No. 700,366. Patented May 20, 1902.

R. L. PATTERSON.

MACHINE FOR PACKING MERCHANDISE.

(Application filed Feb. 26, 1897.)

(No Model.) 10 Sheets—Sheet 1.

Fig. 1.

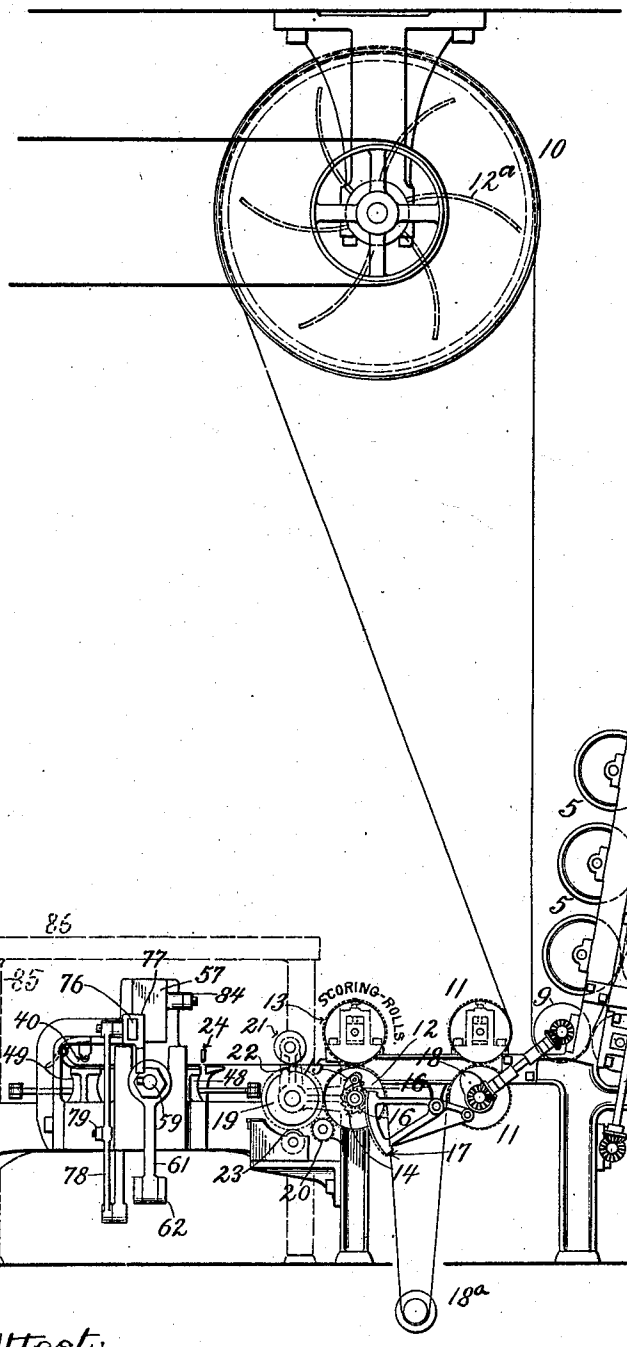
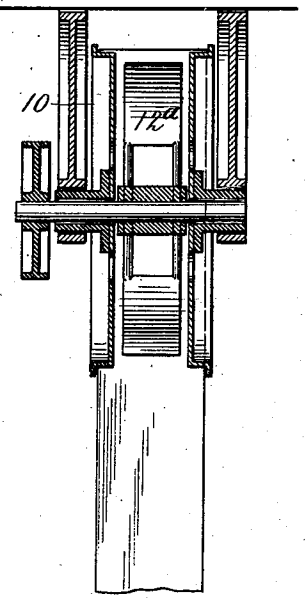


Fig 1a.



Attest;
C. C. Burdine
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(No Model.) 10 Sheets—Sheet 2.

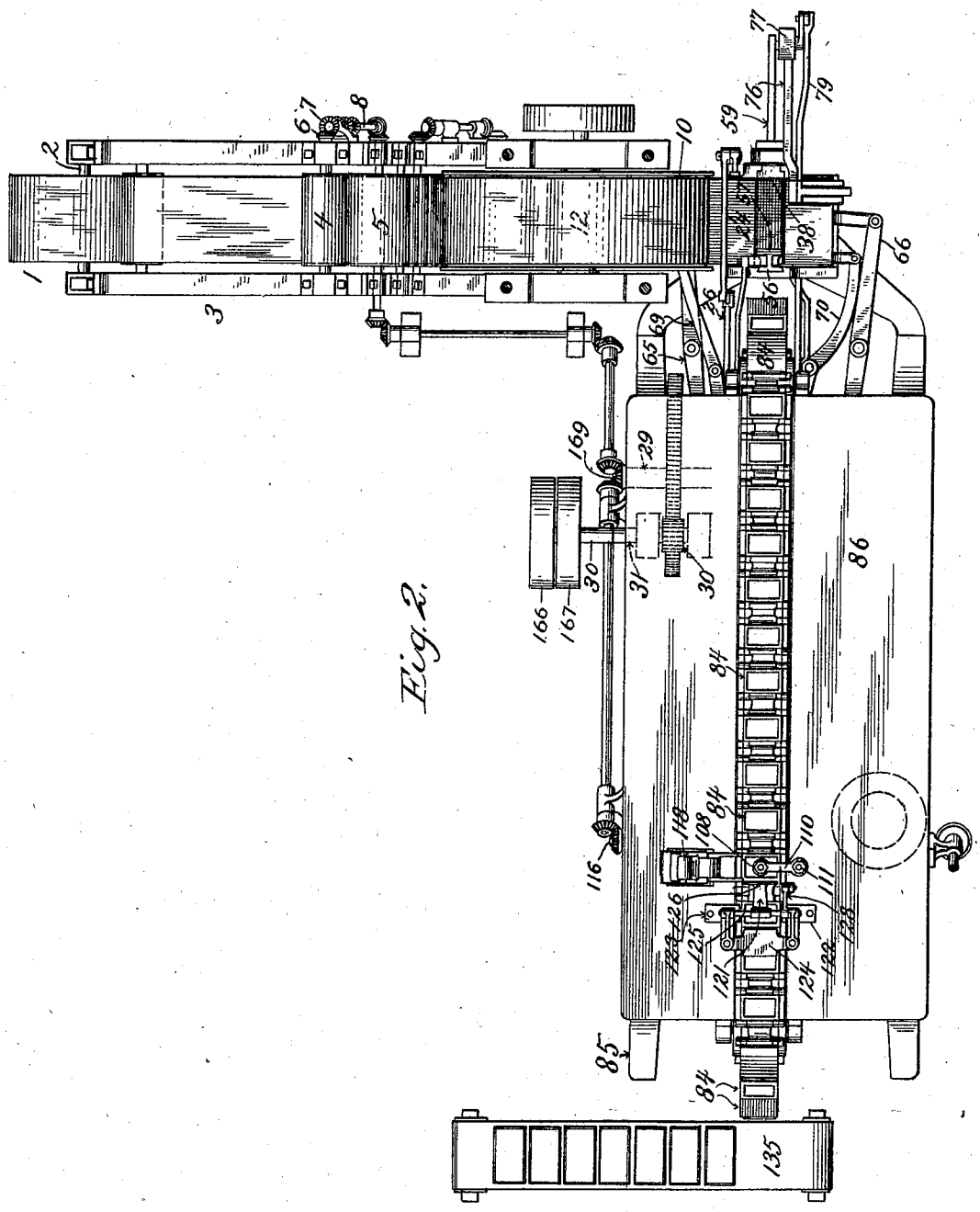

Fig. 2.

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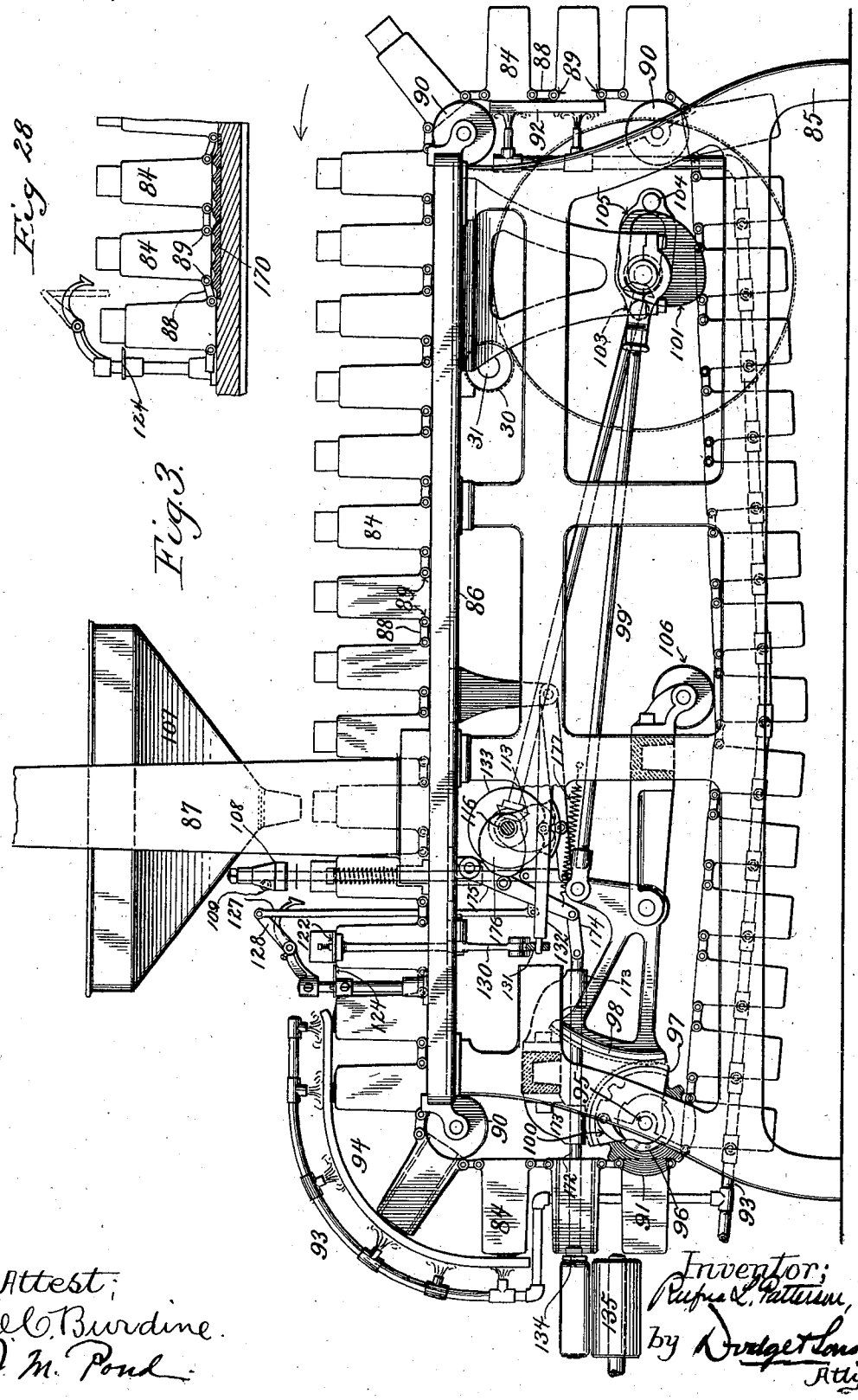
MACHINE FOR PACKING MERCHANDISE.

(Application filed Feb. 26, 1897.)

(No Model.) 10 Sheets—Sheet 3.

Fig 2a

Fig. 3.



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MACHINE FOR PACKING MERCHANDISE.

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(No Model.) 10 Sheets—Sheet 4.

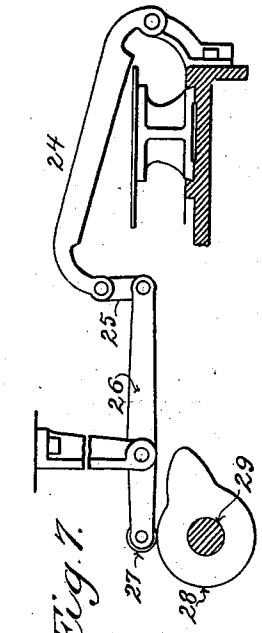

Fig. 1.

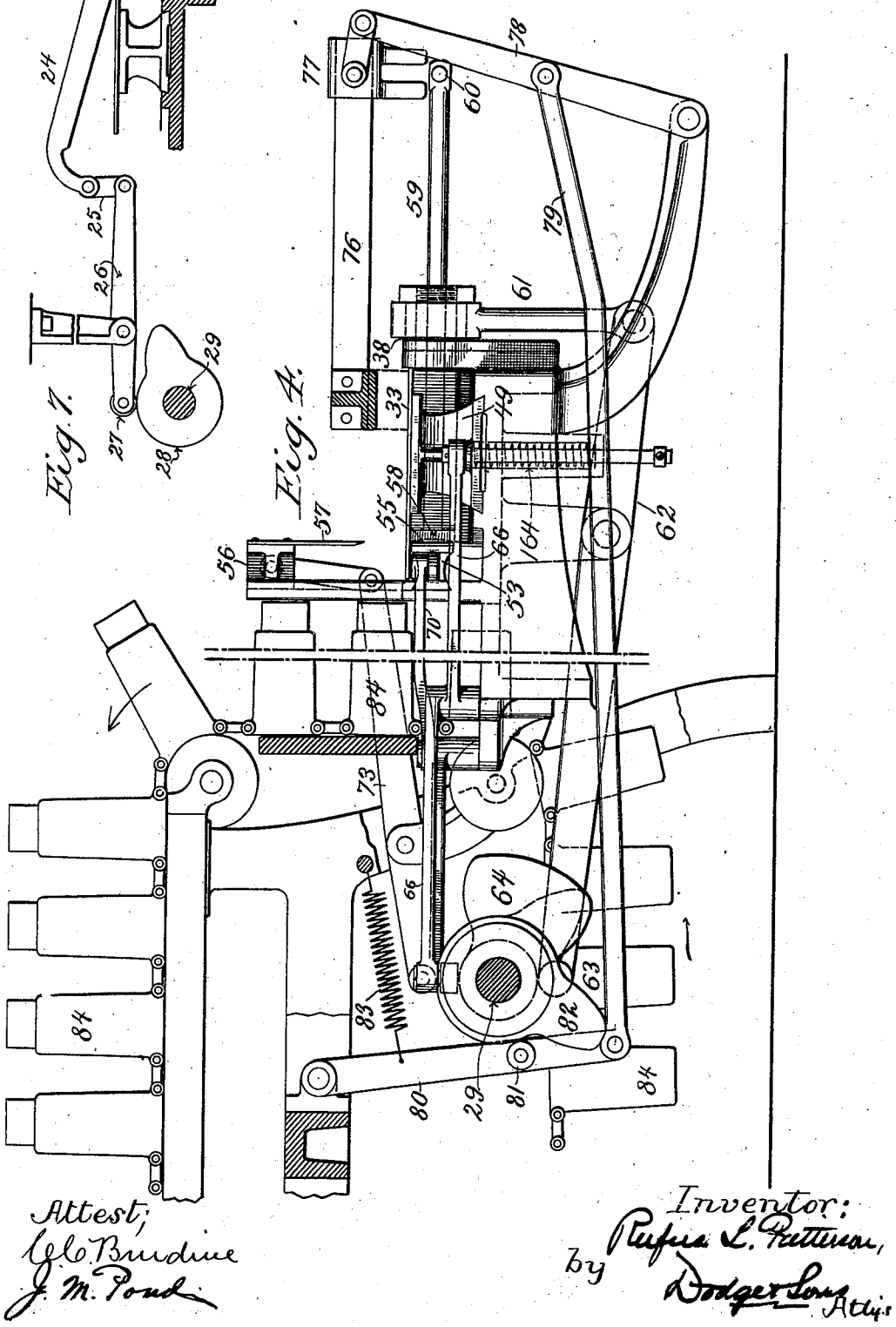

Fig. 4.

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MACHINE FOR PACKING MERCHANDISE.

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(No Model.) 10 Sheets—Sheet 5.

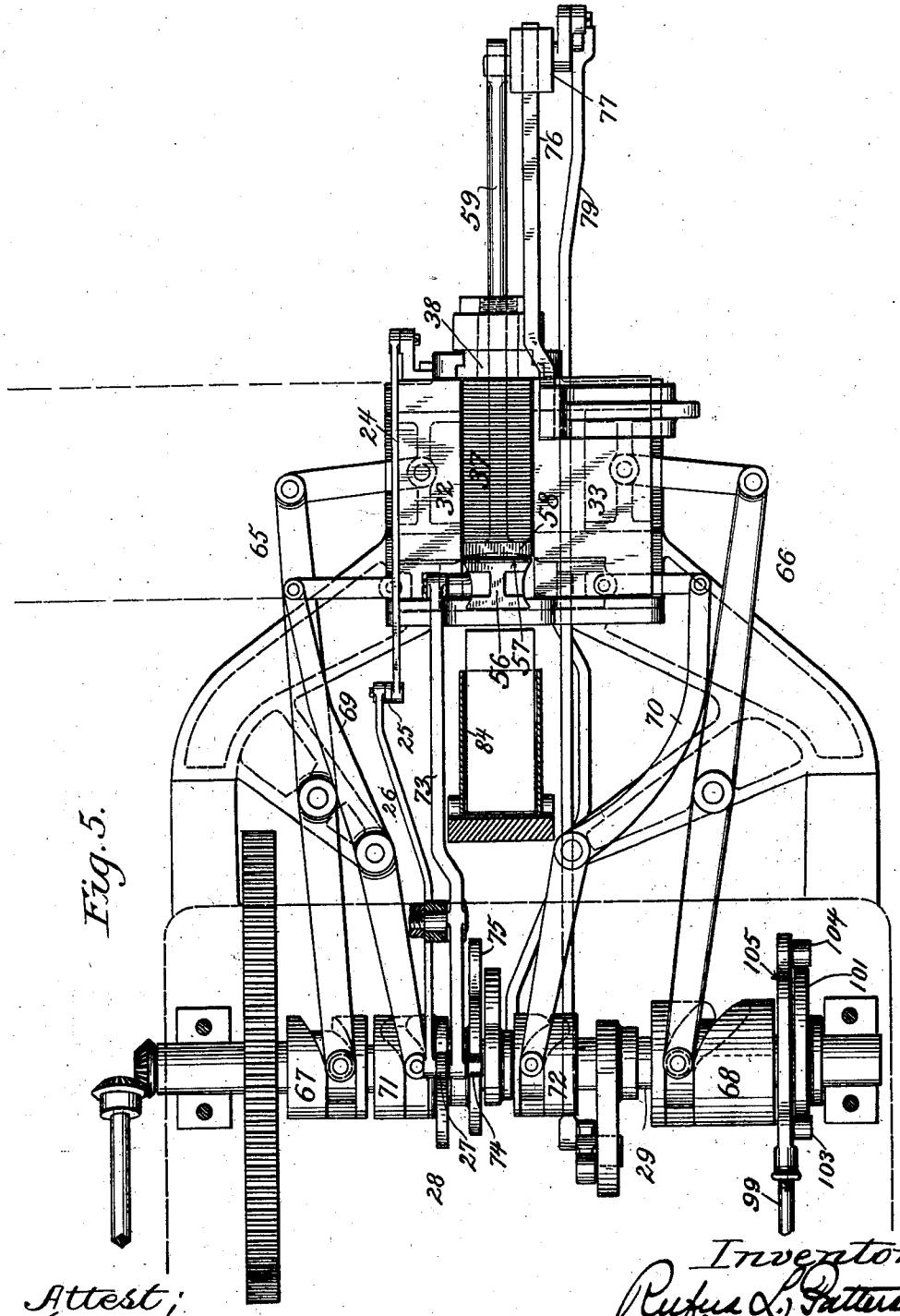

Fig. 5.

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MACHINE FOR PACKING MERCHANDISE.

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(No Model.) 10 Sheets—Sheet 6.

Fig. 6.

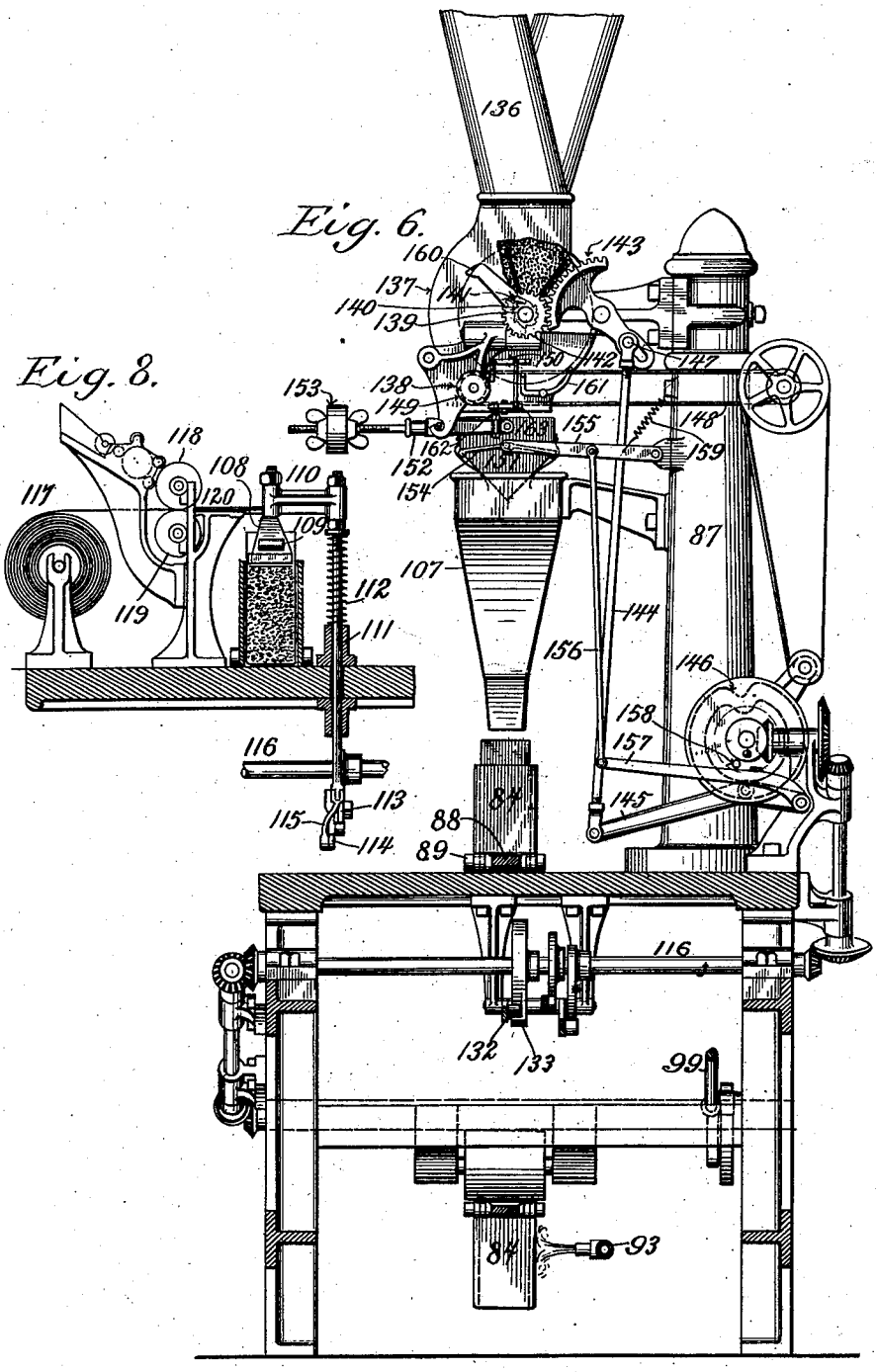

Fig. 8.

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MACHINE FOR PACKING MERCHANDISE.

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(No Model.) 10 Sheets—Sheet 7.

Fig. 9.

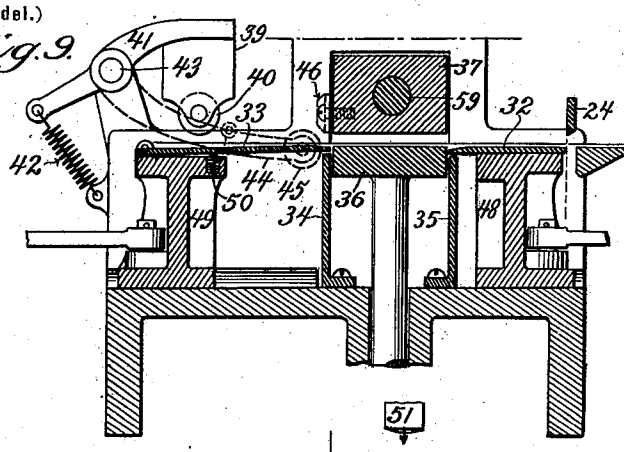


Fig. 10.

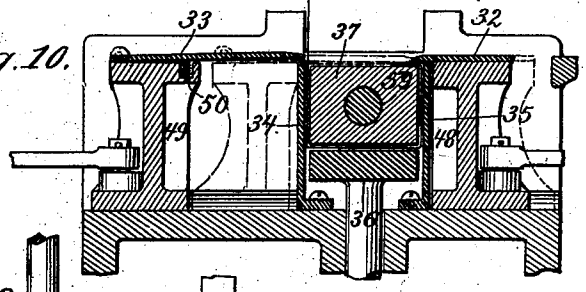


Fig. 11.

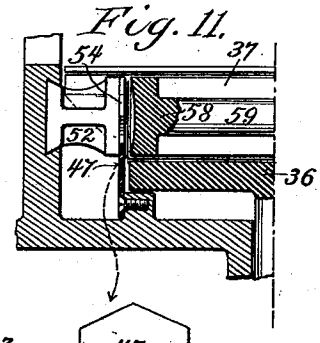


Fig. 12.

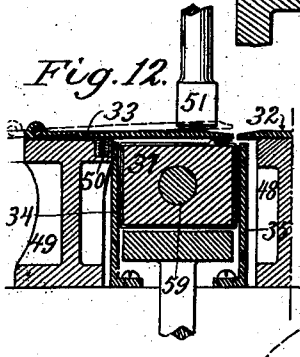
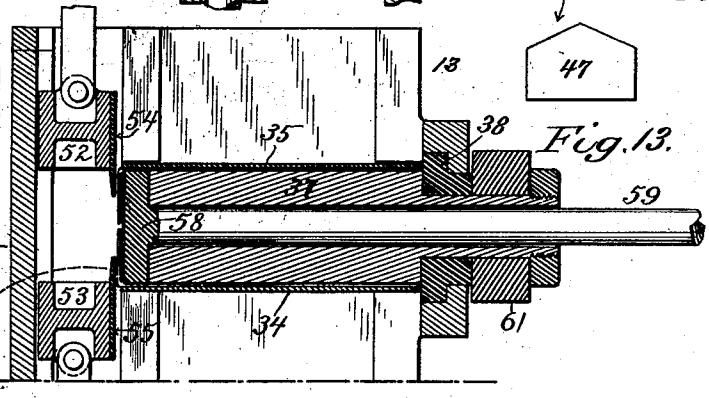


Fig. 13.



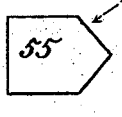


Fig. 14.

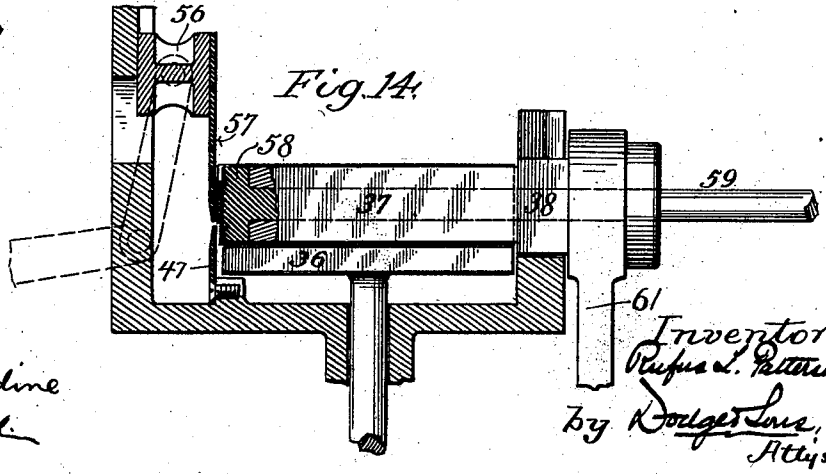


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Fig. 15.

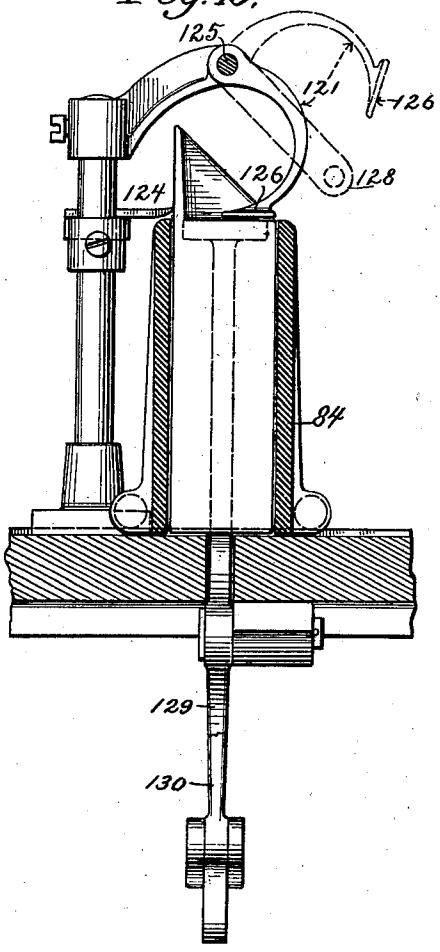

Fig. 16.

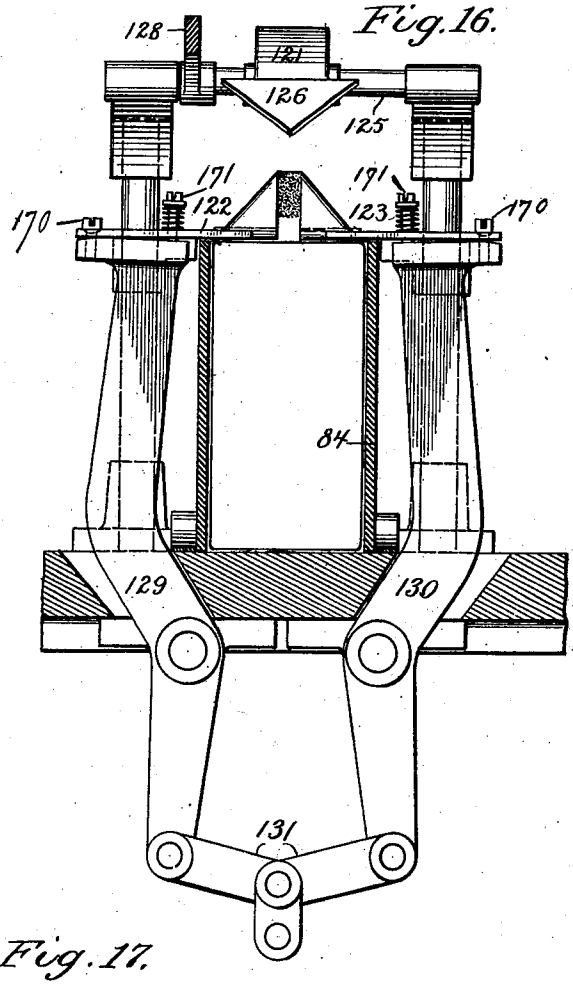

Fig. 17.

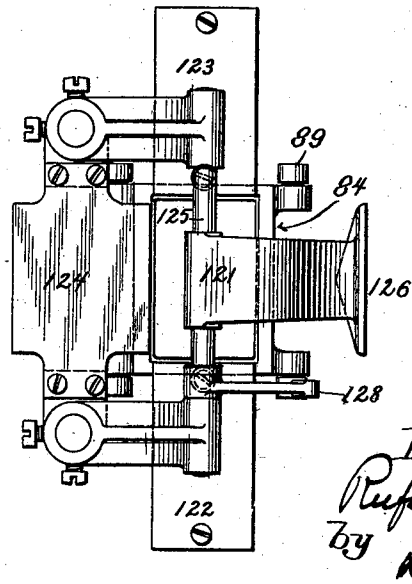

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Fig. 18.

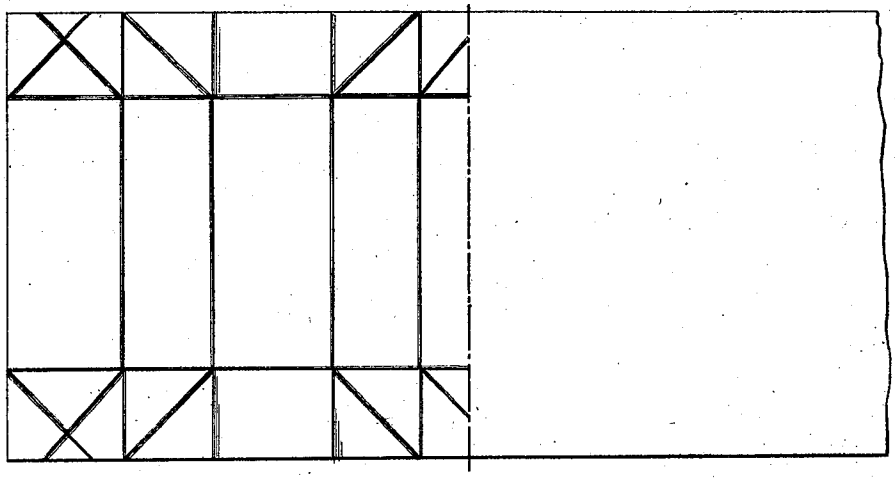


Fig. 19.

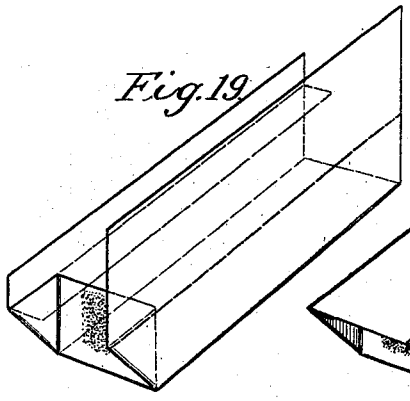


Fig. 20.

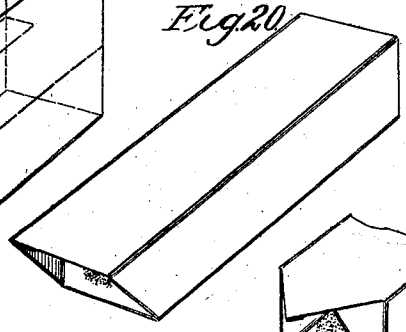
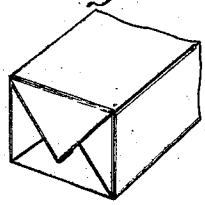


Fig. 22.



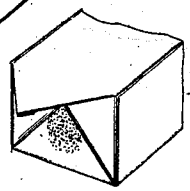


Fig. 21.

Fig. 23.

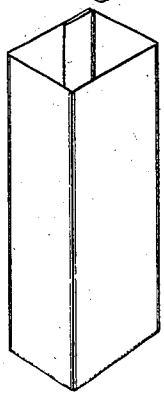


Fig. 24.

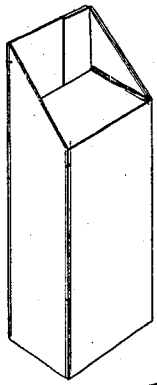


Fig. 25.

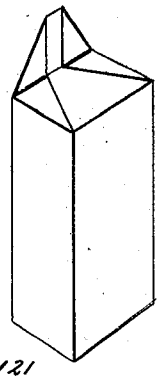


Fig. 26.

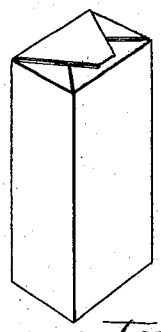
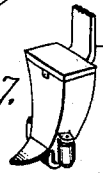


Fig. 27.



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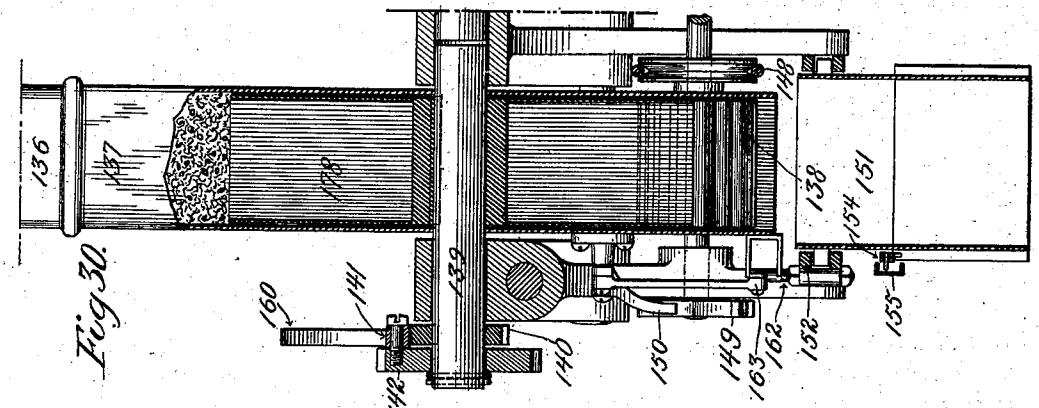

Fig. 30.

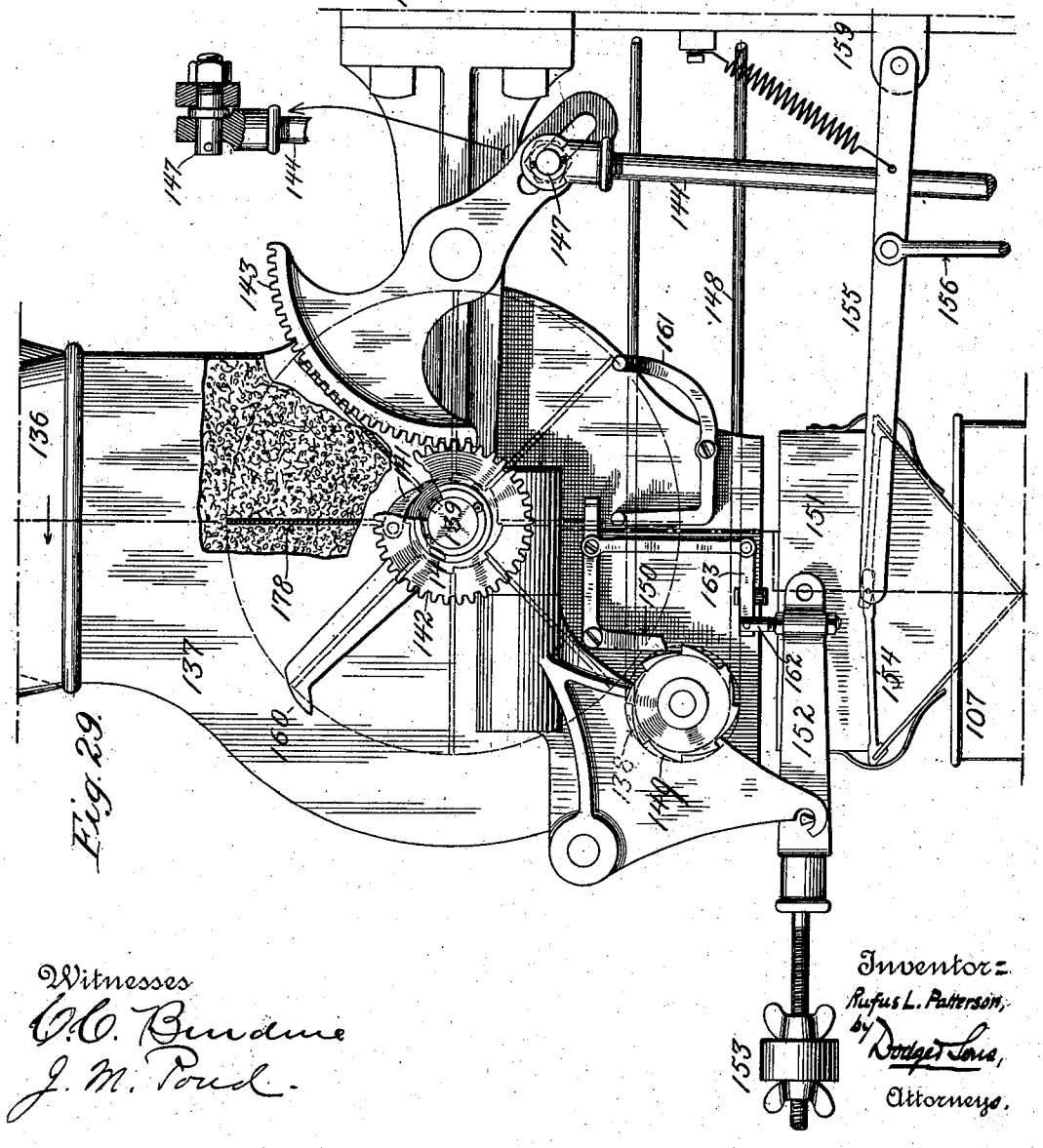

Fig. 29.

Witnesses
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J. M. Pond.

Inventor:
Rufus L. Patterson,
by Dodger Sons,
Attorneys.

UNITED STATES PATENT OFFICE.

RUFUS L. PATTERSON, OF DURHAM, NORTH CAROLINA.

MACHINE FOR PACKING MERCHANDISE.

SPECIFICATION forming part of Letters Patent No. 700,366, dated May 20, 1902.

Application filed February 26, 1897. Serial No. 625,168. (No model.)

To all whom it may concern:

Be it known that I, RUFUS L. PATTERSON, a citizen of the United States, residing at Durham, in the county of Durham and State of North Carolina, have invented certain new and useful Improvements in Machines for Packing Merchandise, of which the following is a specification.

My invention pertains to machinery for packing merchandise, and is designed in its complete form to print a web of paper in one or more colors, to cut from said web proper lengths for the production of bags or packages, to fold and paste the paper into the required form, to measure and weigh the proper charges, to deposit them into the prepared bags or packages, and, finally, to seal and deliver the finished packages, all automatically.

Referring to the accompanying drawings, Figure 1 is a side elevation of the printing apparatus, showing the package-forming mechanism in end elevation; Fig. 1ª, a vertical sectional view taken in the plane of the axis of the blower-shaft of Fig. 1; Fig. 2, a top plan view of the complete apparatus; Fig. 3, a side elevation of the packing mechanism; Fig. 4, a side elevation, partially in section, showing the mechanism by which the bag or package is formed and delivered to the filling mechanism; Fig. 5, a plan view of the cam mechanism by which the folding devices are actuated; Fig. 6, a side elevation of the measuring and weighing mechanism; Fig. 7, a detail view of the shearing or cutting mechanism by which the blank for a package or bag is severed from the web; Fig. 8, an elevation, partly in section, of the pasting and packing or compressing mechanism; Figs. 9 to 14, inclusive, detail views of the mechanism by which the blank is folded into form to produce a bag or package; Figs. 15, 16, and 17, detail views of the mechanism for closing the mouth of the bag; Figs. 18 to 26, inclusive, diagrammatic perspective views illustrating the steps or stages in the formation of the bag or package; Figs. 27 and 28, views illustrating modifications; Figs. 29 and 30, enlarged views in elevation and section, showing the measuring mechanism.

At the present time there is a large and growing demand for packaged goods, especially in the line of staple articles of merchandise—such as coffee, tea, sugar, spices, breakfast-foods, and the like—and the present invention is designed to produce a machine by which the packaging of such goods may be speedily and efficiently performed. Certain parts of the machine or certain groups of mechanism therein are susceptible of use independently of others—as, for instance, the measuring and weighing devices may be used independently of the printing or of the packaging mechanism, the printing and bag-forming mechanism may be used independently of the measuring or weighing mechanism, and the printing mechanism may be eliminated and the measuring or the measuring and weighing mechanism used conjointly with the package-forming and packing devices. I therefore mean to claim the separate mechanisms and groups of mechanisms independently of their combination in one organized structure and also to claim the complete structure, wherein all the parts are designed with reference to each other and to their operation in proper time and sequence.

In many of its details the embodiment of the invention may be varied; but I shall set forth that construction and arrangement of parts which I have fully developed and which is now believed by me to be the most desirable embodiment of the invention.

Referring first to Fig. 1, I have represented a web or roll of paper 1, mounted upon a shaft or axle 2, carried in brackets or supports upon a suitable frame 3, which also carries feed-rollers 4 and one or more printing mechanisms 5. The feed-rollers and printing mechanisms receive motion through bevel-gears 6 and 7 from a shaft 8, which, in turn, may receive its motion from any convenient source.

In practice it is deemed desirable to print the bag or package blanks in two or more colors, and where this is desired I provide a plurality of printing mechanisms 5, which may be of any approved type, and I pass the web or paper from the roll 1 first between the feeding-rollers 4 4 and then between the form-rolls and the impression-rolls of the printing mechanisms 5, thence between a second pair of feed-rolls 9 9, thence upward over a drum or rotary support 10, and back to a third pair of feed-rolls 11 11. The feed-rolls 9 9 are cut away between their ends, so as to bear only

upon the unprinted edges of the web or sheet. In passing from the rolls 9 9 to the rolls 11 11 the paper or web is carried a considerable distance through the air with its two faces exposed thereto, the drum 10 serving to separate said faces and to permit a free access of air to the printed surface.

The drum 10 is constructed in the manner represented in Fig. 1ª or in any equivalent form, whereby it is adapted to sustain the paper or web at its edges, while leaving the intervening printed surface free from contact with any portion of the drum or other body. As seen in Fig. 1ª, the drum 10 consists simply of two flanged or rimmed wheels, each having a circumferential face of sufficient width to sustain one edge of the paper, the two wheels being separated such distances as to accommodate the width of the web or sheet between their flanges.

Printers' ink dries rapidly when exposed to a moving air-current, and in order that it may dry during the passage of the web or sheet from the feeding-rolls 9 to the feeding-rolls 11 a fan 12ª or other air-forcing device is arranged to direct a current of air against the printed surface of the web between these points. In the drawings, Figs. 1 and 1ª, I have represented the fan 12ª as carried by a shaft passing through tubular axles or journals of the drum-wheels 10; but this is merely suggestive and need not be followed in practice. Any air-forcing device which shall direct a current of air against the exposed printed surface will answer the purpose.

As indicated in Fig. 1, the feeding-rolls 9 9 and 11 11 are geared to rotate in synchronism, and they are driven with due regard to the travel of the paper or web through the printing mechanism.

It will of course be understood that the printing devices may be of any well-known form, such as are now used for printing calico and other fabrics or such as have heretofore been employed for printing bag-blanks and the like. It is therefore unnecessary to enter into a detailed description of the printing apparatus.

From the feed-rolls 11 11 the web or sheet passes to intermittently-acting rolls 12 and 13, which are designed to score, crease, or indent the web on the lines of future folding. To this end one roll is formed or furnished with slightly-projecting ribs, and the other is made with corresponding grooves or depressions, the two being made to register with accuracy. The character and arrangement of the scoring-ribs and grooves will vary according to the nature of the web and the dimensions and form of the package to be produced, Fig. 18 showing the scored or indented blank, and thus illustrating in plane projection the surface of the rolls. The scoring-rolls 12 and 13 are geared to rotate at equal surface speeds and receive motion through the medium of a ratchet-wheel 14, carried by roll 12, which wheel is turned by a pawl 15, carried by an arm 16, secured to or made integral with a pinion loosely mounted upon the shaft or gudgeon of roll 12 and rotated first in one and then in the other direction by a segmental rack 17. Rack 17 is pivotally supported upon the main frame of the machine and is actuated by a cam 18 on the end of lower roll 11. The motion may be positively effected in both directions by use of a curved cam or in one direction only by use of an open cam, in which latter case gravity or a spring will be utilized to return the rack to its normal or depressed position.

As pointed out, the rolls 12 and 13 act intermittently, while rolls 11 11 act continuously and turn at a constant rate of speed. From this it follows that a certain amount of slack accumulates between the two pairs of rolls during the periods of inaction of the rolls 12 13. To take care of this and to prevent the web from being buckled, torn, or disfigured, I place upon that portion lying between the feeding and the scoring rolls a roller 18ª, having flanged or enlarged ends. This roller by reason of its weight keeps the web taut and straight, acting in a manner similar to a belt-tightener, yet is light enough to be readily lifted when the scoring-rolls turn, so that no hindrance to their operation is caused. By this combination of rolls I am enabled to score or indent the stock without subjecting it to undue tension or strain, having always a surplus in advance of rolls 11 when the scoring is performed, which surplus is under the very slight tension of roller 18ª.

19 indicates another roll, geared to rotate in unison with roller 12 and in the same direction through the aid of an intermediate pinion 20. Roll 19 is designed, with the aid of a smaller roll 21, to apply paste to the blank at such point as will serve for securing the bottom of the bag or package. To enable the roll to perform this latter function, it is formed or furnished with a projection 22, which at one point in the rotation of the roll makes contact with a paste-roller or equivalent paste-supplying body 23 and at another point therein bears against and delivers paste to the web, supported at the time by the upper roller 21, the point of such application being indicated in Figs. 19, 20, and 21. When the web is advanced a proper distance beyond the rolls 19 21, a bag length or blank is severed therefrom by a vertically reciprocating or oscillating knife 24, (shown in Fig. 1, but more clearly in Figs. 2, 5, and 7,) the parts being so timed or related that the knife acts only while the web length in advance of rolls 19 21 is at rest. The intermittent action of the rolls 12 and 13 is designed to preclude any tearing of or injury to the web by the scoring or creasing rolls, which might occur if said rolls drew the web directly from the rolls 11; but rolls 19 and 21, being geared to turn at the same surface speed as the scoring-rolls, will advance the web at precisely the rate at which it is delivered by the scoring-rolls.

The precise mode of actuating the knife or cutter is immaterial, though I have shown the knife in Figs. 5 and 7 pivoted at one end to a rigid support and connected by a link 25 at its opposite end to a lever 26 of the first order, the free end of which is furnished with an antifriction-roller 27, which bears upon the edge or circumference of a cam 28, carried by a shaft 29. As will be pointed out, shaft 29 carries a series of cams, by or through which the appropriate motions are imparted to each and all of the folding devices by which the bag or package is brought into shape. It receives motion from any convenient prime motor through a pinion 30, carried by a band-wheel shaft 31 and meshing with a gear-wheel upon shaft 29, as indicated by dotted lines in Fig. 2, though any equivalent driving-rig may be employed. Before being severed from the web the bag length or blank is carried across and caused to lie upon a horizontal bed or support, at one side of which is located a stationary shear edge or blade, with which the cutter 24 coacts.

The manner of folding up the blank to produce a bag or package is illustrated in Figs. 9 to 14, inclusive.

The bed or support just mentioned is formed by two movable horizontal plates or folders 32 and 33, which are normally drawn apart a distance equal to the width of the intended bag or package or until their proximate edges just overlap the upper edges of two vertical plates 34 and 35, constituting the side walls of a mold in which the bag or package is fashioned. Between the plates 34 and 35 there is arranged a yielding bed or block 36, which, bridging the space between the folders 32 and 33, forms a support for the blank. Directly above the block or bed 36 there is located a form or pattern-block 37, about which the bag or package is wrapped or folded. This form or pattern-block is carried by a vertically-reciprocating head or slide 38, to which one end of the form is made fast, and standing normally somewhat above the level of the folders 32 and 33 it permits the bag-blank to pass beneath and between it and the block 36. When the blank is thus placed and is severed from the web, the form or pattern-block 37 is caused to descend, carrying before it the blank and the block 36 beneath it; but the side portions of the blank, supported, as they are, by the folders 32 and 33, are turned upward into vertical planes, as indicated in Fig. 10.

It has already been explained that paste is applied to the blank at one point in passing between rolls 19 and 21 to insure the sealing of the bottom of the bag. That portion of the blank thus supplied with paste overhangs the folders 32 33, and consequently does not give off the paste to said parts, which would of course cause trouble in the working of the machine. To supply paste for the longitudinal seam or joint of the bag or package, there is arranged above the folder 33 a paste-receptacle provided with a roller 40 or equivalent delivering device and carried by a lever 41, to which is applied a spring 42, a counterweight, or equivalent lifting device to hold the paste-receptacle and roller normally above the lever of the bag-blank. Projecting from the pivot shaft or spindle 43 of the lever 41 is an arm 44, carrying at its end an antifriction-roller 45, and secured to or projecting from the head or slide 38 is a lug 46, which as the form or pattern-block descends bears against roll 45, depresses arm 44, and thereby lowers the paste-receptacle 39 until its roll 40 bears upon the bag-blank lying upon folder 33. The lug 46 is of such vertical measurement as to hold the paste-roller in contact with the blank until said blank is almost drawn out from beneath it by the continuing descent of the form or pattern-block 37; but that just before the edge is reached the arm 44 is released and the paste-receptacle and its roll are permitted to rise. The spring 42 or its equivalent—a weight—serves to elevate the paste-receptacle when it is thus made free to rise, a spring being preferred, because of its more prompt action. In descending the form or pattern-block carries the projecting end of the blank against a fixed folder-plate 47 of the form shown in Fig. 11. This folder occupies a vertical position just a little out of plane with the end of bed or block 36 and of pattern-block or form 37, so that as the blank is carried down the protruding portion of the lower side of the package being formed is turned or folded inward and upward, as indicated in Fig. 11, thus making the first bottom fold. The upper edge of the folder 47 is highest at the middle and inclines thence downward toward each side to cause the proper formation of the bottom fold. The pattern-block or form having been carried down to the position shown in Figs. 10 and 11 and the sides and bottom having been thus given their initial folds, a horizontally-reciprocating head 48 moves inward toward the form or pattern-block 37, carrying with it the folder plate or blade 32, which when moved its full distance inward laps slightly over or upon the pattern-block or form 37 and over or upon the paper thereon. Owing to the preliminary creasing or scoring of the paper, the portion against which the folder 32 bears will be caused to lie flat upon the upper face of the form or pattern-block, notwithstanding the slight distance to which it is overlapped by the folder 32. The reason for giving so slight a projection or overhang of the folder is that it is desirable to leave uncovered as large a part of the upper face of the blank as practicable when the flap or fold is laid upon the form or pattern-block, so that the second flap or fold previously pasted may be laid fairly upon it without overlapping the folder 32. At the same time that the folder 32 moves inward, or shortly thereafter, folder 33, which is carried by a head 49, similarly moves inward from the opposite side,

its range of movement being greater than that of folder 32 advisably, though not necessarily.

To insure the proper laying of the wider second flap or fold upon the narrower first flap or fold, the folder 33 is hinged or loosely attached to head 49 and is normally elevated at its forward or inner edge by a spring 50. The elevation of the folder is limited in any convenient way and is slight in any event, but is sufficient to prevent pressing the wider flap down flat upon the narrower one or upon the form beneath until the folder has reached the limit of its inward movement. The narrower flap being pressed flatly upon the form or pattern-block and the wider one left free to rise by reason of the natural spring or resilience of the paper, the wider one will always fall upon the narrower one. To insure perfect contact and good adhesion, the folder 33 is depressed by a plunger or head 51 after reaching the position indicated in Fig. 12. At or just before the moment that the head or plunger 51 bears upon the folder 33 and presses it down upon the flap or fold of the package the folder 32 withdraws, so that there shall be no interference of one folder with the other and so, also, that if paste is squeezed from between the two flaps it shall not foul the folder 32. Just after the folder 33 performs its work, or it might be simultaneously therewith, two horizontally-moving heads 52 and 53, carrying bottom-folding blades 54 and 55, move inward toward each other, as indicated in Fig. 13, and make the second and third bottom folds. Lastly a head 56 descends, carrying with it a blade or folder 57, which makes the fourth and last bottom fold. This blade is made somewhat long and is quite elastic, the several thicknesses produced by the successive folds being liable to necessitate a certain amount of yielding or adaptation of the folder 57. It is likewise important that a quite firm though elastic pressure be given the last fold in order to give a good finish to the bottom, and particularly to insure adhesion of the bottom fold to those preceding it.

It will be remembered that a dab of paste is applied to the bag-blank before the latter is severed from the web, and this at a point which afterward becomes the first fold of the bottom. The subsequent folds each overlap this dab of paste and are thereby caused to adhere to the first or inner fold.

It will be seen that by the foregoing mechanism there is formed a complete bag or package open at one end and suited to receive merchandise. This may be of paper of any desired weight and texture or of other suitable material, a good Manila paper being deemed advisable ordinarily. The several operations take place in such quick succession that the paste has no opportunity to dry or set before the parts are laid and pressed together; but care must be taken to use a good grade of paste, glue, or mucilage or other adhesive material and to keep it of proper consistency. After the bag or package is thus formed the several folders withdraw and the pattern-block or form 37 rises to its first position above the plane of the folders 32 and 33.

As shown in Figs. 13 and 14, the pattern-block or form 37 has an end piece 58 separate from its body, though corresponding accurately therewith in outline. This end piece is carried by a central rod or stem 59, preferably polygonal in section, which passes longitudinally through the pattern-block or form, and extending some distance outward beyond said form is furnished near its outer extremity with a cross-pin or stem 60, as seen in Fig. 4. The purpose of this construction is to permit the bag or package to be removed from the form or pattern and placed within a holder or receptacle, as hereinafter explained. The face of the end piece 58 may be a smooth plane or it may be concave, the flat face being deemed best in practice.

It is important that the several folders perform their operations in proper order and time, and to insure the maintenance of any relative adjustment that may be made it is deemed advantageous to place upon a common shaft the various cams for actuating said folders, as also that for carrying the bag from the form into the holder or carrier. This arrangement is illustrated in Figs. 4 and 5, where the shaft 29 is represented as bearing the various cams mentioned. Referring first to Fig. 4, it will be seen that the vertically-sliding head 38, which carries the pattern-block or form, is connected by a link 61 with one arm of a lever 62 of the first order, the other arm of which has a laterally-projecting stud or roller 63, which is acted upon by a cam 64. The cam serves to lift the sliding head and pattern-block or form, which may descend by spring or gravity or be positively depressed through the use of a covered instead of an open cam. As shown in Fig. 5, the side-folders 32 and 33 are actuated by levers 65 and 66, moved by grooved cams 67 and 68, suitable links being employed to connect the folder-carrying heads 48 and 49 with the levers 65 and 66. In like manner the heads 52 and 53, carrying the bottom or end folders 54 and 55, are connected by links with levers 69 and 70, which are moved horizontally by grooved cams 71 and 72, carried by shaft 29. The vertically-moving head 56, carrying the end or bottom folder 57, is connected by a link with a vertically-oscillating lever 73, carrying at the opposite end a stud or roller 74, which bears upon the periphery or enters the slot of a cam 75, likewise carried by shaft 29.

To cause the removal of the prepared bag or package from the form or pattern-block 37 and its delivery to a suitable holder or carrier, I provide the mechanism illustrated in Fig. 4, where 76 indicates a rigid guide-bar upon which is arranged a sliding block or head 77.

The block 77 is provided with a fork open at its lower end to receive the pin 60 of rod 59 when the bag form or pattern-block 37 is elevated. Block 77 is connected by a link with the upper end of a lever 78, which is pivoted or fulcrumed at its lower end and is connected by a draw-bar 79 with the free or moving end of a lever 80, which is pivoted or fulcrumed at its opposite end to the frame of the machine or other suitable support. At a point between its ends the lever 80 is furnished with a laterally-projecting stud or roller 81, which bears against the periphery of a cam 82, carried by shaft 29, being held in contact therewith by the action of a spring 83 or equivalent means. The parts having been properly set and timed and a package or bag having been formed, the form or pattern-block 37 is elevated by lever 62 and pin 60 is carried into the fork of block 77, and shortly thereafter the cam 82, acting upon lever 80, draws bar 79, oscillates lever 78, and moving block 77 inward, carrier-rod 59 and with it the end piece 58 of the bag form or pattern-block. In this way the bag is removed from the pattern-block or form and carried into a suitable holder or carrier 84.

In all cases where open cams are employed springs may be used to give movement in the direction opposite to that produced by the cam, or covered cams may be used throughout. It may be found preferable to use the open cams and springs to permit the parts to yield in the event of encountering obstacles when moving in operative direction.

Referring next to Figs. 2, 3, and 4, the construction and arrangement of the carrier by which the bags are delivered to and from the charging devices will be explained.

It is proper to mention that while paper has been spoken of in the foregoing description as the material of which the bags or packages are made any suitable material—paper, cloth, cardboard, or other—capable of being operated upon in the manner and by the means described may be used. So, too, the relative dimensions of the package may be varied and the terms "sides," "ends," &c., are to be understood as referring to a package having the general relation of dimensions herein set forth, though they might require to be transposed if the proportions were so far changed as to make those parts the ends which are herein referred to as "sides."

The folding or bag-forming mechanism is carried by an end extension of a frame 85, in and upon which frame are mounted suitable appliances for charging the bags or packages and for closing and sealing them. Frame 85 supports a horizontal bed or table 86, from which rises a column or standard 87, which supports mechanism for measuring or weighing or for measuring and weighing the charges of material and delivering the same into the prepared bags or packages.

The mechanism for receiving, holding, and conveying the bags or packages consists of an endless chain, composed of open-ended boxes 84, connected by links 88, the pins of which are advisably furnished with rollers 89. The chain thus formed passes about four sets of rollers 90 91, located at the ends of the bed or table 86 and at points directly below, the rolls 91 being notched to receive the rollers 89, and thus to act as sprocket-wheels for giving motion to the chain. The small rollers 89 facilitate the travel of the chain over the top of the bed or table 86 and also over a short vertical bed or support 92 at the bag-receiving end of the table.

The cells or boxes 84 will ordinarily be made of metal, and when so made will be subjected to the heating effect of jets of hot air supplied by a nozzled or perforated pipe 93, or they may be heated by steam, gas-jets, or other means, the selection of which will depend somewhat upon the goods to be packed and the character of the adhesive employed. The purpose of thus heating the boxes or carrier-cells is to cause a prompt and thorough drying of the paste or other adhesive, so that perfect packages may be insured and injury of the contents through the action of moisture present in the adhesive may be avoided. Similar heating appliances are provided at the delivery end of the machine for drying the top of the package after it is sealed. As seen in Fig. 3, a curved metal guard 94 is arranged in position to bear upon the closed tops of bags, and being heated by jets of hot air, flame, or steam from a branch of pipe 93 it serves to press and iron down the flaps or folds and to dry the paste or other adhesive.

The carrier-chain is advanced step by step through the agency of any suitable mechanism, that shown in Fig. 3 being well adapted to the purpose. Upon the shaft 95, on which are keyed the sprocket-wheels 91, there is also made fast a ratchet-wheel 96. Loosely mounted upon said shaft 95 is a gear-wheel 97, meshing with a segmental rack 98, pivotally supported in the frame 85 and oscillated by a rod or pitman 99. On the side face of the gear-wheel is a pawl or dog 100, which is caused either by gravity or by a spring to engage with the teeth of ratchet-wheel 96 when moving forward and which rises and rides freely backward over said teeth on the reverse movement. The rod or pitman 99 is moved longitudinally at proper intervals by a cam 101, carried by a lower shaft 29 and playing between two studs or rollers 103 and 104, carried by a slotted plate 105, straddling or encircling shaft 29 and secured to the end of pitman or rod 99. For the purpose of keeping the carrier-chain taut I provide a bearing-roller 106, which may either be loosely supported and arranged to adjust itself after the manner of a common belt-tightener or be made adjustable, as preferred.

As shown in Fig. 5, the boxes or carriers 84 in passing over vertical bed 92 come into alinement with the pattern-block or form 37 and its movable end piece 58, and the parts

are so designed, proportioned, adjusted, and timed that the boxes shall come to rest one after another directly in alinement with the bag form both vertically and horizontally. So, also, the end piece 58 is timed to advance with the bag to carry it into the carrier box or holder and to recede, leaving the bag in said box or holder, before the carrier-chain again begins to move. The bag will be made to fit so snugly within the box or holder as to preclude liability of being withdrawn by the plunger or carrier 58, or, if found necessary, friction devices may be added to retain it; but as this is set forth in an application filed in my name on the 20th day of August, 1897, and designated by Serial No. 648,936 it need not be further described herein.

Standard 87 carries or sustains a hopper 107, into which and from which is delivered the measured charge for each successive bag or package. The hopper has a contracted discharge pipe or outlet which is so located that each bag in turn shall come to rest directly beneath and in line with it, as indicated in Figs. 3 and 6, and the measuring and weighing mechanism is timed to deliver into the hopper at those periods when a bag is in such position. It is desirable that the charge be leveled in each bag preparatory to closing its top in order that the folds may be neatly and accurately made and properly secured. This may be done by subjecting the box or holder to a shaking or jogging motion just after the charge is introduced or by a plunger or presser-head entering the mouth of the bag and bearing upon the contents. The selection will depend somewhat upon the character of the material being packed and the facility or lack of facility of movement of its particles. I have shown the presser-head 108 and shall ordinarily employ such device, finding that with most substances it gives very satisfactory results. The presser-head is shown in Figs. 3 and 8 and is preferably made hollow to constitute a paste-receptacle, one of its side walls being furnished with a paste-roller 109, as shown in said figures. It is carried by a horizontal arm 110, secured to a vertical rod or stem 111, which is elevated by a spring 112 and is periodically lowered by a cam 113, acting upon a lever or radius-bar 114, which is connected by a link 115 with the rod or stem 111. Cam 113 is carried by a shaft 116, which receives motion through gearing from shaft 29. In descending into and withdrawing from the mouth of the bag or package the presser-head 108 carries its paste-roller 109 over the inner face of one wall of the bag, applying a suitable quantity of paste thereto.

In Fig. 28 I have represented a bar or rail 170 with a wavy or corrugated upper face secured to the bed or table 86 in such position that as the carriers or holders 84 pass from the point where the charge is introduced to the point where the mouth or top of the package is closed the holder, and consequently the package and its contents, shall be rapidly shaken by reason of the rollers 89 of the carriers riding over the corrugated surface. There will be a like rail at either side of the carrier-chain.

It is a common practice to introduce into packages of this general character a card, ticket, or coupon for advertising purposes or the like, and to supply and introduce such cards or tickets there is provided the apparatus illustrated in Fig. 8. This comprises a paper-roll 117, from which the paper strip passes to and between printing and impression rolls 118 119 of a printing apparatus of ordinary construction. Between these rolls and the presser-head 108 is a bed or table 120, upon which the strip rests and beyond which it projects beneath the presser-head and over the mouth of the bag. The outer edge of the table 120 is made slightly beveling to constitute a fixed shear-blade, and the proximate side of the presser-head has its lower edge similarly formed, so that as the head passes the table it shall shear off the protruding length of paper and carry it into the bag or package. To cause the periodical advance of the paper strip, any suitable intermittent feeding mechanism may be adopted—such, for instance, as that shown in Fig. 3—for turning the sprocket-wheels 91 to advance the carrier-chain. The card-printer may be omitted or thrown out of action when not needed.

Just after the withdrawal of the presser-head the carrier-chain advances one step, and thereby carries the charged bag or package into position to be acted upon by the closing or end-folding mechanism. As shown in Fig. 3 and on a larger scale in Figs. 15, 16, and 17, this consists of a swinging folder 121, two horizontally-moving side folders or blades 122 and 123, and a fixed plate 124, beneath which the package is carried to produce the final fold and to press and iron down the several folds. The plate may be a part or continuation of the guard-plate 94 or a separate plate in plane with the end thereof. In closing the mouth of the bag or package the swinging folder 121 first comes into action. It is merely an arm mounted upon a rock-shaft 125 and carrying a pointed or V-shaped plate 126, which striking the side of the bag above its contents folds it inward over the top of the package. Motion is given to the rock-shaft by a rod 127, connected at one end to a radial arm 128 of said rock-shaft and at the other end to the vertical rod or stem 111, by which the presser-head 108 is raised and lowered. Obviously, however, the special form and arrangement of cams or gearing for effecting this and other movements are relatively unimportant and may be varied as desired.

The side-folders 122 and 123 are simply two flat blades or plates, respectively carried by levers 129 and 130, the lower and shorter arms of which levers are connected by a toggle 131, which in turn is connected with one end of a

lever or radius-bar 132. Said bar or lever is quickly raised and lowered at intervals by a covered cam 133 on shaft 116, (shown in Figs. 3 and 6,) said movements taking place during or just after the backward movement of folder-plate 126. By arranging the side-folders to start inward before the folder-plate 126 is entirely withdrawn the first fold is prevented from rising before the side folds are laid upon it.

To enable the folding blades or plates to adapt themselves readily to any slight variation in the height to which material stands in the bag or package and to render their action elastic and yielding, each plate is held in place by a screw 170, passing through a hole in the plate slightly larger than the body of the screw, the head of the screw being set just a little higher than the plate and the top of each arm or lever 129 130 being slightly rounded or beveled at the rear or outer side, as shown in Fig. 16. Near the forward or inner edge of the top face of each lever 129 130 a second screw 171 is passed through a hole in the folder or blade lying thereon, its head being kept some distance above the plate and a spiral spring being arranged between the screw-head and the plate, as seen in Fig. 16.

It has been explained that paste is applied to the inner face of one wall of the bag-mouth before the folding of the end begins, and it will be seen upon referring to the drawings, Figs. 3 and 15, that it is applied to that face or wall of which the final fold is formed. By making the bag of such length that the side folds at the top or end cannot meet the paste will be exposed between the inturned edges of the final fold, so that when said fold or flap is pressed down upon the preceding folds or flaps it will adhere thereto. By applying paste somewhat liberally it may be caused to spread laterally, and thus to insure perfect sealing, while the folds beneath and the inserted card or ticket preclude the paste or moisture therefrom reaching the contents of the package.

It will be observed upon referring to Fig. 3 that the sealed bag or package passes from the folding devices directly to and beneath the plate 124, and thence beneath the guard 94, which latter may be heated, as described, or left unheated and allowed to act by pressure alone. It is deemed desirable to have the presser 108 and the folder-blade 126 act at the same time, but upon successive packages, because thereby the periods of rest of the carrier may be made quite short. By being held beneath the plate 124 and the guard 94 during several periods of advance and rest of the carrier the effective sealing of the package is insured, the paste being thus given time to set and dry thoroughly before being subjected to the expanding force of the compressed charge when the latter is of an elastic nature, as in the case of tea and various other substances.

The holders or boxes 84 pass successively over the end of table or bed 86 and out from under the guard 94, each in turn coming to rest in a horizontal position at a point between the rolls or wheels 90 and 91. While the holder is in this position, an ejector 134 enters at the base or inner end of the box or holder and passing through the same from end to end forces out the contained package, depositing it upon an endless belt 135 or other carrier or receiver. The mechanism for actuating this ejector is illustrated in Fig. 3, where it will be seen that the ejector 134 is carried by a rod 172, movable through guides 173, and connected by a link 174 with a lever 175, moved outward by a cam 176 and returned by a spring 177.

I have described above simple and efficient means of applying paste or other adhesive to the end flaps of the bag or package; but other devices may be substituted for these, or the arm 121 may carry a paste-roller or series of rollers to apply paste to the several flaps or folds of the upper end, as illustrated in Fig. 27.

The successive steps performed in making the bag or package are illustrated in Figs. 19 to 26, inclusive; but as these operations have been quite fully detailed further description here is unnecessary.

Any suitable measuring or weighing or measuring and weighing mechanism may be employed to supply the bags or packages; but that illustrated in Fig. 6 is preferred.

The material to be packed is fed from an elevated bin or stock-hopper through a trunk or spout 136 (one or more) to a hollow cylinder 137, within which rotates a chambered or pocketed measuring-wheel or a plurality of such wheels. If more than one is used, the cylindrical shell 137 is partitioned to give to each a separate space or chamber.

The construction and arrangement of the measuring-wheel and its actuating mechanism are best shown in Figs. 29 and 30, though they will also be found on a smaller scale in Fig. 6. The measuring-wheel is somewhat smaller than the interior of the cylinder and is set eccentrically therein, so as to be in close proximity to one of its sides, while the space between the opposite side and the periphery of the wheel is occupied by a dribbling-roll 138, the surface of which may be smooth, milled, fluted, pitted, or otherwise formed to suit the material being fed. The measuring-wheel has a series of cells, pockets, or compartments of like and definite capacity, so that by turning said wheel different distances a single charge or multiples of such charge may be delivered. To turn the wheel, its shaft or axle 139 has secured upon it a ratchet-wheel 140, which is engaged by a dog or pawl 141, carried by a pinion 142, mounted loosely upon said shaft or axle. A segmental rack 143, turning about a pivot and having an actuating-arm connected by a rod or pitman 144, with a radius-bar or lever 145, moved by a cam 146, serves to oscillate the

rack and to turn the pinion first in one and then in the other direction. In this way the dog or pawl is caused alternately to engage with and to ride back over the teeth of ratchet-wheel 140, and consequently the wheel is turned at intervals, but always in the same direction. The actuating-arm of rack 143 is slotted, so that by setting the bolt 147, connecting it with rod or pitman 144, nearer to or farther from the pivot of the rack the throw of the latter may be varied and the extent of rotation of the measuring-wheel at each operation regulated and determined. The dribbling-roll 138 is driven by a light belt 148 from any convenient rotating shaft or member, the friction of the belt being so slight that the roll may be locked without stopping the belt or doing injury to any part of the mechanism. Secured upon the shaft of said roll 138 is a ratchet-wheel 149, which is engaged at times by a locking-dog or detent 150 in the form of an elbow-lever pivoted to the end face of the cylinder or shell 137. Beneath the measuring-wheel is a scale-pan 151, carried by a scale-beam 152, hung upon knife-edge bearings, as indicated, and provided with an adjustable balance-weight 153. This pan is provided with spring-sustained doors or gates constituting a bottom, the gates being provided with actuating arms or levers 154, which overlap at their ends and are actuated at stated intervals by a lever or radius-bar 155, connected by a rod 156 with a second lever or radius-bar 157, which is depressed at stated times by a pin 158, projecting from the side face of cam-wheel 146. A spring 159, applied to lever or radius-bar 155, overcomes the weight of said lever and the actuating members connected therewith and normally relieves the gate-levers 154 entirely of their weight or influence, so that the delicacy of action of the scale shall not be interfered with. The connection between lever 155 and the gate-levers 154 is formed by a pin projecting from one into an enlarged eye or opening in the other, so that normally there is no contact between them. The weight 153 is so set as to slightly overbalance the charge deposited in the scale-pan by the measuring-wheel, and the dribbling-roll 138 is intended to complete the charge by the gradual addition of the small amount required for that purpose. To set the dribbling-roll in action, the pinion 142 has attached to it an arm 160, which just as the rack completes its throw in direction to rotate the measuring-wheel engages one arm of a trip-lever 161, the other arm of which is thereby thrown upward beneath the horizontal arm of detent 150 and withdraws its nose from engagement with ratchet-wheel 149, thereby making the dribbling-roll free to rotate. When the scale-pan is fully charged, the dribbling-roll should of course cease to deliver material to the pan, and hence a hook or slotted link 162, carried by the scale-beam, engages over a horizontal lever 163, connected with the detent 150, and throws said detent into engagement with the ratchet-wheel 149, stopping its rotation instantly as the pan begins to descend. Just after this occurs the pin 158 acts upon lever 157 and causes the gates to open, and thus to empty the pan.

A spring 164 is provided to elevate the bed or support 36, as shown in Fig. 4.

The primary power-shaft 31 of the machine carries a fast pulley 166, a loose pulley 167, and a pinion 30, which latter gives motion to a large gear-wheel on shaft 29, as shown in Figs. 2 and 3, and from a bevel-pinion 169 on the end of shaft 29 motion is transmitted to the printing-cylinders through suitable intermediate shafts and gearing, as shown in the same figures.

Having thus described my invention, what I claim is—

1. In an organized apparatus for the manufacture and filling of packages, the combination of printing mechanism adapted to print a continuous web or sheet; a cutter to sever a blank therefrom; scoring or indenting devices to mark the lines of folding; folding mechanism adapted to give form to the package and to close its end; a delivery device for removing the bag from the forming mechanism; a carrier to receive the same; means for charging the bag with a predetermined quantity of material; and mechanism for sealing the filled bag or package.

2. In a machine for making bags or packages, the combination of means for feeding a continuous web; a knife or cutter for severing a blank therefrom; folding devices for forming said blank into a bag or package, the same comprising fixed walls 34, 35, pattern-block or form 37, fixed end-folder 47, side-folders 32, 33, end-folders 54, 55 and 57, and mechanism for imparting motion to said folders; a carrier to receive the bags or packages; and a stripper for removing the bags or packages from the forming devices and delivering them to the carrier.

3. In combination with mechanism adapted to fold and cement bag material into the form of bags or packages, an endless chain of package-holders each adapted to contain and completely surround one bag or package; means for causing a travel of the carrier-chain; and heating jets or nozzles located along the path of the carriers and serving to heat them as they pass.

4. In combination with a bag or package forming mechanism, an endless carrier-chain provided with cells or boxes each adapted to contain and completely surround one bag or package; a bed or table over which said cells or boxes pass; and a heating-pipe extending along the line of travel of the boxes and the bed and serving to heat the boxes and the bed or table.

5. In a machine for forming, filling and sealing bags or packages, the combination of bag or package folding and cementing mechanism; an endless chain of boxes each to re-

ceive one of said bags or packages; a table or bed over which said boxes move; a guard beneath which the boxes move; and means for heating the boxes, table and guard; whereby all the lines of joining or cementing of the bags or packages may be set and dried.

6. In a machine for forming bags or packages, the combination of a mold or forming-chamber having walls 34 and 35, movable bottom 36, and fixed end-folder 47; form or pattern-block adapted to descend into and rise out of the forming-chamber; end-folders 54 and 55; side-folders 32 and 33, and mechanism substantially such as described for actuating the several folders.

7. In a mechanism for folding material into the form of a bag or package, the combination of walls 34 and 35, pattern-block or form 37; rigid side-folder 32; pivoted side-folder 33; and means for holding the folder 33 normally above the level of folder 32.

8. In combination with walls 34 and 35; form or pattern-block 37; sliding head 48 provided with folder 32; sliding head 49 provided with yielding folder 33; spring 50 for elevating the folder 33; and head or plunger for depressing said folder after the same has moved inward to lay the outer fold of the bag or package upon the inner one.

9. In a machine for forming bags or packages, the combination of a mold or forming-chamber; a support for a bag-blank above said chamber; a form or pattern-block adapted to bear upon the bag-blank and to carry it into the forming-chamber; and a paste-applying roll or device adapted to bear upon the blank near one edge during the descent of the form or pattern-block to carry the blank into the forming-chamber, whereby the blank is drawn beneath and against said roll or device in the act of being bent about the form.

10. In combination with a forming-chamber and with a support for a bag or package blank; a paste-receptacle; a paste-roll carried thereby; a yielding support for the paste-receptacle serving to hold it and its roll normally away from the blank; a lever connected with said receptacle and serving to move the same toward the blank; and a form or pattern-block adapted to bear upon the blank and carry it into the forming-chamber, and also to act upon the lever of the paste-receptacle to move and hold said receptacle toward the blank until the movement of said form or block is nearly completed.

11. In combination with walls 34 and 35; folders 32 and 33; form or pattern-block 37 provided with lug 46; lever 41; counterbalance 42; paste-receptacle 39; paste-roller 40; and lever 44 connected with and serving to depress the paste-receptacle.

12. In combination with a form or pattern-block and means for folding a blank about the same; a fixed guide; a head movable upon said guide, provided with an open fork; a movable end piece applied to the form or pattern-block; a rod carrying said end piece, extending through the form or pattern-block, and provided with a cross-pin; means for moving the sliding head along the guide; and means for elevating and lowering the pattern-block, end piece and rod to carry the pin of the latter into and out of engagement with the fork of the sliding head.

13. In combination with a forming-chamber; form or pattern-block 37; end piece 58; rod 59 provided with pin 60; sliding head 38 carrying the pattern-block; elevating link and lever 61 and 62; cam 64; guide 76; sliding head 77 provided with an open fork lever 78 connected with head 77; draw-rod 79; lever 80; and cam 82, all substantially as shown and described.

14. In a packing-machine, the combination of a bag-holder; a presser-head adapted to enter a bag or package within said holder; and a paste-roller or paste-applying device carried by said head and adapted to apply paste within the bag-mouth.

15. In combination with a bag or package holder as 84, a presser-head 108 containing a paste-chamber; and a paste-roller having one side extending into said chamber and the other protruding therefrom to deliver paste within the mouth of a bag in the act of pressing the material therein.

16. In combination with a bag or package holder; a printing mechanism adapted to print a continuous strip; a bed or table between said printing mechanism and the holder; and a presser-head adapted to act in conjunction with the edge of said table to cut or shear a ticket from the printed strip and to carry it into the bag or package.

17. In combination with a suitable bag-holder; levers 129 and 130 provided respectively with yielding folding-blades 122 and 123; toggle 131 connecting said levers, and a cam for straightening and breaking said toggle to actuate the folders.

18. In a packing-machine, the combination of a pocketed or chambered measuring-wheel; a cylindrical shell or hopper encircling said wheel; a pinion carried by the shaft of said wheel; a pawl-and-ratchet connection between the wheel-shaft and pinion; a rack for turning said pinion; a cam for actuating said rack; and an adjustable connection between the cam and rack, whereby the throw of the rack can be varied to determine the extent of rotation and consequent delivery of the wheel.

19. In combination with a measuring-wheel and means for rotating the same; a scale-pan beneath the wheel; a dribbling-roll; friction driving-gear for said roll; a dog or detent for holding the dribbling-roll out of action; a connection between the scale-pan and the detent whereby the descent of the latter is caused to throw the detent to locking position; and an arm actuated by the wheel-rotating mechanism and serving to withdraw the detent as the wheel completes its movement.

20. In combination with a measuring-wheel

provided with pockets and having its shaft provided with a ratchet-wheel, a pinion loosely mounted upon said shaft and provided with a dog or pawl to engage said ratchet-wheel; a rack for imparting motion to said pinion; a radius-bar; a cam for moving said radius-bar; and a rod connecting the radius-bar and the rack and adjustably connected with the latter, whereby the throw of the rack may be varied to move one or more than one of the pockets of the measuring-wheel at will to the delivery or discharge opening, substantially as set forth.

21. In combination with the scale-pan provided with doors or gates and with operating-levers 154 therefor; radius-bars 155 and 157; connecting-rod 156; lifting-spring 159, and depressing-pin 158 carried by wheel or disk 146.

22. In combination with a wheel having receiving-chambers, a ratchet-wheel; a pawl-carrier; a pawl mounted upon said carrier; and means for varying the throw of the pawl-carrier to cause the pawl to ride back over a greater or less number of teeth of the ratchet, and to advance the wheel to discharge a corresponding number of chambers, substantially as shown and described.

23. In combination with a rotary drum or wheel provided in its circumference with receiving chambers or pockets; a ratchet-wheel having a common axis with said drum and arranged to move in unison therewith; a pawl-carrier; a pawl movable with said carrier and adapted to engage the ratchet-wheel; a rack meshing with and serving to rotate said carrier-wheel; a lever for imparting motion to said rack; an adjustable connection between the rack and the actuating-lever; and a cam for moving the actuating-lever, all substantially as described, whereby the throw of the pawl-carrier may be varied to determine the number of chambers or pockets of the measuring-wheel brought to the delivery-point at each stroke.

In witness whereof I hereunto set my hand in the presence of two witnesses.

RUFUS L. PATTERSON.

Witnesses:
WILLIAM W. DODGE,
HORACE A. DODGE.