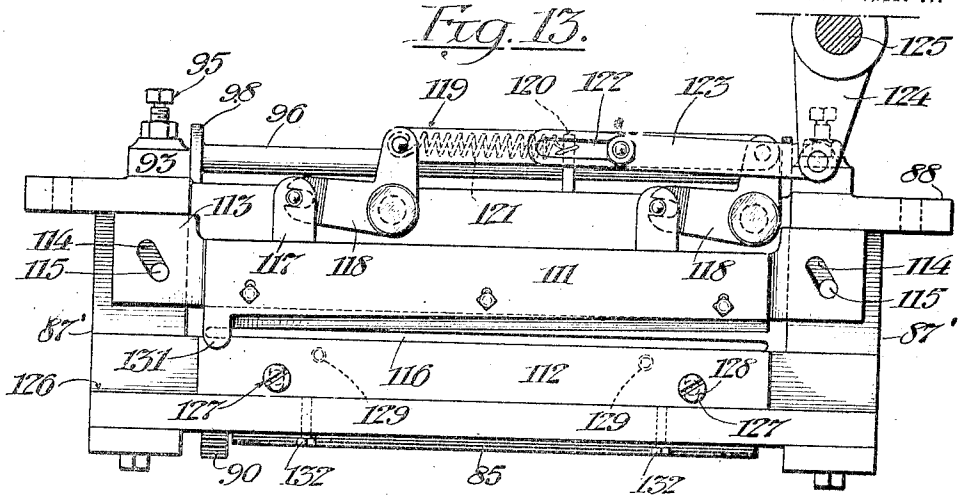


Fig. 14.

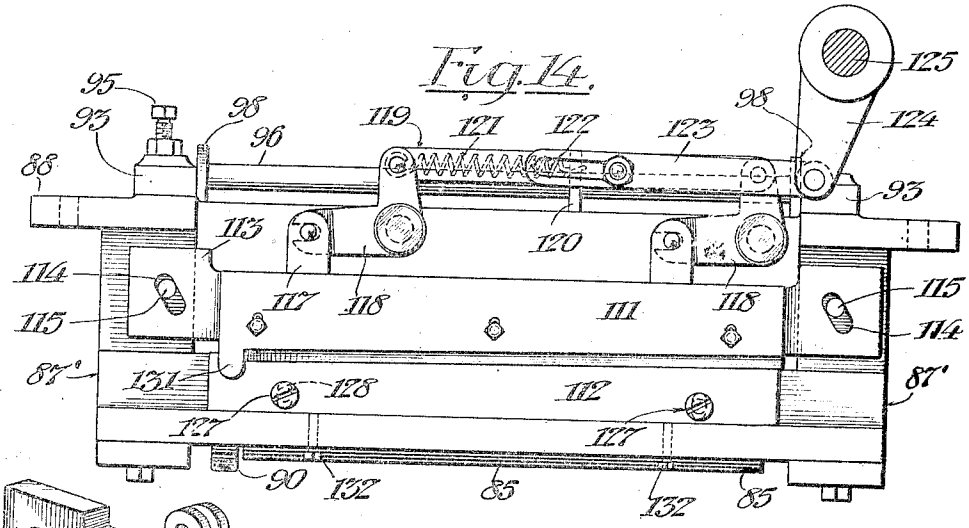
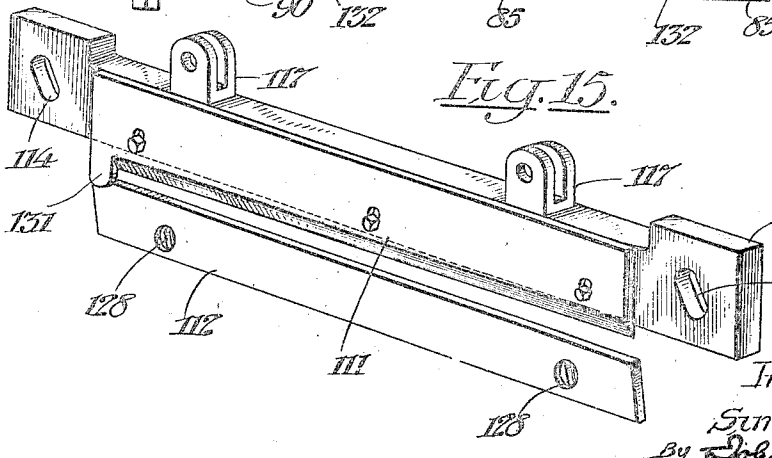


Fig. 15.



Inventor:
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S. COOPER.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

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Patented Aug. 31, 1920.

18 SHEETS—SHEET 12.

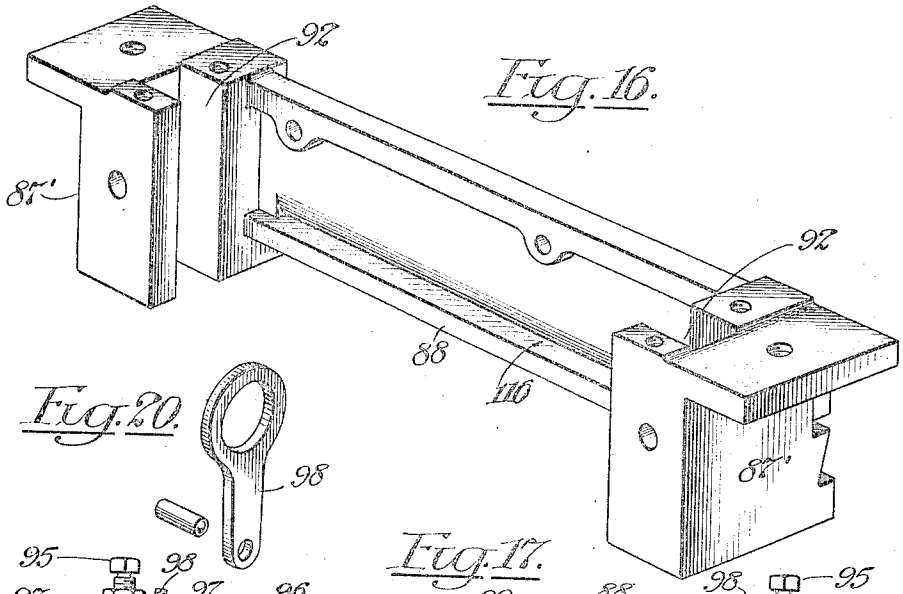


Fig. 16.

Fig. 20.

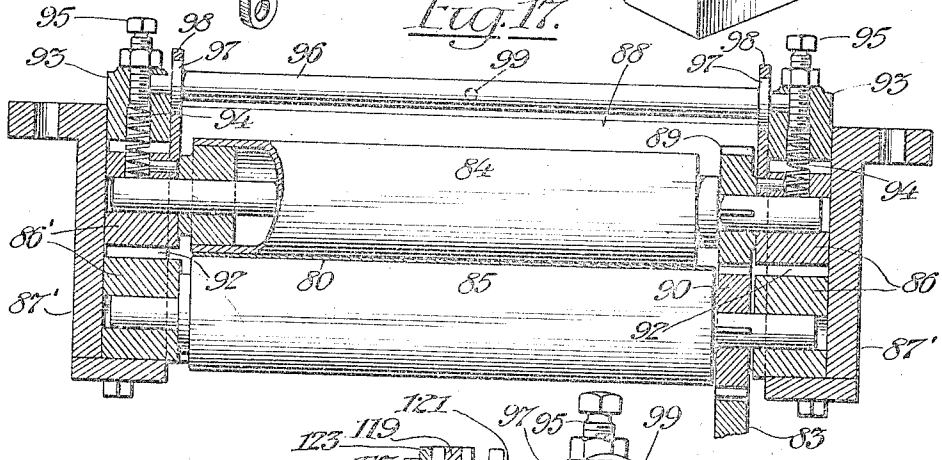


Fig. 17.

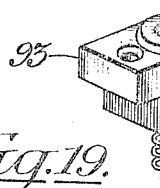
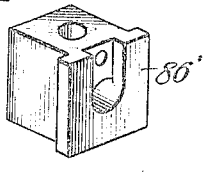


Fig. 19.



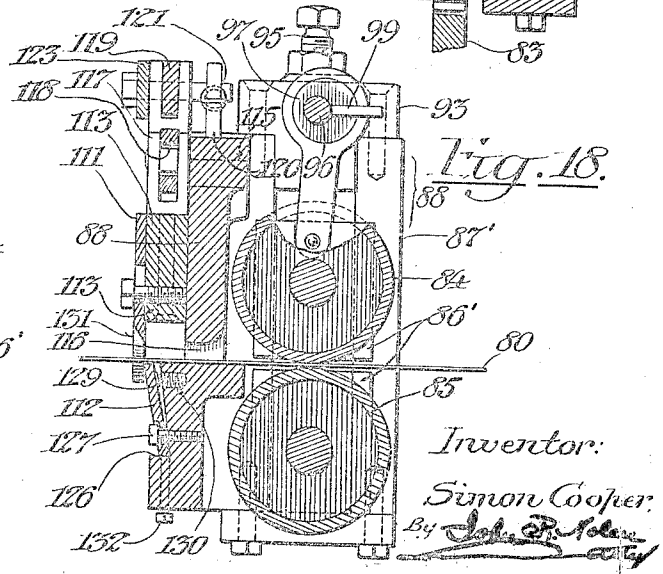


Fig. 18.

Inventor:

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By John R. Nolan

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PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 13.

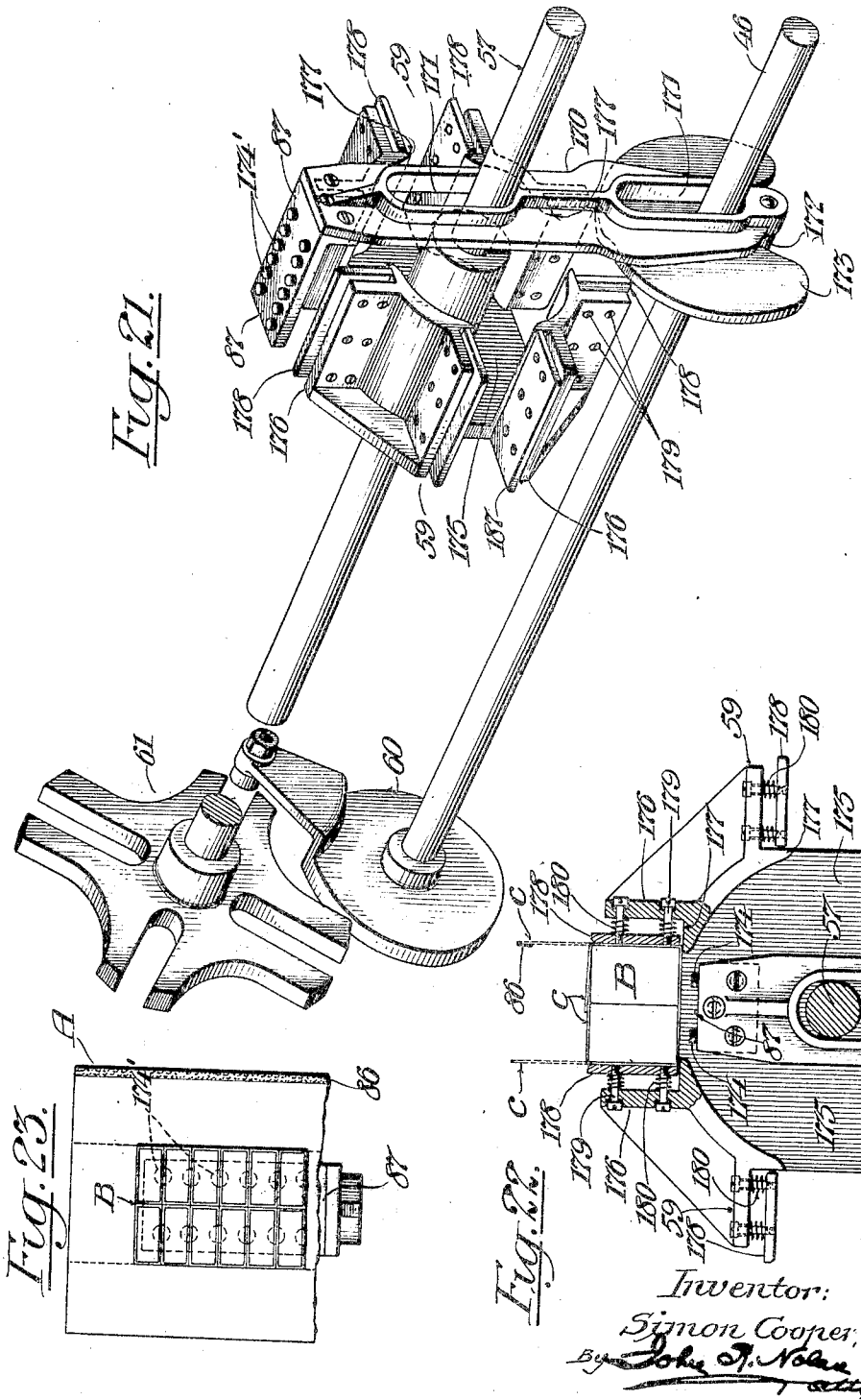


Fig. 21.

Fig. 23.

Fig. 22.

Inventor:
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S. COOPER.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 14.

Fig. 20.

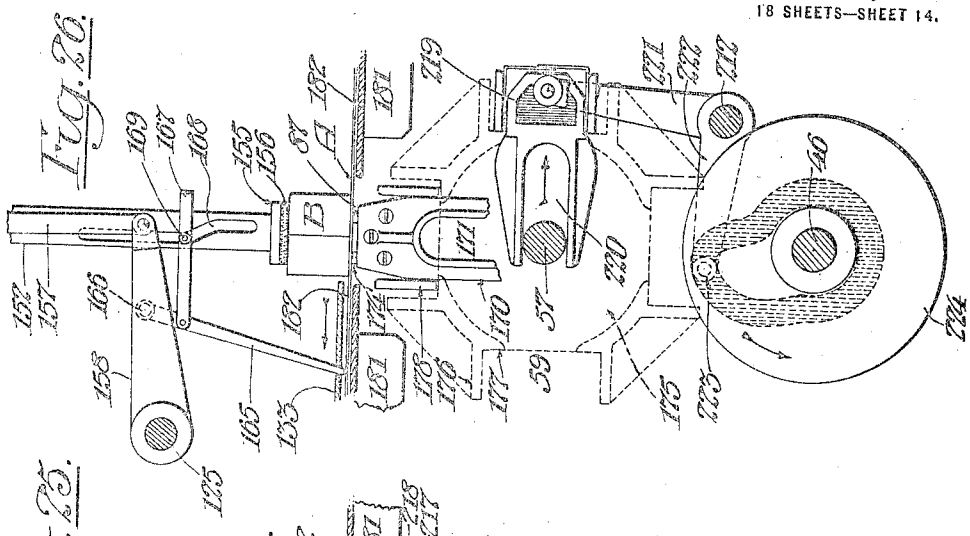


Fig. 23.

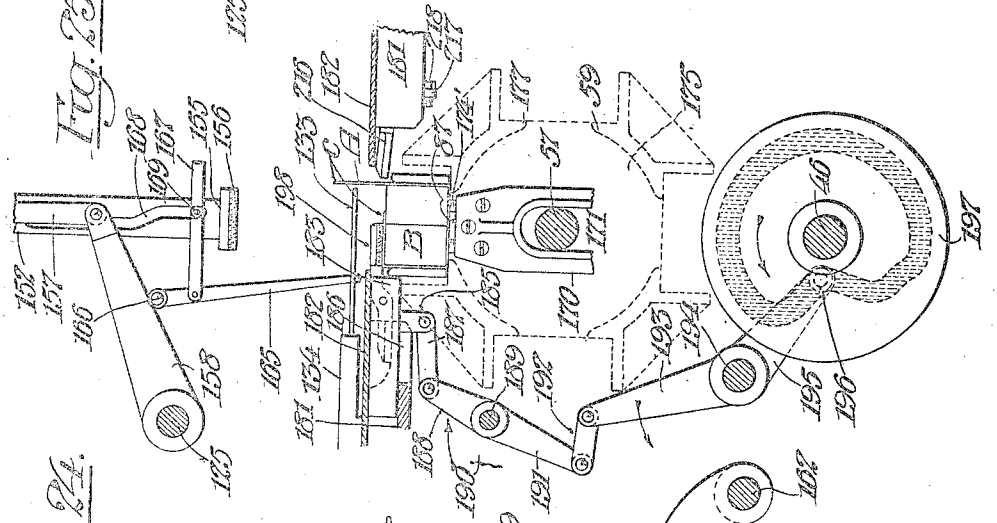
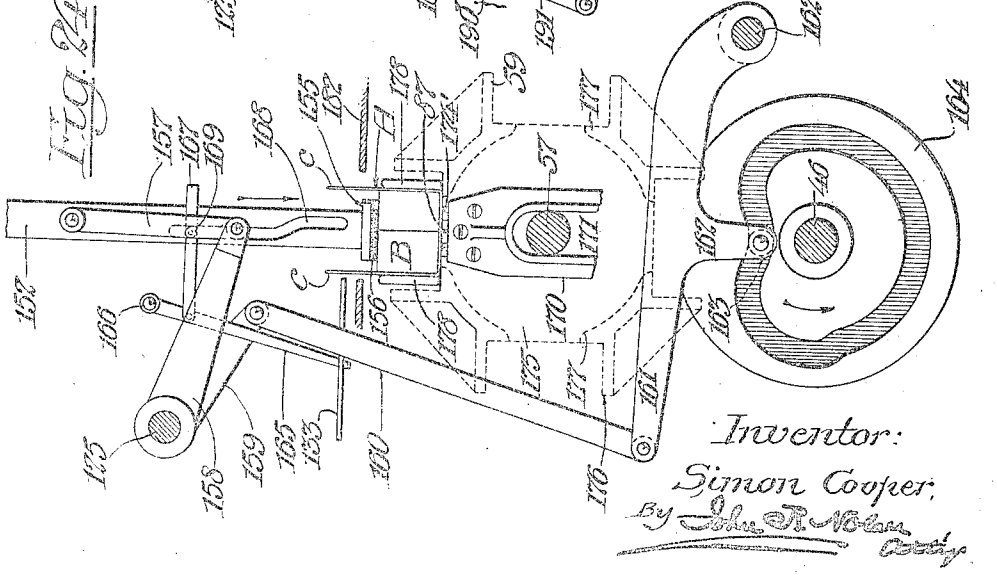


Fig. 24.



Inventor:
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PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 15.

Fig. 27.

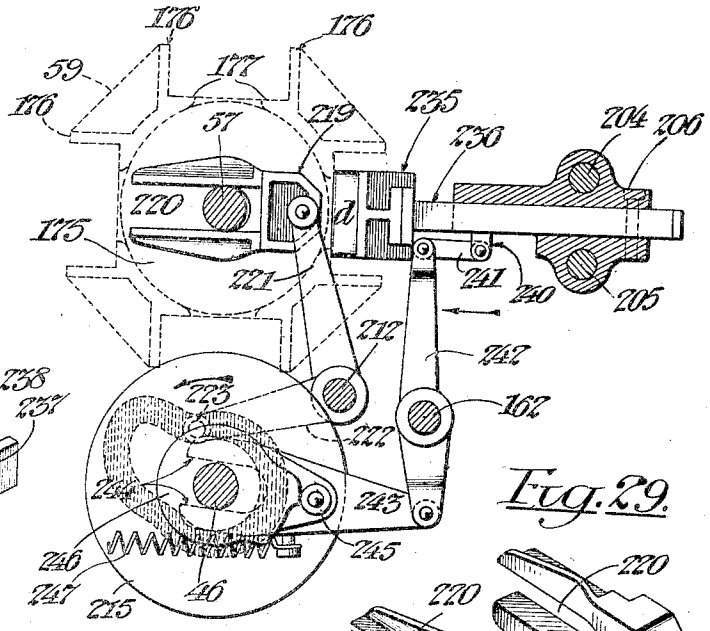


Fig. 30.

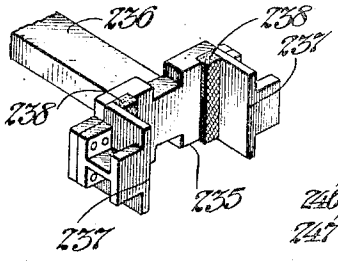


Fig. 29.

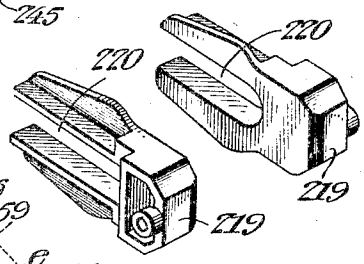
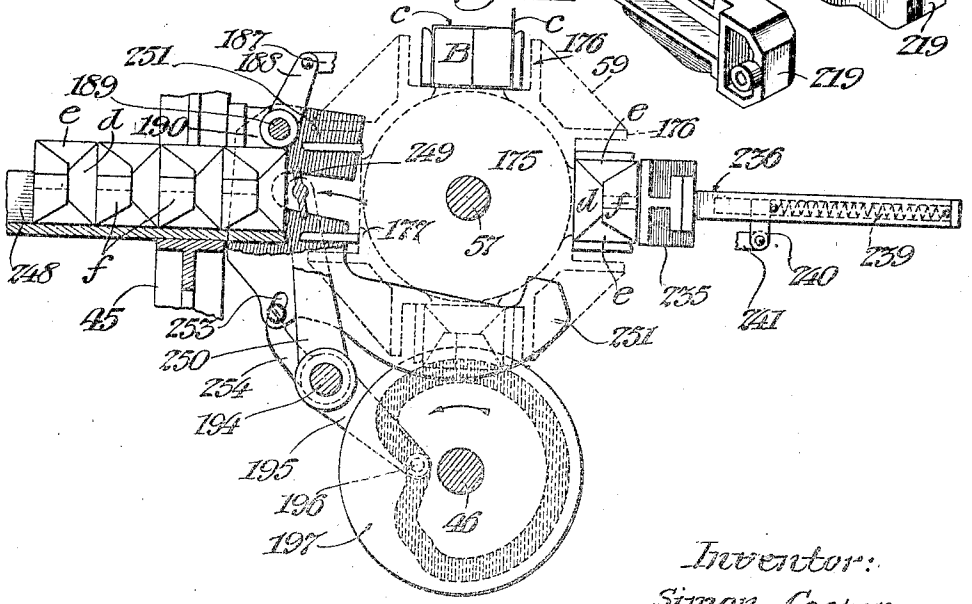


Fig. 28.



Inventor:
Simon Cooper.
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PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 16.

Fig. 32.

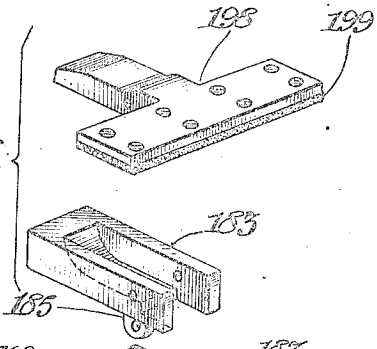


Fig. 31.

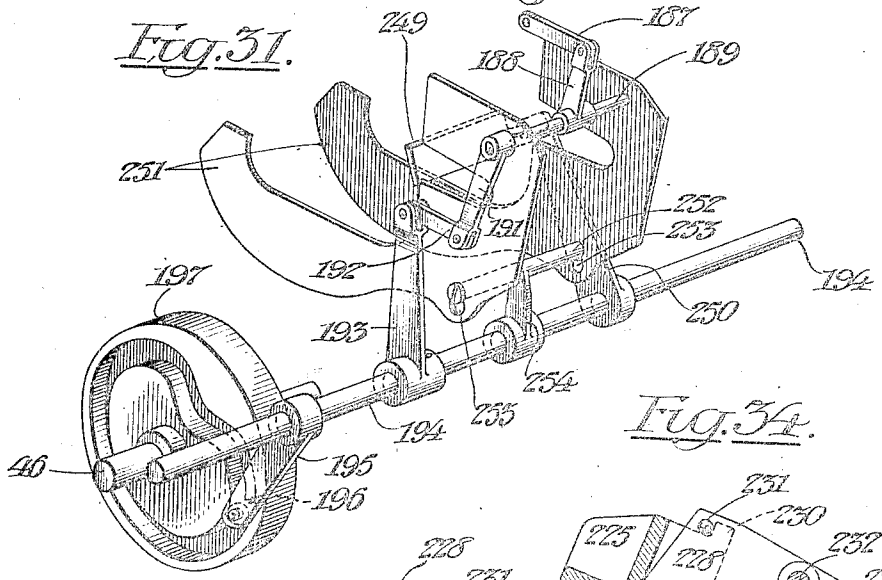


Fig. 34.

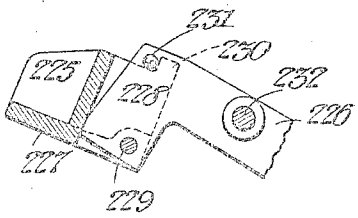
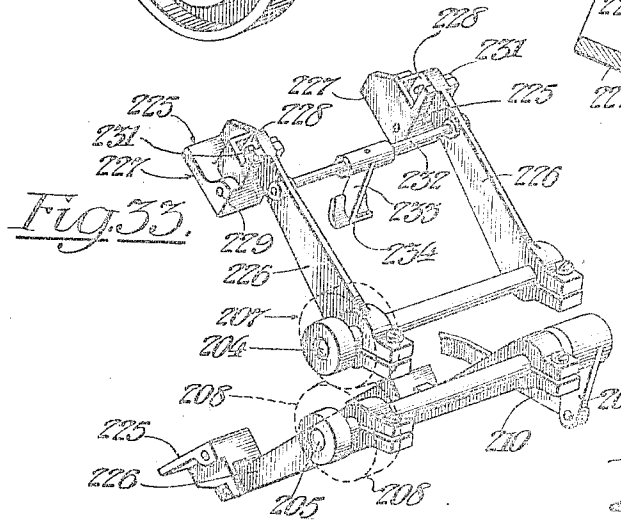


Fig. 33.



Inventor:
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PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 17.

Fig. 35.

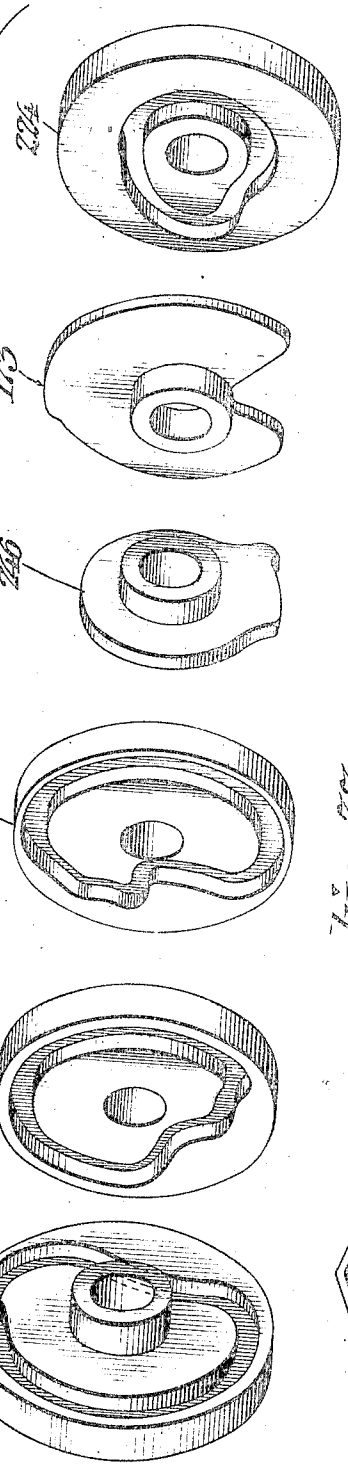


Fig. 36.

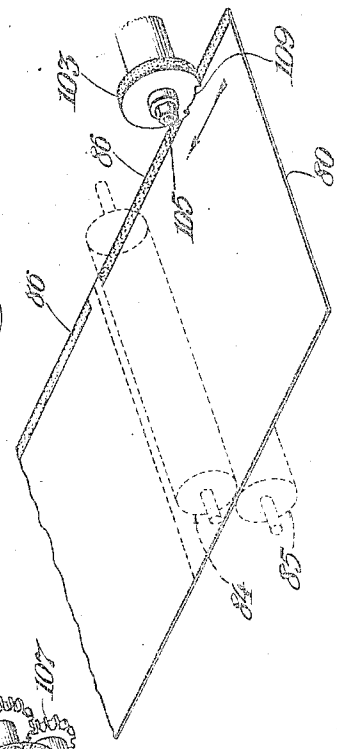


Fig. 37.

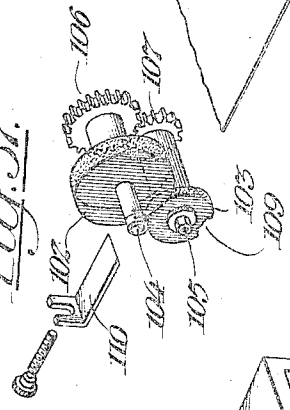
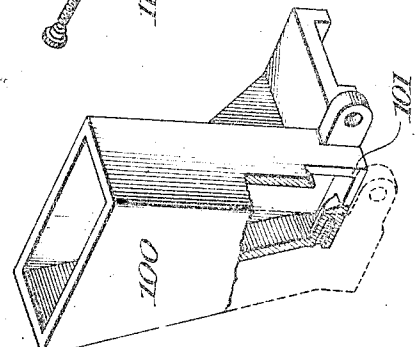


Fig. 38.



Inventor:
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by John R. Nolan
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S. COOPER.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,351,025.

Patented Aug. 31, 1920.

18 SHEETS—SHEET 18.

Fig. 41.

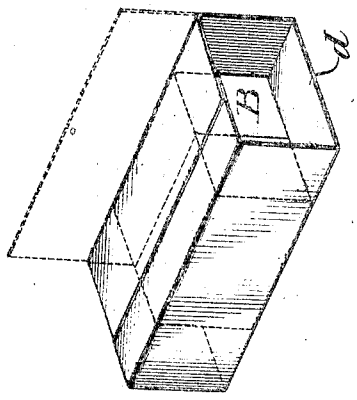


Fig. 44.

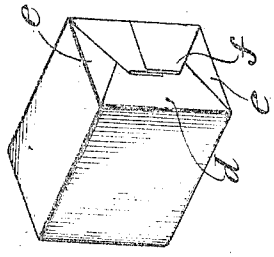


Fig. 40.

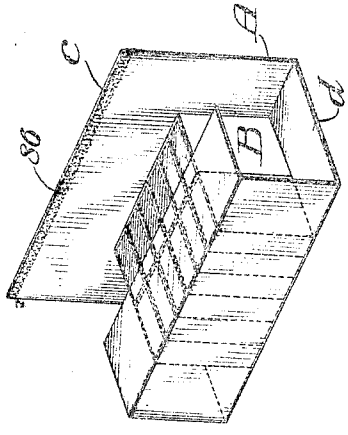


Fig. 43.

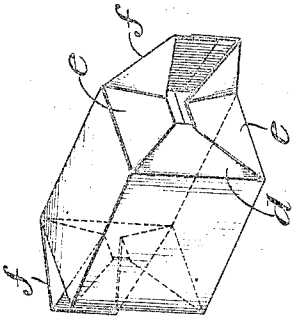


Fig. 39.

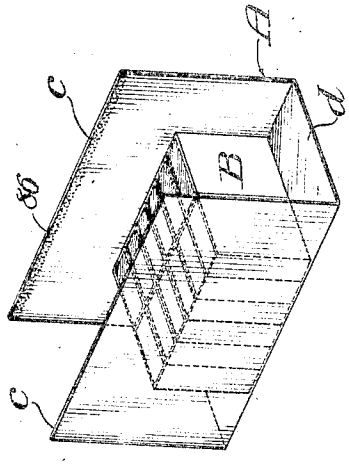
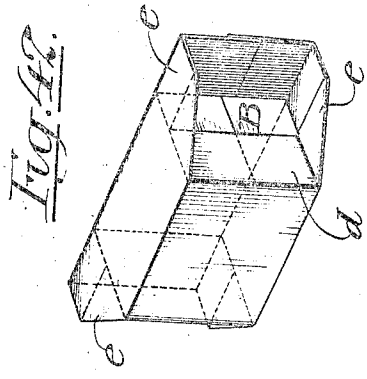


Fig. 42.



Inventor:
Simon Cooper.
by Lake R. Adams,

UNITED STATES PATENT OFFICE.

SIMON COOPER, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PACKAGE-WRAPPING MACHINE.

1,351,025. Specification of Letters Patent. Patented Aug. 31, 1920.

Application filed September 27, 1918. Serial No. 255,956.

To all whom it may concern:

Be it known that I, SIMON COOPER, a citizen of the United States, and resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Package-Wrapping Machines, of which the following is a specification.

This invention relates to package wrapping machines, having reference more especially to a machine for wrapping definite quantities of small boxes and their contents, such, for example, as boxes of matches.

The main object of my invention is to provide a machine whereby successive groups of boxes, or other articles, are automatically removed from a row or rows thereof, and wrappers applied to and effectively folded about the succeeding groups in such a manner as to produce, rapidly and economically, packages of uniform shape and size.

In the preferred form of embodiment of my invention herein disclosed juxtaposed rows of boxes (or articles of similar form) are progressively advanced to a delivery station and predetermined numbers thereof are successively removed and associated with lengths of wrapping paper to the margin of which paste or the like has been properly applied, and each group of boxes with its associated wrapper is subjected to the sequential operations of efficient folding and ironing instrumentalities.

My invention, generally stated, comprises a source of box supply whereby rows of boxes are advanced in an orderly manner to a delivery station; means whereby lengths of wrapping paper are fed adjacent such station; means whereby predetermined groups of boxes are successively removed from the rows and imposed on the succeeding lengths of paper; means whereby each group of boxes and its associated wrapper are delivered to a chambered structure and the wrapper thereby partially folded in such a manner as to embrace the bottom and sides of the group of boxes; means whereby said structure is intermittently actuated to position the succeeding chambers thereof for the reception of succeeding groups of boxes and their associated wrappers, and at the same time advance the contained boxes and wrappers to succeeding stations; means whereby the up-projecting sides of each wrapper are folded upon the top of the group of boxes; means whereby the end-projecting top, side and bottom portions of the wrapper are successively folded against the adjacent ends of the boxes and upon each other; and means whereby the end folds of the wrapper are ironed and smoothed so as to insure their close and intimate relation to each other and to the incased group of boxes, and thus complete the package preparatory to its discharge from the structure.

The invention also comprises novel features of construction and operation, together with various combinations of parts, all of which will be hereinafter described and claimed.

In the drawings—

Figure 1 is a plan of a wrapping machine embodying my invention.

Fig. 2 is an elevation of one side of the machine.

Fig. 3 is an elevation of the opposite side thereof.

Fig. 4 is an elevation of the front end of the machine.

Fig. 5 is an elevation of the opposite end of the machine.

Fig. 6 is a horizontal section of the machine, as on the line 6—6 of Fig. 2.

Fig. 7 is a longitudinal vertical section of the same, as on the line 7—7 of Fig. 1.

Fig. 8 is a transverse vertical section of the machine, as on the line 8—8 of Fig. 7.

Fig. 9 is a similar section, but showing the mechanisms in the relative positions which they are caused to assume during a succeeding operation of the machine.

Fig. 10 is a perspective of a trough structure along which juxtaposed rows of boxes are fed and arranged for delivery in groups.

Fig. 11 is an enlarged plan of the delivery end of the trough showing a group of boxes preparatory to discharge.

Fig. 12 is a transverse vertical section, enlarged, through the trough, showing a feed-belt and boxes positioned thereon.

Fig. 13 is an elevation of the paper cutting mechanism, showing the movable cutter thereof in its raised or normal position.

Fig. 14 is a similar view showing the movable cutter in its down position after severing the paper.

Fig. 15 is a perspective of the cutter bar and the associated cutter blades.

Fig. 16 is a perspective of the supporting frame for the cutter and feed-roll mechanisms.

Fig. 17 is a section through said frame and feed-roll mechanism, as on the line 17—17 of Fig. 1.

Fig. 18 is a vertical section through the feed-roll and cutter mechanisms, as on the line 18—18 of Fig. 1.

Fig. 19 is a perspective of a bearing box and cap member for one of the feed-roll shafts.

Fig. 20 is a similar view of the arm and pin of an eccentric connection for adjusting one of the upper feed-roll bearings.

Fig. 21 is a perspective of the intermittently-rotatable package receptacles and the associated wrapper and box support, together with their respective actuating elements.

Fig. 22 is a sectional elevation of one of the package receptacles and a portion of the wrapper and box support; the receptacle containing partially wrapped boxes, and the support being in its lowermost position preparatory to the advancement of such receptacle to the next succeeding folding station.

Fig. 23 is a plan of the wrapper and box support, showing a wrapper and boxes thereon, and also indicating the positions of the surface pads of said support in relation to the end edges of the adjoining upstanding boxes.

Figs. 24, 25 and 26 are diagrams illustrating successive operations of the wrapper and box support, the pressure plunger and the top folding members in relation to each other and to the intermittently rotatable package receptacles. In Fig. 26 the first end folding member for the projecting ends of the wrapper is indicated in folding position.

Fig. 27 is a diagram illustrating the operation of the end folding mechanism; the first end folder thereof being shown as retracted and the final end folder as in advanced or folding position.

Fig. 28 is another diagram showing the final end folder as retracted, also mechanism for ironing the end folds, together with mechanism for ejecting the packages successively from the receptacles.

Fig. 29 is a perspective of the pair of first end folding members.

Fig. 30 is a similar view of the final end folding member.

Fig. 31 is a perspective of the ironing and ejecting mechanisms.

Fig. 32 is a similar view of one of the top folding members and its carriage.

Fig. 33 is a similar view of the opposed pairs of top and bottom end folding members, and adjuncts.

Fig. 34 is a sectional elevation of the acting end of one of the said end folding members.

Fig. 35 illustrates, in perspective, the series of power shaft cams and the relation of their cam surfaces to each other.

Fig. 36 is a perspective of the paste-applying disk showing its relation to the web of wrapping material, and indicating the interrupted marginal line of paste as applied thereby to the web, the feed rolls for the web being indicated by dotted lines.

Fig. 37 is a perspective of said disk and associated parts.

Fig. 38 is a perspective of the paste hopper, the lower portion thereof being in section.

Figs. 39 to 44, inclusive, are perspective views of the associated wrapper and boxes, showing the wrapper in its successive stages of folding.

Referring to the drawings, 45 designates a supporting frame of suitable shape and size for its intended purpose; and 46 designates a main or drive shaft extending longitudinally of the frame and having its bearings in suitably-disposed boxes on the latter, which shaft is driven from a suitable source of power. In the present instance the shaft is provided with a spur wheel 47 in mesh with a pinion 48 on a shaft 49 which has its bearings in suitably-disposed boxes on the main frame. The shaft 49 bears a spur wheel 50 in mesh with a pinion 51 on the shaft of an electric motor 52, and hence the power is transmitted through the described gearing to the main shaft. The shaft 49 is provided with a suitable clutch of any usual or approved construction, whereby the spur wheel 50 may be made fast or loose, as desired. The complementary members of the clutch are indicated at 53, 54, respectively, in Figs. 1 and 6, the movable member 53 being pivotally connected to the lower end of a vertical shifting lever 55 which is jointed at its upper end to a movable hand operated bar 56, as usual.

An intermittently-rotatable shaft 57 extends longitudinally of the frame and has its bearings in suitably-arranged boxes 58. This shaft bears a turret structure 59 having a series of peripheral chambers or re-

ceptacles which are advanced by the intermittent rotation of the shaft 57 to successive receiving, folding and discharging stations which will be hereinafter described.

In the present instance the shaft 57 is actuated from the main shaft 46 through a Geneva stop motion, the driving and driven members 60, 61 of which are fast on the shafts 46 and 57 respectively. These members are constructed to impart four intermittent movements to the shaft 57 in each complete rotation thereof.

An intermittently-rotatable shaft 62 extends transversely of and has its bearings in suitably-disposed boxes in the sides of the main frame. On this shaft at one end thereof is a ratchet wheel 63 with the teeth of which engages a pawl 64 pivoted to one arm of an oscillating lever 65 on the shaft. The other arm of this lever is connected by means of a link 66 with a crank arm 67 on the outer end of a short-shaft 68 having its bearings in a box on the adjacent side of the frame. On the inner end of the shaft 68 is a gear wheel 69 in mesh with a similar wheel 70 on a shaft 71 extending transversely of and having its bearings in suitable boxes on the frame sides. The shaft 71 bears a spiral gear 72 in mesh with a similar gear 73 on the main shaft 46, whereby during the rotation of the latter the motion is transmitted to the shaft 71 and therefrom through the crank and pawl and ratchet connections to the shaft 62 so as to impart step-by-step movement thereto. (See Figs. 6 and 7.)

On one end of the shaft 62 is a sprocket wheel 74 which is connected by means of a chain 75 with a sprocket wheel 76 on a transverse shaft 77 mounted in suitable bearings at the rear of the frame work, whereby intermittent motion is transmitted to the rear shaft. In rear of and parallel with the shaft 77 is a shaft 78 having a roller 79 which affords a support and guide for a web of wrapper paper 80 which is drawn from a suitable roll. The shaft 81 of this roll has its bearings in rearward extensions of the sides of the main frame. The roller shaft 78 bears a gear wheel 82 in mesh with a gear wheel 83 on the shaft 77, and hence the roller 79 is intermittently rotated. The paper, as it progresses upon the roller, passes horizontally to and between a pair of feed rolls 84, 85 by means of which the free end of the web 80, to one margin of which paste 86 (Fig. 36) has been previously applied, is intermittently advanced to a position where a wrapper (A) of suitable length is severed from the web. The wrapper thus cut is supported upon a vertically-movable bed 87 (Fig. 21) of special construction, which is positioned horizontally beneath a predetermined group of boxes (B) preparatory to the wrapping of the latter, as will be hereinafter set forth.

The feed rolls 84, 85 are journaled in boxes 86′ mounted in spaced housings 87′ on the ends of a transverse supporting bar 88 which is bolted to the respective sides of the main frame. The feed roll journals are provided with intermeshing gear wheels 89, 90, the lower of which meshes with a gear wheel 83 on the shaft 77. Hence the feed rolls are intermittently rotated and the web is accordingly advanced. Preferably the lower box 86′ is stationary, and the upper box is movable vertically with respect thereto in suitable guide ways 92 in the housings. The tops of the guide ways are closed by caps 93 which are vertically perforated to receive springs 94 that are seated in sockets in the respective upper boxes, so as to exert yielding pressure thereon. The caps are provided with vertical adjusting screws 95 which, bearing upon the respective springs 94, may be manipulated to vary the pressure of the springs, as desired. Journaled in the caps 93 is a shaft 96 which lies above and parallel with the feed rolls. This shaft has formed thereon, adjacent the respective caps 93, counterpart eccentrics 97 which are loosely encircled by the perforated upper portions of depending arms 98 that are pivotally connected at their lower ends to the adjacent upper boxes, whereby partial rotation of the shaft 96, in the proper direction, will bodily raise or lower the upper boxes and thus adjust the upper roll 84 in relation to the lower roll, so as to render the feed rolls active or inactive upon the web as occasion may require. The shaft 96 is provided with a projecting handle 99 to facilitate its operation. (See Figs. 17 to 20, inclusive.)

A paste-containing hopper 100 is supported above the roller 79 at the rear of the machine, so as to overhang one longitudinal edge of the web of paper before it enters the bite of the feed rolls. Mounted to turn in the paste outlet 101 at the bottom of the hopper is a disk 102 which transfers the paste from the hopper to the periphery of a lower distributing disk 103, which, in turn, applies the paste along one longitudinal margin of the progressing web. The paste disks are loosely sleeved on shafts 104, 105, respectively, which are fixed to suitably-located lugs on the hopper structure. The disk sleeves have intermeshing gear wheels 106, 107, respectively whereof the lower wheel 107 meshes with a gear wheel 108 on the shaft of the guide roller 78. Thus the two paste disks are concurrently rotated. The periphery of the lower or distributing disk 103 is provided with a notch or offset 109 which is so disposed as to interrupt the marginal line of paste on the web at intervals

between succeeding wrapper lengths; that is, where the cutter severs the lengths from the web. 110 designates an adjustable scraper for the paste transfer disk. (See Figs. 7, 36, 37 and 38.)

The paste-applying mechanism above indicated is of usual construction and need not be further particularly described. Any other known or approved form of paste-applying means may be employed.

Referring to the cutting mechanism, 111 designates a vertically-movable blade overhanging the path of the web of paper transversely thereof, immediately in front of the feed roller; and 112 designates the lower or doctor blade with which the movable blade coacts in its descent to sever the web transversely.

The blade 111 is bolted to a bar 113 which is provided near its respective ends with correspondingly inclined slots 114 which receive studs 115 on the housing structure previously referred to, whereby during the downward or cutting stroke of the bar it is moved longitudinally to a limited extent so as to impart a shearing action to the blade 111. The housing structure has a horizontal slot 116 therethrough for the free passage of the web.

The bar 113 is provided with spaced upstanding lugs 117 which are articulated with the lower arms of bell-crank levers 118 fulcrumed on the housing structure. The upper arms of these levers are coupled by means of a link 119 and one of said arms is connected with a projection 120 on the said structure by means of a stout spring 121, the tendency of which is to pull the levers to the right (as viewed in Fig. 13) and thus normally maintain the bar 113 and its blade 111 in raised position. The link 119 has a pin and slot connection 122 with an overlapping link 123 which is pivoted to a crank-arm 124 on a rock-shaft 125, whereby during the movement of such shaft in one direction the link 123 is pushed in a manner to exert through the connection just described a downward cutting force on the knife bar in opposition to the action of the spring, and whereby during the movement of such shaft in the opposite direction said spring returns the knife bar to its raised position and permits it to remain therein until the next succeeding movement of the shaft 125 (see Figs. 8, 9, 13, 14 and 15.) The rock shaft 125 is periodically actuated by means hereinafter explained.

The lower blade 112 is preferably supported in a slightly inclined position upon the lower part 126 of the housing structure, which part is appropriately inclined, as clearly seen in Fig. 18. The blade 112 is loosely connected to the structure by means of screws 127 which pass into the body of the structure through enlarged openings 128 in the blade 112 so as to permit of limited horizontal oscillation and also vertical adjustment of said blade; and its upper portion is yieldingly swung outward into operative relation to the path of the upper blade 111 by suitably-disposed springs 129 which are seated in sockets 130 in the structure. A lug 131 at one end of the upper blade depends in front of the lower blade and serves as a stop to limit and determine the outward movement of the lower blade. By this construction the upper longitudinal edge of the lower blade is maintained constantly in operative relation to the path of the upper blade. Nice vertical adjustment of the lower blade in respect to the cutting edge of the upper blade can be effected by means of vertical adjusting screws 132 which are mounted in the lower part of the housing structure so as to take against the opposing edge of the lower blade.

As previously mentioned, the wrapper (A), as it is severed from the web of paper, rests upon a vertically movable bed 87 beneath a group of boxes (B) preparatory to the wrapping of the latter. Similar groups of boxes are consecutively moved to and temporarily supported upon a slide 133 overlying the bed, which slide is adapted to be withdrawn at proper intervals in such a manner as to permit the groups of boxes to rest upon the respective wrappers after the latter are severed from the web.

The slide 133, which constitutes a temporary support for the selected groups of boxes, comprises a horizontal plate mounted in suitable parallel guides 134 which are arranged in the respective transverse edges of an opening in the rearward or delivery portion of the bottom of an elongated trough 135 extending longitudinally of the machine; which slide is adapted to be operated to open and close the opening at predetermined intervals, as will presently appear. The trough extends rearwardly from the front of the machine, and is supported by suitably-disposed cross-bars extending between the frame sides; the bottom opening being positioned directly above the bed 87. The width of the trough is slightly greater than double the width of a match box, so that two rows of upstanding boxes may be supported on and freely moved along the floor of the trough. In the present instance the bottom opening is of such dimensions that six boxes of each row may freely pass therethrough when the slide 133 is withdrawn from the opening: or, in other words, a group comprising one dozen of assembled boxes may be imposed on the wrapper in proper position for wrapping.

The juxtaposed rows of boxes are fed

along the trough in any suitable manner. In the present instance the floor of the trough has two transverse slots 136 therein in spaced relation to each other for the free passage of the upper run of a feed belt 137 to and along the floor. This belt passes about a roller 138 fast on the intermittently-rotatable shaft 62 and about a forward roller 139 journaled in bearing boxes in the sides of the main frame directly under the trough. As the feed belt is intermittently impelled by the roller 138 the match boxes imposed on the upper run of the belt are correspondingly moved toward the rear or delivery end of the trough.

A feed roller 140, in axial alinement vertically with the roller 138, overlies the match boxes in the trough. The shaft 141 of the roller 140 has its bearings in standards 142 on the sides of the main frame, and one of its journals is extended and provided with a gear wheel 143 in mesh with a gear wheel 144 on the shaft 62, whereby said roller 140 is rotated in an opposite direction to the roller 138. The roller 140 has a yielding covering 145, preferably of rubber, which contacts with the upper ends of the match boxes when they are advanced thereto, thus positively insuring the continued rearward passage of the match boxes along the trough. (See Fig. 7.)

The trough is provided, directly in front of its bottom discharge opening, with a casing 146 which bridges the trough and is positioned to insure the uniform disposition of the match boxes upon the floor of the trough as they enter and pass beneath the casing. The forward edge of this top is preferably upwardly flared, as at 147, to depress slightly raised boxes, if any, and facilitate their passage into the casing.

To the rear of the casing top are affixed two spaced spring fingers 148, the free ends of which project rearwardly and are provided with normally-depressed lips 149 which lie vertically above the forward edge of the discharge opening of the trough. These fingers yield to the upward pressure of the two rows of boxes, as they are moved above the bottom opening, but when the prescribed number of boxes are positioned above such opening, that is, after a step movement of the feeding belt 137, the spring lips insinuate themselves between such boxes and the next succeeding boxes so as to act as a rearward stop for the latter.

Preferably the side walls of the casing are provided with rearwardly extending strips 150 in parallelism with and in close relation to the sides of the trough, the rear or free ends of the strips being coupled by means of a retracting spring 151. These strips yieldingly embrace the upper portions of the group of match boxes and tend to maintain them uniformly in place above the discharge opening of the trough. (See Figs. 10 and 11.)

A vertical plunger 152 which overhangs the discharge portion of the trough is designed to eject the assembled group of boxes through the bottom opening of the trough when the slide 133 is retracted. The plunger, which is supported and guided in a suitable slide frame 153 on a bridge structure 154 spanning the main frame, is provided with a foot 155 which is proportioned to bear upon the tops of the assembled group of boxes at the discharge opening. The bottom of the foot 155 is provided with a pad 156, of rubber or other suitable material, adapted to bear yieldingly upon the underlying boxes. The plunger 152 is connected by means of link 157 to an arm 158 on the rock-shaft 125 before referred to in respect to the operation of the cutter mechanism. This shaft, which has its bearings in the bridge structure, has affixed thereto an arm 159 that is connected by means of a link 160 with one end of a lever 161 fulcrumed on a shaft 162 supported in the vicinity of the main shaft 46. The lever 161 overhangs the main shaft and is provided with a downward projection 162 bearing a roller 163 adapted to run in the race of a cam 164 on the main shaft. The contour of the cam race is such that the lever 161 is raised and lowered at predetermined intervals, thereby effecting through the connections described the periodical oscillations of the rock-shaft 125 and the timely reciprocations of the cutter bar and the box-ejecting plunger; that is to say, assuming the parts to be in the relative positions shown in Fig. 5, a short upward movement is transmitted to the plunger 152, thereby actuating the cutter mechanism to sever the web of paper as above mentioned; then the effective downward stroke is transmitted to the plunger, and the latter is then retracted to its original position,—*i. e.* the position immediately preceding the short upward movement—and is retained therein for a stated interval of time preparatory to a repetition of the operation just explained.

During the descent and retraction of the plunger 152 the slide 133 is reciprocated through suitable connections between the plunger and the slide. In the present instance, such connections include a pendulous arm 165 which is pivoted to the bridge structure, as at 166, and is so disposed that its lower end enters an aperture in the slide 133. This arm is pivotally connected to one end of a horizontal slide bar 167 which is mounted in the guide portion 153 of the bridge structure adjacent to one side of the plunger. This side of the plunger is provided longitudinally thereof with a cam groove 168 with which is engaged a stud or roller 169

on the slide bar 167: the contour of the groove being such that the bar 167 is reciprocated at proper intervals, thereby swinging the arm 165, and, perforce, reciprocating the box supporting slide 133.

In the descent of the plunger 152, after the retraction of the slide 133, the assembled boxes are moved upon the underlying wrapper (A) on the bead 87 above referred to, (see Fig. 26), and said bed, together with the wrapper and the group of boxes imposed thereon, are forced down by the descending plunger, as seen in Fig. 24. During the initial descent of the plunger the previously described connection between the rocker shaft 125 and the cutter bar, permits the latter to resume its normal or raised position and remain therein until the next succeeding short upward movement of the plunger.

The bed 87 is supported at the upper end of a vertically movable bar 170 which is slotted, as at 171, for the free passage of the shafts 46, 57. The lower end of the bar is provided with a laterally-projecting roller 172 which is held normally in contact with a cam 173 on the main shaft 46 by the action of a counterpoised lever 174, the inner end of which takes against the lower end of the bar, as seen in Figs. 8 and 9. The contour of the cam 173 is such as to permit the descent of the bar and bed, then maintain them in down position for a stated interval of time, and then permit them to resume their normal or raised position. The bed is provided on its upper surface with a series of yielding pads 174′, preferably of soft rubber, which correspond in number with the group of boxes and are so disposed that one pad is directly beneath the adjacent lower ends of adjoining boxes so as to afford a support therefor. (See Fig. 23.) The pads 174′ being separate and independent of each other readily yield and adapt themselves to the variable pressure thereon of the ends of boxes of slightly different lengths, when the group of boxes is depressed by the overlying plunger, thus insuring an intimate and uniform grouping of the boxes upon the wrapper on which they are imposed.

The bed 87 is vertically reciprocable within the succeeding peripheral chambers or receptacles of the intermittently rotatable turret structure 59 above referred to. The movement of the turret is such that each chamber thereof is positioned beneath the bed and there maintained for a period sufficient to permit the bed to descend and remain for an interval of time below the bottom of the chamber, which chamber is of such internal form and dimensions that in the descent of the bed the portions (*c*) of the wrapper extending beyond the respective sides of the superposed group of boxes are folded vertically against such sides so as to project above the top of the group, as seen in Fig. 24. See also Fig. 39.

In the present instance the turret structure comprises a body having a hollow interior 175 with which merge four equally spaced chambers constituted by suitably-spaced walls 176 arranged in pairs. The walls of each chamber are provided interiorly with shoulders or ledges 177 which are spaced sufficiently apart to permit the passage of the bed and its supporting bar between them and within the interior of the turret. The walls 176 are also provided with yielding clamp plates 178, which are supported by pins 179 extending loosely through apertures in the respective walls. Encircling the pins are springs 180 which tend to maintain the plates 178 normally away from the walls; the two yielding members thus provided in each chamber being so spaced apart as to receive between them and yieldingly embrace the group of boxes and the partly folded wrapper thereon; such boxes and wrapper being supported at the limit of their downward movement by the opposing ledges 177 of the chamber. (See Fig. 22.)

When the boxes and wrapper are thus associated and supported the up-projecting portions *c* of the wrapper are folded down upon the top of the group of boxes; the fold bearing the marginal paste overlapping the other so as to cement the two folds together.

The preferred means for folding the up-projecting portions (*c*) of the wrapper is as follows, reference being had more especially to Figs. 8, 9, 25, 31 and 32 of the drawings: Two horizontal guide boxes 181 are supported by the respective sides of the main frame so as to extend toward and partly overhang the turret structure. On these boxes are cover plates 182 the inner ends of which are extended but are spaced apart sufficiently to permit the vertical movement of the bed 87 therebetween. Slidingly mounted within the boxes are chambered heads 183, 184, respectively, which carry successively acting top folding members and are reciprocative toward and from each other. The head 183 carrying the first top folder, is provided with a depending lug 185 which extends through a slot 186 in the adjacent guide box and is connected by means of a link 187 with a crank arm 188 on a rocker shaft 189. This shaft has its bearings in brackets 190 supported on the adjacent side frame of the machine. Depending from the rocker shaft is an arm 191 which is, in turn, connected by means of a link 192 to an arm 193 rising from a rocker-shaft 194 having its bearings in suitably-disposed boxes on the main frame. Fast on the rocker shaft 194 is an arm 195 having a roll 196 in registry with the race of a face cam 197 on the main shaft 46, the contour

of said cam race being such as to impart through the connections just described a quick reciprocation to the head 183 during each rotation of the cam. (See Fig. 31.)

The folding member on the head 183 comprises a T-shaped lever 198 pivoted at the inner end of the head, the inner or folding portion of the lever corresponding in length to the width of the wrapper and being preferably provided with a facing of rubber 199, or other suitable yielding substance. (See Fig. 32.) The rear portion of the lever is socketed on its under side to receive a small retracting spring 200 (Fig. 9) which, being secured at its respective ends to the lever and the floor of the head 183, tends to maintain the inner or folding portion of the lever upwardly inclined, whereby during the inner stroke of the head such portion impinges against the opposing upstanding side of the wrapper and folds it over and upon the group of boxes, as clearly seen in Figs. 25 and 40.

The head 184 carrying the second top folder, has secured thereto a rod 201 which is articulated by means, such as a pin-and-slot connection 202, with the top of an arm 203 rising from the upper of two parallel rock-shafts 204, 205, which are included in the mechanism for subsequently folding the projecting ends of the wrapper, as will presently appear. The rock-shafts have their bearings in a suitably-disposed bracket 206 on the main frame, and are provided with intermeshing gear wheels 207, 208, respectively, whereby when the lower shaft 205 is actuated the upper one is moved in a reverse direction. Fast on the lower shaft is an arm 209 which is connected by means of a link 210 with the up-standing arm 211 of a bell-crank lever that is loosely mounted on a suitably-disposed shaft 212 in the vicinity of the main shaft 46. The other arm 213 of the lever overhangs the main shaft and bears a cam roller 214 in operative relation to the race of a face cam 215 on said shaft; the contour of the cam race being such as to effect through the lever and link connections just described the timely actuation of the rock-shafts 204, 205 and the various mechanisms, including the head 184, connected therewith, whereby, among other things, the folding member on this head is caused to act against and fold the opposing upstanding portion of the wrapper having the line of paste, such action being timed to fold the opposing upstanding pasted portion of the wrapper upon the preceding fold during the retraction of the first folder. (See Figs. 9 and 41.)

The folding lever 216 on the head 184 is substantially similar in construction and operation to the first folding lever 198, excepting that provision is had whereby a slight downward movement is positively imparted to the lever 216 at the end of its folding action in order to insure the sealing of the overlapping edges of the folds. For this purpose the outer arm of the lever 216 is provided adjacent its fulcrum with a depending lug 217 which extends through appropriate slots in the head 184 and its guide box. Extending through this lug is a set-screw 218 which is so disposed as to abut against the exterior of the opposing wall (176) of the turret when the head 184 approaches the limit of its inward stroke; thus forcibly tilting the lever 216 in opposition to the action of the spring and causing the inner or folding portion of the lever to press hard upon the overlapping pasted edge of the second fold, as seen in Fig. 9.

The purpose of the pin-and-slot connection between the rocker-arm 203 and the rod 201 extending from the head 184 carrying the top folder 216, is to insure sufficient lost motion to permit the sequential operations of the said folder and the end folding mechanisms hereinafter described.

Upon the retraction of the top folding levers 198, 216 the turret structure is moved a quarter-turn, thus presenting the partially wrapped group of boxes to the second or end folding station. At the same time an empty chamber is brought to the first or receiving station and the wrapper and box supporting bed 87 is raised through such chamber into position to receive and support a succeeding wrapper and a superposed group of boxes preparatory to the side and top folding operations above described. During the latter operations on the package at the receiving station, the projecting ends of the wrapper incasing the boxes at the second station are folded against the ends of the boxes, by the end folding mechanism above referred to. This mechanism will now be described in detail, reference being had to Figs. 8, 9, 26 to 30, inclusive, and 33, of the drawings.

When the package is moved to the second station, the bottom of the package is vertically disposed on the outer side of the turret. The first operation at this station is to fold the end projecting bottom portions (*d*) of the wrapper against the respective ends of the group of boxes, as illustrated in Fig. 42. The means for this purpose includes a pair of spaced heads 219 which are supported at the respective sides of the turret and are reciprocable in a horizontal path in close relation to the ends of the package; that is to say, the heads 219 are moved outward and retracted, engaging in their outward movement the opposing bottom ends *d* of the wrapper and folding them snugly against the adjacent ends of the package. The heads 219, which are provided with bifurcated extensions 220 slidingly embracing the turret shaft 57, are pivotally con-

nected to a pair of arms 221 fast on the rock-shaft 212 hereinbefore described with respect to the operation of the second top folder. On the rock-shaft 212 is an arm 222 which overhangs the main shaft and bears a roll 223 in registry with the race of a face cam 224 fast on the latter shaft. The contour of the cam race is such that at a prescribed part of its rotation the heads 219 are rapidly reciprocated horizontally, effecting in their outer stroke the efficient folding of the end bottom portions (*d*) of the wrapper and then returning to and remaining in their retracted position until a succeeding package is positioned at the second station. (See Figs. 5, 8, 27 and 29.)

The second operation at the end folding station is to fold the end projecting side portions (*e*) of the wrapper upon the bottom end folds *d* and against the respective ends of the group of boxes as illustrated in Fig. 43; which end-projecting side portions, it is to be noted, are at the top and bottom of the package when it is located at the second station.

The preferred means for thus folding the end projecting side portions (*e*) of the wrapper includes two oppositely-swinging pairs of properly spaced heads 225 which are carried by the free ends of inwardly projecting arms 226 fast on the respective rock-shafts 204, 205 above referred to. In the opposite rocking movements of these shafts through the cam connections above described the respective arms are accordingly swung toward and away from a horizontal plane intersecting the axis of the turret; the pair of heads on the upper arms acting upon and folding the respective upper end projections *e* and the pair of heads on the lower arms acting upon and folding the respective lower end projections *e* of the wrapper. The mechanism is so arranged and timed that the heads 225 act simultaneously upon the respective wrapper end projections *e* in their paths. (See Figs. 8, 9, 33 and 34.)

Preferably the heads 225 comprise bodies having angular acting portions 227 and being pivoted at their inner ends to lugs 228 on the respective arms, as at 229 so as to have capacity for slight independent rocking motion. Each of the heads 225 is provided with a stop-lug 230 which takes against a lateral stud 231 on the adjacent arm and thus limits the movement of the head relative to the arm. By this construction the complementary upper and lower heads 225 bear yieldingly against the opposing ends of the wrapper and move toward and in close relation to each other so as to insure a uniform flexure and folding of the end projecting side portions (*e*) of the wrapper against the proximate ends of the associated group of boxes. Thereupon the arms 226 are swung apart so as to raise and lower the upper and lower heads respectively.

In order to insure the accurate positioning of the package within the turret chamber, preparatory to the effective operation of the folding heads 225, the upper arms 226 are connected by means of a cross-bar 232 having a depending arm 233 provided with a foot 234 which is so arranged as to bear against the outer vertical portion (*i. e.* the top) of the package during the descent of the arms 226 and thus push the package bodily inward to proper position in the event of its being outwardly displaced. (See Figs. 8, 9 and 33.)

The next and final step at the end folding station is to fold the remaining end projecting top portions (*f*) of the wrapper upon the previous folds *e* and *d* at the respective ends of the package, as illustrated in Fig. 44; which top portions, it is to be noted, are at the outer vertical part of the package as contained in the turret during the end folding operation.

The preferred means for thus folding the end projecting top portions of the wrapper includes a substantially U-shaped head 235 which is supported on the inner end of a reciprocative bar 236 so as to be movable toward and from the package; the end members 237 of the head being in such spaced parallel relation to each other that in their inward movement they press against the respective end projecting top portions (*f*) of the wrapper and fold them snugly against the ends of the package contiguous thereto. The head 235 is preferably provided, adjacent to the inner corners of the end members 237, with pads 238, of rubber or the like, which yieldingly bear against the opposing edges of the package during the completion of the final folding operation and thus insure an effective folding of the wrappers along such edges.

The bar 236 is slidingly mounted in a guidway in the bracket 206 above referred to. This bar is longitudinally channeled for the reception of a spring 239 which is connected at its respective extremities to the outer end wall of the channel and to a depending lug 240 which is slidingly fitted within the channel of the bar. The lug is flexibly connected by means of a link 241 with the upper arm 242 of a lever which is loosely mounted on the shaft 162 as a fulcrum. The lower arm of the lever is pivoted to one end of an arm 243 having a bifurcated portion 244 which straddles the main shaft; and having also a laterally projecting roller 245 which is held in operative contact with a cam 246 on said shaft by means of a stout spring 247 which is secured to the arm and to one side of the main frame. The contour of the cam is such as to effect, in conjunction with the spring 247,

the timely actuation of the arm 243, which, through the lever and link connection described, accomplishes the horizontal reciprocation of the bar and its folding head. (See Figs. 8, 27 and 30.) The spring connection between the lug 240 and the bar 236 insures a yielding impact of the folding head 235 against the package, and thus obviates any liability of crushing or jamming the boxes within the chambers of the turret structure.

When the head 235 is retracted from the package, the turret structure is moved another quarter turn by the operation of the Geneva stop mechanism above described, thus bringing the preceding partially wrapped group of boxes to the second station, and another empty chamber to the receiving station; and so on successively. Such wrapped package is advanced to and maintained at the third or lowermost station until the next succeeding quarter-turn of the turret, whereupon the package is positioned at the entrance of an outwardly-extending discharge chute 248 into which it is ejected by means of a swinging bar 249. (See Figs. 5, 8, 9 and 28.) This bar is carried by an arm 250 rising from the cam-actuated rock-shaft 194 previously described, whereby during the periodical movements of said rock-shaft for the effective action of the first top folder the arm 250 is actuated to eject a completed package from the turret. It is to be noted that during the movements of the turret the ejecting bar 249 lies within the interior of the latter.

As each package passes from the second or end folding station to the final or diametrically-opposite discharging station, the folded ends of the package are effectively creased and maintained securely in folded condition by the action thereagainst of a pair of plates 251 of extended area which are mounted at the respective ends of the turret so as to embrace the package in its travel. The lower portions of these plates are spaced apart and connected by means of a cross-rod 252, and their upper ends, adjacent to the discharge station, are loosely hung on the rock-shaft 189 above mentioned in connection with the operating instrumentalities for the first end folder. The ends of the cross-rod 252 extend through slots 253 in the respective plates 251 so as to permit limited relative movement between the rod and the plates. This rod is connected to an arm 254 rising from the rock shaft 194, whereby during the operation of the latter the plates 251 are vibrated on the shaft 189, as an axis, thus effectively ironing the folded ends of the succeeding packages preparatory to their discharge from the turret. (See Figs. 5, 6, 8, 9, 28 and 31.)

It is to be understood that I do not limit myself to the particular forms of mechanism herein disclosed, as the same may be variously modified without departing from the principle of the invention and the scope of the appended claims.

I claim—

1. In a wrapping machine, the combination of means for supporting and feeding a row of boxes, including a bottom member for temporarily supporting successive groups of said boxes, and spring-pressed side strips spaced apart and arranged above said member so as to embrace and grasp the boxes, means for moving said member into and from its supporting position, a box and wrapper support below said member, means for vertically-reciprocating said support in respect to said member, means for supplying wrapper material to said support and in position thereon to receive the boxes when they are released by said member, and pressure means for acting upon and depressing the released boxes.

2. In a wrapping machine, the combination of means for supporting and feeding a row of boxes, including a bottom member for temporarily supporting successive groups of said boxes, and spring-pressed side strips spaced apart and arranged above said member so as to embrace and grasp the boxes, means for moving said member into and from its supporting position, a box and wrapper support below said member, means for vertically-reciprocating said support in respect to said member, means for intermittently advancing a web of wrapper material upon said support and in position thereon to receive the boxes when they are released by said member, pressure means for acting upon and depressing the released boxes, a cutter spaced from said support, and means for actuating said cutter at predetermined intervals to cut succeeding wrapper lengths from said web.

3. In a wrapping machine, the combination of means for supporting and feeding a row of boxes, including a member for temporarily supporting successive groups of said boxes, means for moving said member into and from its supporting position, a box and wrapper support below said member, means for vertically-reciprocating said support in respect to said member, means for supplying wrapper material to said support and in position thereon to receive the boxes when they are released by said member, a plurality of receptacles, means for successively advancing them beneath and into the vertical path of said support, and pressure means for acting upon the released boxes during the descent of the support into the succeeding receptacles.

4. In a wrapping machine, the combination of means for supporting and feeding a row of boxes, including a member for tem-

porarily supporting successive groups of said boxes, means for moving said member into and from its supporting position, a box and wrapper support below said member, means for vertically-reciprocating said support in respect to said member, means for intermittently advancing a web of wrapper material upon said support and in position thereon to receive the boxes when they are released by said member, a cutter spaced from said support, means for actuating said cutter at predetermined intervals to cut succeeding wrapper lengths from said web, a plurality of receptacles, means for successively advancing them beneath and into the vertical path of said box and wrapper support, and pressure means for acting upon the released boxes during the descent of said support into the succeeding receptacles.

5. In a wrapping machine, the combination of a trough having a movable bottom portion adapted temporarily to support successive groups of boxes at the delivery end of the trough, and having also spring-pressed side strips spaced apart and arranged above said member so as to embrace and grasp the boxes, means for feeding boxes along the trough and upon the said bottom portion and between the side strips, means for moving said bottom portion into and from its supporting position, a box and wrapper support below said bottom portion, means for vertically reciprocating said support in respect to said bottom portion, and means for supplying wrapper material to said support and in position thereon to receive the boxes when they are released by said bottom portion, and pressure means for acting upon and depressing the released boxes.

6. The combination of a trough having a bottom portion slidable transversely of the trough and adapted temporarily to support successive groups of boxes at the delivery end of the trough, spring-pressed side strips spaced apart and arranged above said bottom portion so as to embrace and grasp the boxes, means for feeding boxes along the trough and upon the said bottom portion and between the side strips, means for periodically sliding said bottom portion from the boxes assembled thereon, a box and wrapper support below said bottom portion, means for vertically reciprocating said support in respect to the said bottom portion, means for supplying wrapper material to said support and in position thereon to receive the boxes when they are released by said bottom portion, and pressure means for acting upon and depressing the released boxes.

7. In a wrapping machine, the combination of a trough having a movable bottom portion adapted temporarily to support successive groups of boxes at the delivery end of the trough and having also spring-pressed side strips spaced apart and arranged above said bottom portion so as to embrace and grasp the boxes, means for feeding boxes along the trough and upon the said bottom portion and between the side strips, means for moving said support into and from its supporting position, a box and wrapper support below said bottom portion, means for vertically reciprocating said support in respect to said bottom portion, means for supplying wrapper material to said support when the latter is elevated, a structure having a series of spaced receptacles open at their outer and inner ends, means for moving said structure to position its receptacles successively within the path of reciprocation of the box and wrapper support, and pressure means for acting upon the released boxes during the descent of the plunger into the succeeding receptacles.

8. In a wrapping machine, the combination of a trough having a movable bottom portion adapted temporarily to support successive groups of boxes and having also spring-pressed side strips spaced apart and arranged above said bottom portion so as to embrace and grasp the boxes, means for feeding close-lying boxes along the trough and upon the said bottom portion and between the side strips, means for spacing the temporarily supported boxes from the remainder of the boxes, means for moving said bottom portion into and from its supporting position, and pressure means for acting upon and depressing each group of boxes when the bottom portion is withdrawn.

9. In a wrapping machine, the combination of a trough having a movable bottom portion adapted temporarily to support successive groups of boxes and having also spring-pressed side strips spaced apart and arranged above said bottom portion so as to embrace and grasp the boxes, means for feeding close-lying boxes along the trough and upon the said bottom portion and between the side strips, yielding spacing members arranged to engage each temporarily supported group of boxes and separate it from the remainder of the boxes, means for moving said bottom portion into and from its supporting position, and pressure means for acting upon and depressing each group of boxes when the bottom portion is withdrawn.

10. In a wrapping machine, the combination of a trough having a movable bottom portion adapted temporarily to support successive groups of boxes, means for feeding close-lying boxes along the trough and upon the said bottom portion, spring spacing members overhanging the support and positioned to separate each temporarily supported group of boxes from the remainder

of the boxes, spring pressed clamp members arranged to embrace and grasp the succeeding groups, means for moving said bottom portion into and from its supporting position, and means for successively depressing the unsupported groups.

11. In a wrapping machine, the combination with means for bodily moving a group of slide boxes arranged in close parallel relation to each other, of a support against which the boxes are moved having a series of yielding pads arranged in spaced relation to each other so as to receive the impact of the adjacent end edges of adjoining boxes.

12. In a wrapping machine, the combination with means, including a reciprocative plunger, for bodily depressing a group of upstanding slide boxes arranged in close parallel relation to each other, of an underlying bed having a series of yielding pads thereon, and means for feeding a wrapper upon said bed and its pads, said pads being arranged in spaced relation to each other so as to receive the impact of the adjacent end edges of adjoining boxes.

13. In a wrapping machine, the combination with means, including a vertically-reciprocative plunger for bodily depressing a group of upstanding slide boxes arranged in close parallel relation to each other, of an underlying bed having a series of yielding pads thereon, means for vertically reciprocating said bed, means for supplying wrapper material to said bed and in position thereon to receive the group of boxes, said pads being arranged in spaced relation to each other so as to receive the impact of the adjacent edges of adjoining boxes, a plurality of receptacles, and means for successively advancing them beneath and into the vertical path of said bed.

14. In a wrapping machine, the combination of a source of box supply, vertically-reciprocative means for ejecting boxes therefrom, a supporting element upon which the boxes thus removed are deposited, means for advancing a web of wrapper material successively upon said element and beneath the boxes, a vertically-reciprocative cutter spaced from said element and arranged to sever the paper transversely, and connections between said cutter and ejecting means, whereby during an initial upward movement of the latter the cutter is actuated to sever a wrapper length from the web, and whereby during the downward movement of the ejecting means the cutter is returned to its previous position.

15. In a wrapping machine, the combination with a wrapper-and-article support, and means for vertically-reciprocating the same, of a structure having a series of spaced receptacles open at their outer and inner ends, and means for moving said structure to position its receptacles successively within the path of the support, whereby said support is reciprocable through the successively positioned receptacles and in its downward movements passes below the bottoms of the respective receptacles.

16. In a wrapping machine, the combination with a wrapper-and-article support, and means for vertically reciprocating the same, of a structure having a series of spaced receptacles and a common connecting space therefor, and means for intermittently advancing said structure to position its receptacles successively within the path of the support, whereby said support is reciprocated through the successively positioned receptacles and in its downward movements enters the common space connecting the receptacles.

17. In a wrapping machine, the combination with a wrapper-and-article support, and means for vertically-reciprocating the same, of a turret having a central space and a series of spaced apart open receptacles extending radially outward therefrom, and means for intermittently rotating said turret to position the receptacles successively within the path of the support, whereby said support is reciprocated through the successively positioned receptacles and in its downward movements enters the common space connecting the receptacles.

18. In a wrapping machine, the combination with a wrapper-and-article support, means for vertically reciprocating the same, means for successively supplying wrappers to the support, and means for imposing articles on the wrappers, the last-named means including a pressure device for acting upon said articles, and means for vertically reciprocating said pressure device, of a structure comprising a series of spaced receptacles, means for moving said structure to position its receptacles successively within the vertical path of said support, a pair of oppositely-disposed folding members operable across the outer end of each receptacle thus positioned, and means for actuating said members.

19. In a wrapping machine, the combination with a wrapper-and-article support, means for vertically reciprocating the same, means for successively supplying wrappers to the support, and means for imposing articles on the wrappers, the last-named means including a pressure device for acting upon said articles and means for vertically reciprocating said pressure device, of a structure comprising a series of spaced receptacles, means for moving said structure to position its receptacles successively within the vertical path of said support, a pair of oppositely-disposed folding members horizontally reciprocable above the mouth of each receptacle thus positioned, one of

said members having independent vertical movement, and means for horizontally reciprocating both said members toward and from each other and for imparting vertical movement to the independently movable member at or about the limit of its inner stroke.

20. In a wrapping machine having a series of folding stations, the combination with a structure comprising a series of receptacles, and means for intermittently moving said structure to position the receptacles progressively at the folding stations, of means for introducing the articles to be wrapped, together with a wrapper therefor, to each of said receptacles when it is positioned at one station, whereby such wrapper is caused to embrace the bottom and sides of the articles, means at said station for folding the up-projecting portions of the wrapper over upon the top of the package and means at another station for folding in successive order the projecting ends of the wrapper, the last-named means comprising an element for simultaneously forming the bottom folds at the respective ends of the package, oppositely-acting members for simultaneously pressing inward the respective side folds at the ends of the package, and an element for simultaneously forming the final end folds at the top of the package.

21. In a wrapping machine having a series of folding stations, the combination with a structure comprising a series of receptacles, and means for intermittently moving said structure to position the receptacles progressively at the folding stations, of means for introducing the articles to be wrapped, together with a wrapper therefor, to each of said receptacles when it is positioned at one station, whereby such wrapper is caused to embrace the bottom and sides of the articles, means at said station for folding the up-projecting portions of the wrapper over upon the top of the package and means at another station for folding in successive order the projecting ends of the wrapper, the last-named means comprising an element for simultaneously forming the bottom folds at the respective ends of the package, mechanism for simultaneously pressing inward the respective side folds at the ends of the package, said mechanism comprising two opposed pairs of rocker-arms pivoted at their outer ends and having folder portions on their inner ends, coacting gearing between said arms, and means for periodically actuating said gearing, and an element for simultaneously pressing inward the respective side folds at the ends of the package.

22. In a wrapping machine having a series of folding stations, the combination with a structure comprising a series of receptacles, and means for intermittently moving said structure to position the receptacles progressively at the folding stations, of means for introducing the articles to be wrapped, together with a wrapper therefor, to each of said receptacles when it is positioned at one station, whereby such wrapper is caused to embrace the bottom and sides of the articles, means at said station for folding the up-projecting portions of the wrapper over upon the top of the package, and means at another station for folding in successive order the projecting ends of the wrapper, the last-named means comprising an element for simultaneously forming the bottom folds at the respective ends of the package, oppositely-acting members for simultaneously pressing inward the respective side folds at the ends of the package, and an element for simultaneously forming the final folds at both ends of the package comprising a plunger having side portions adapted to embrace the ends of the package, and means for periodically reciprocating said plunger.

23. In a wrapping machine having a series of folding stations, the combination with a structure comprising a series of receptacles, and means for intermittently moving said structure to position the receptacles progressively at the folding stations, of means for introducing the articles to be wrapped, together with a wrapper therefor, to each of said receptacles when it is positioned at one station, whereby such wrapper is caused to embrace the bottom and sides of the articles, means at said station for folding the up-projecting portions of the wrapper over upon the top of the package, and means at another station for folding in successive order the projecting ends of the wrapper, the last-named means comprising spaced reciprocative members for simultaneously forming the bottom folds at the respective ends of the package, opposed pairs of swinging members for simultaneously pressing inward the respective side folds at the ends of the package, and an element for simultaneously forming the final folds at both ends of the package comprising a plunger having side portions adapted to embrace the ends of the package, and means for periodically reciprocating said plunger.

24. In a wrapping machine, the combination with means for supporting a partially wrapped package having end projecting wrapper portions, of wrapper folding mechanism comprising opposed pairs of pivotally mounted arms, folding heads yieldingly supported by said arms, and means for simultaneously swinging the pairs of arms toward or from each other at the respective ends of the package, whereby the upper and lower projecting portions of the wrapper

at each end of the package are simultaneously folded toward each other, together with means carried by said arms for pressing inward a displaced package before the action of said folder members.

25. In a wrapping machine, the combination with means for supporting a partially wrapped package having end-projecting wrapper portions, of wrapper folding mechanism comprising opposed pairs of pivotally-mounted members, means for simultaneously swinging the pairs of members toward or from each other at the respective ends of the package, whereby the upper and lower projecting portions of the wrapper at each end thereof are simultaneously folded toward each other, and means operative to bear against and insure the proper positioning of the package preparatory to the folding action of the said members.

26. In a wrapping machine, the combination with means for supporting a partially wrapped package having end projecting wrapper portions, of wrapper folding mechanism comprising a pair of spaced folding heads, means for reciprocating said heads toward and from the bottom portion of the package so as to fold the bottom end projections of the wrapper, two pairs of pivotally mounted folding members, means for simultaneously swinging said pairs of members toward or from each other so as to fold the side end projections of the wrapper, a final folding head, and means for reciprocating the latter head toward and from the top portion of the package so as to fold the top end projections of the wrapper.

27. In a wrapping machine, the combination with a structure comprising means for supporting a partially wrapped package having end projecting wrapper portions, of means for folding said projecting portions against the respective ends of the package, means for actuating said structure to advance the package, and means for pressing and ironing the folded ends of the package, said latter means comprising a pair of plates of extended area mounted at the respective sides of the turret, said plates being pivoted at their upper portions, a cross-rod, a cam connection between said rod and the lower portions of the plates, and a rocker connection for actuating said cross-rod during the travel of the structure.

28. In a wrapping machine, the combination with a structure comprising means for supporting a partially wrapped package having end projecting wrapper portions, of means for folding said projecting portions against the respective ends of the package, means for actuating said structure to advance the package, a pair of elongated members embracing the package during its travel, a member for ejecting the wrapped package from said structure, means for vibrating said members toward and from the adjacent ends of the package, and connections between said latter means and the ejecting member.

29. In a wrapping machine having a plurality of folding stations, the combination with a structure comprising a series of receptacles and means for intermittently moving said structure to position the receptacles progressively at the folding stations, of means for introducing articles, together with a wrapper therefor, to each of said receptacles when it is positioned at one station, whereby the wrapper is caused to embrace the bottom and sides of the articles, means at said station for folding the up-projecting portions of the wrapper over upon the top of the package, means at another station for folding in successive order the projecting ends of the wrapper, and means succeeding said latter station for pressing and ironing the end folds of the wrapper, said latter means comprising a pair of vibratory plates, and means for actuating the same during the travel of said structure.

30. In a wrapping machine having a plurality of folding stations, the combination with a structure comprising a series of receptacles and means for intermittently moving said structure to position the receptacles progressively at the folding stations, of means for introducing articles, together with a wrapper therefor, to each of said receptacles when it is positioned at one station, whereby the wrapper is caused to embrace the bottom and sides of the articles, means at said station for folding the up-projecting ends of the wrapper over upon the top of the package, means at another station for folding in successive order the projecting ends of the wrapper, and means succeeding said latter station for pressing and ironing the end folds of the wrapper, said latter means comprising a pair of vibratory plates and means for actuating the same during the travel of said structure, together with means for ejecting the completed packages successively from said structure.

Signed at New York, in the county and State of New York this 18th day of September, 1918.

SIMON COOPER.