No. 755,754. PATENTED MAR. 29, 1904.

C. H. & A. DAY.

MACHINERY FOR FORMING OR MAKING PAPER BAGS.

APPLICATION FILED NOV. 1, 1902.

NO MODEL. 6 SHEETS—SHEET 1.

Fig. 1.

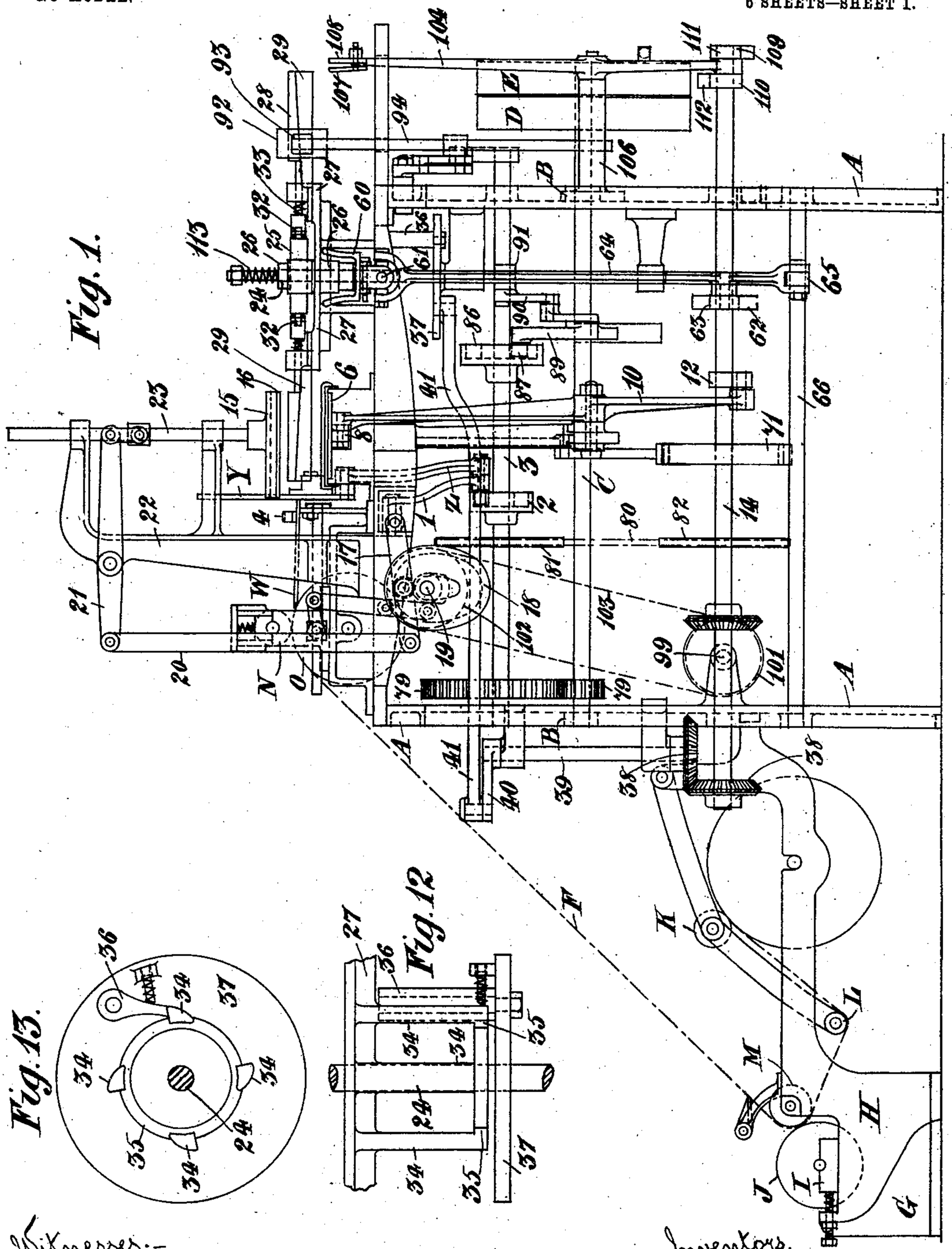

Fig. 13.

Fig. 12.

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NO MODEL. 6 SHEETS—SHEET 2.

Fig. 5.

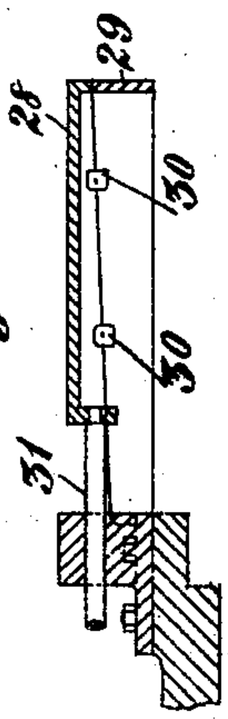


Fig. 6.

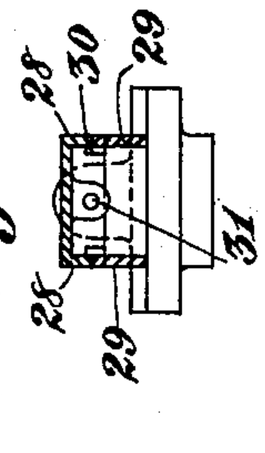


Fig. 9.

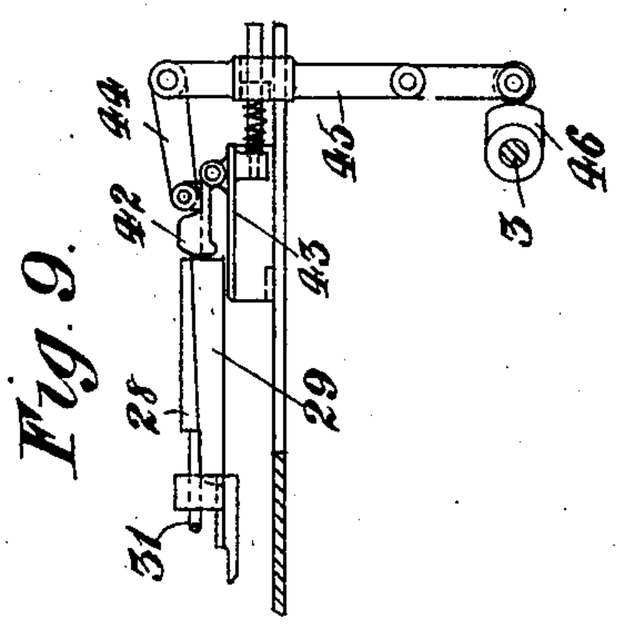
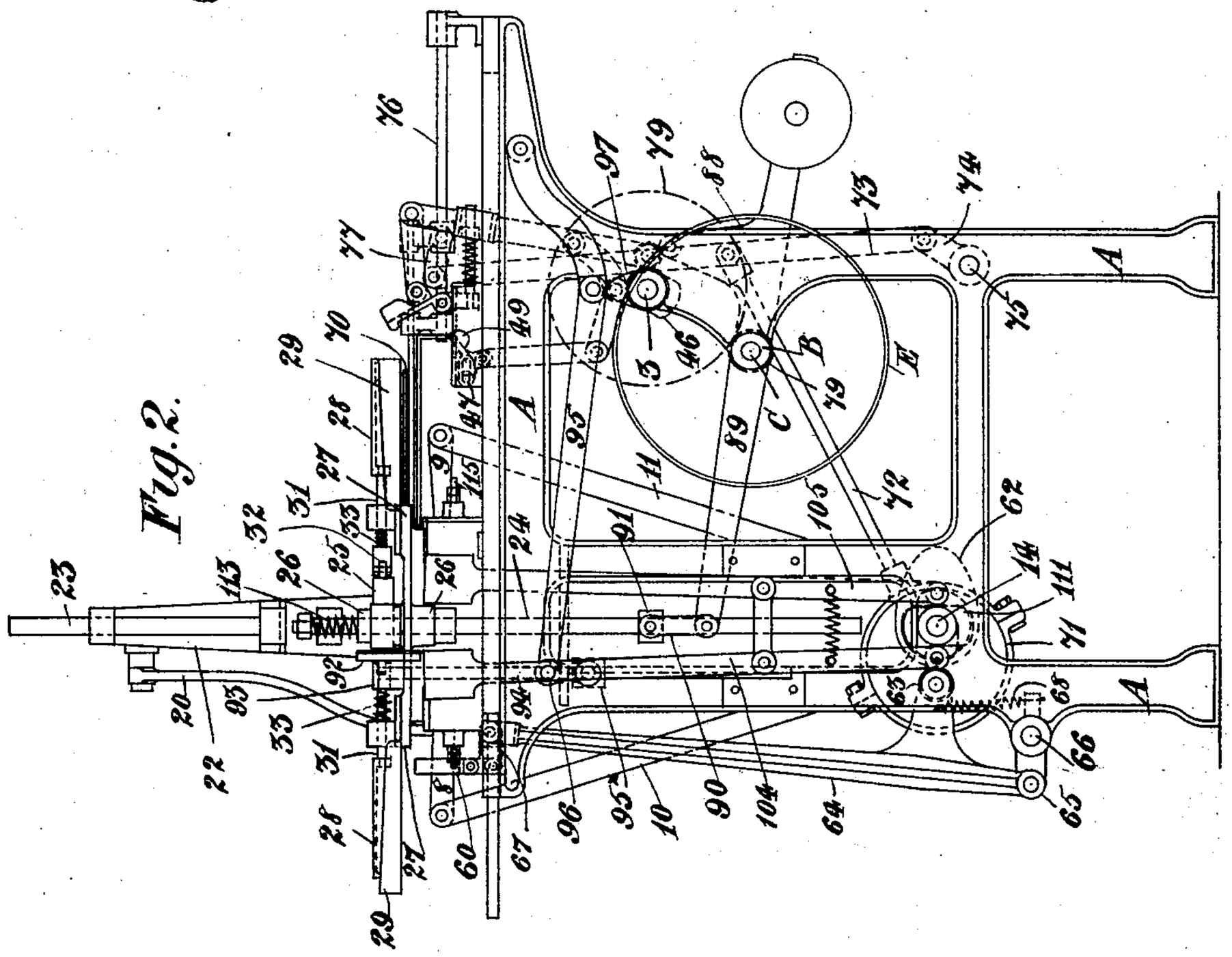


Fig. 2.



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NO MODEL. 6 SHEETS—SHEET 3.

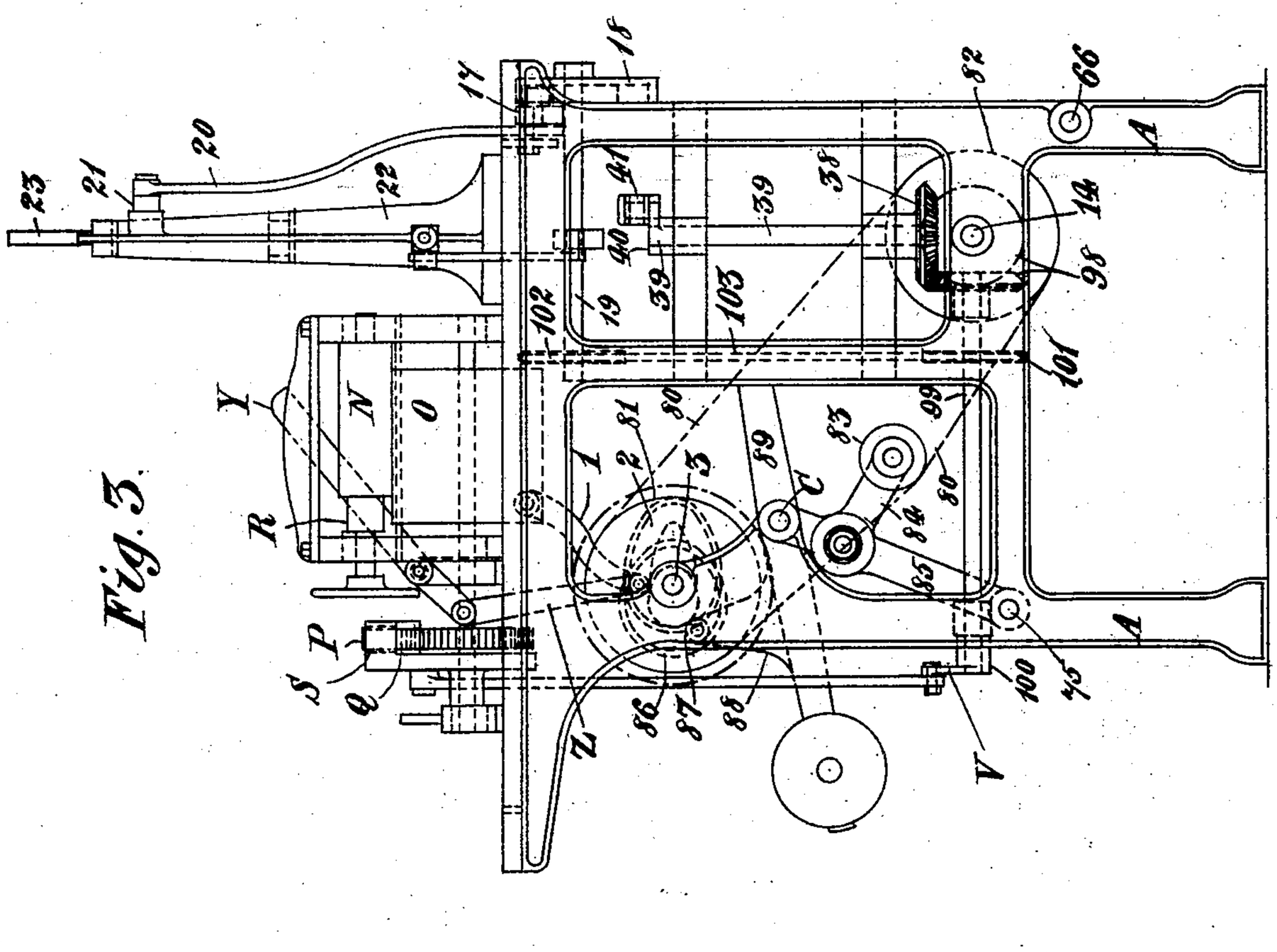

Fig. 3.

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NO MODEL. 6 SHEETS—SHEET 4.

Fig. 4.

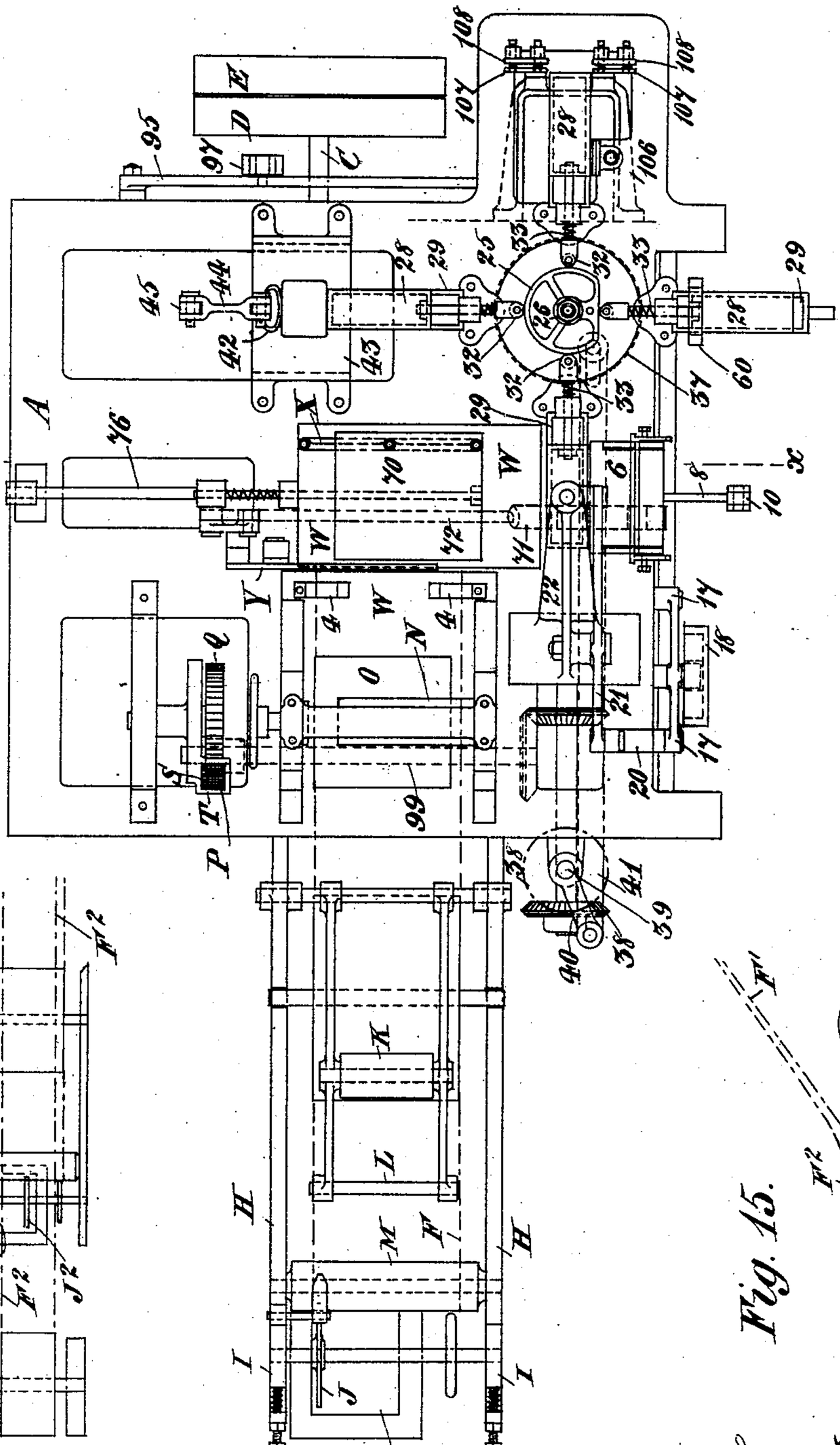


Fig. 16.

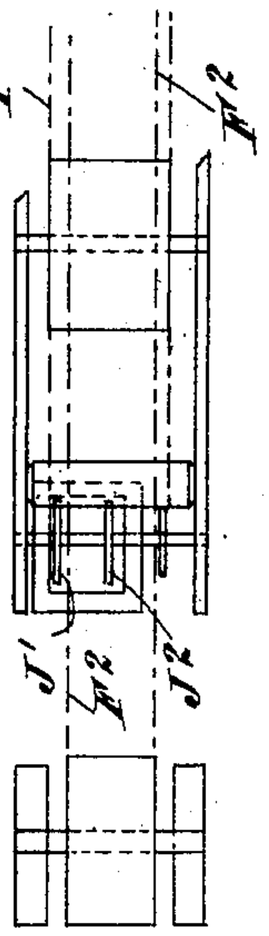
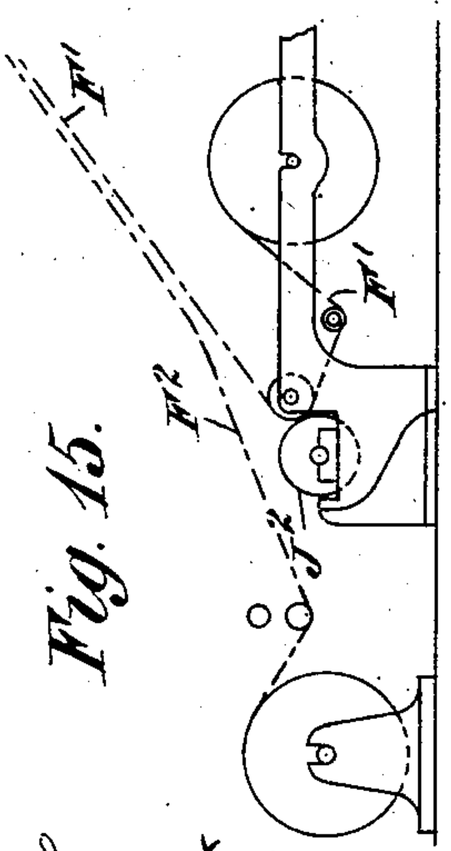


Fig. 15.



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NO MODEL. 6 SHEETS—SHEET 5.

Fig. 7.

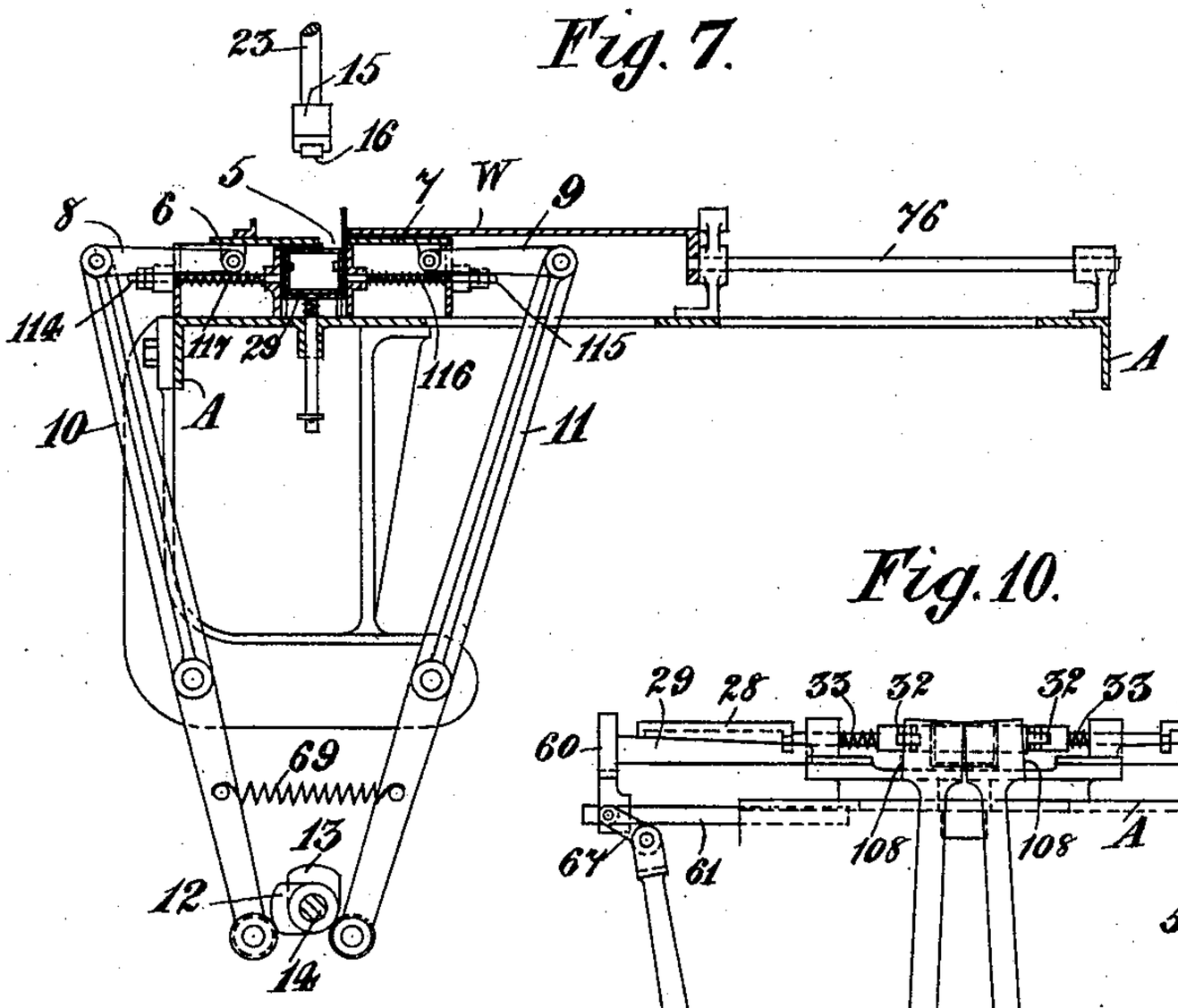


Fig. 10.

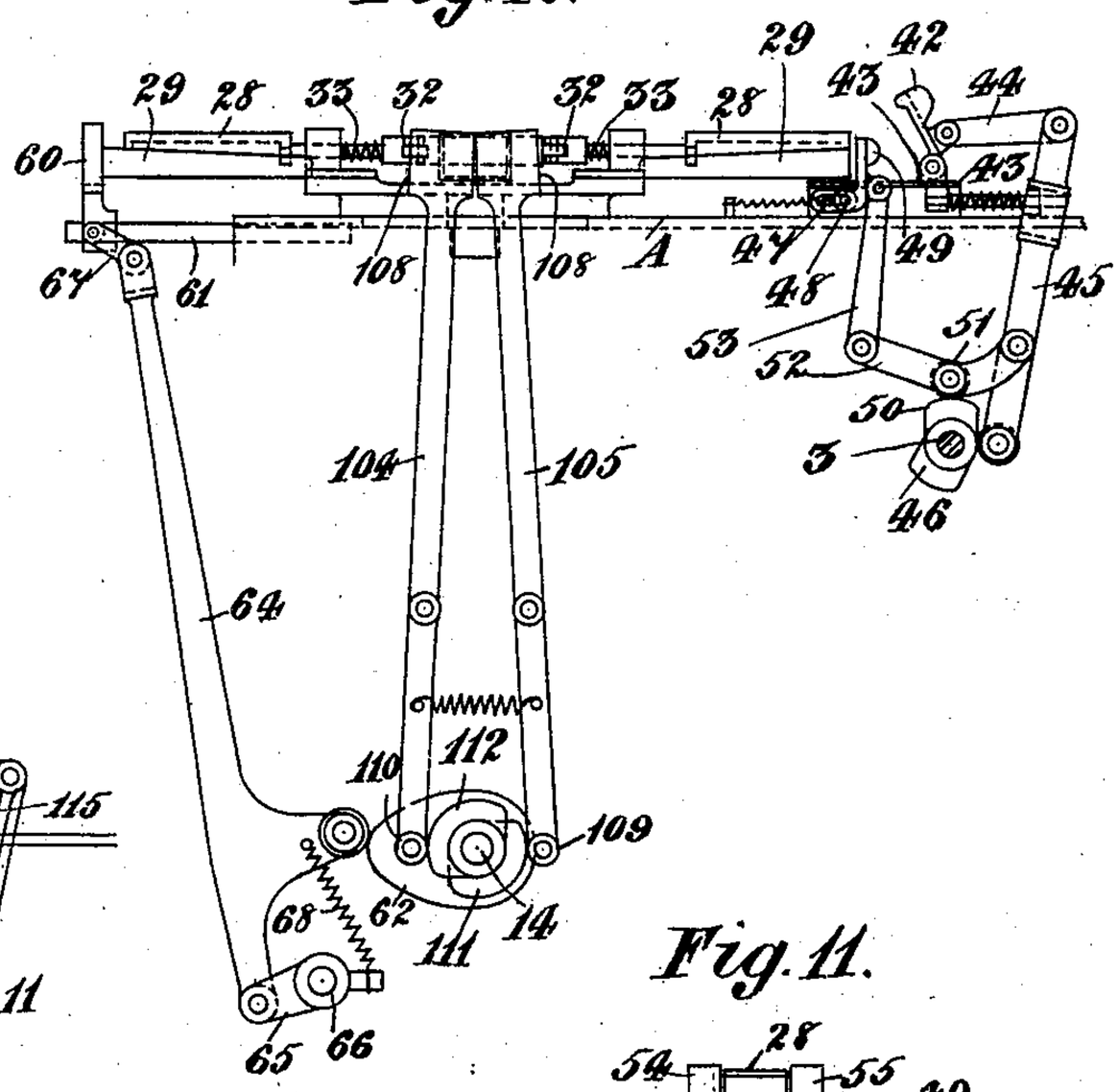


Fig. 8.

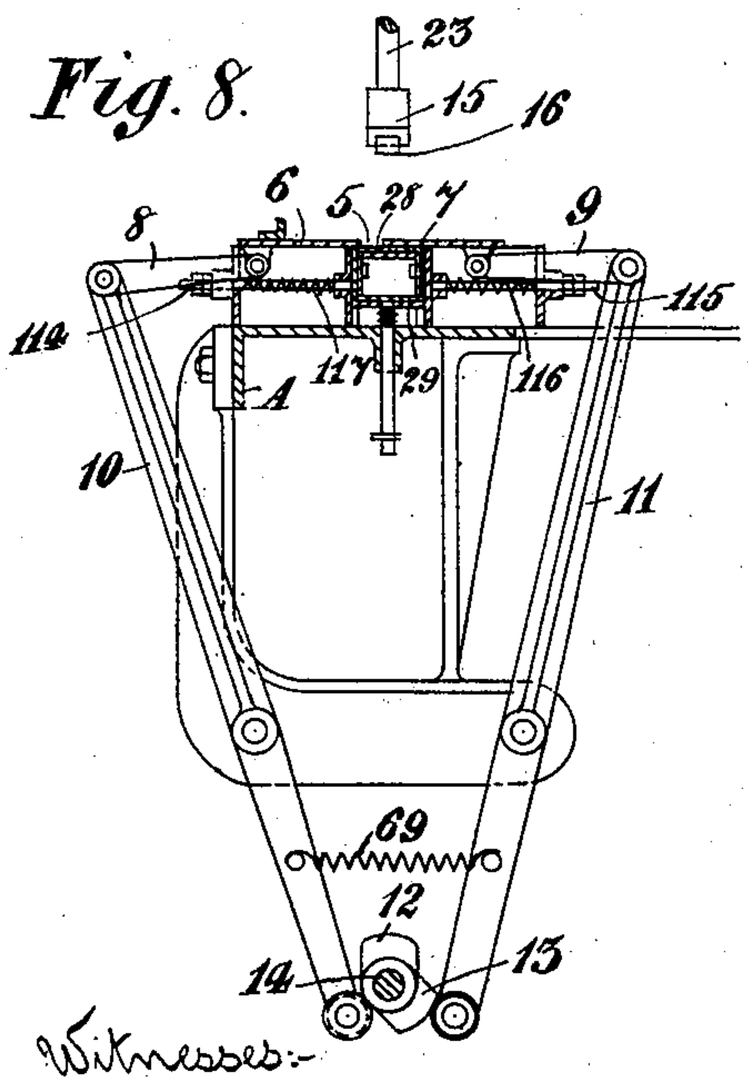
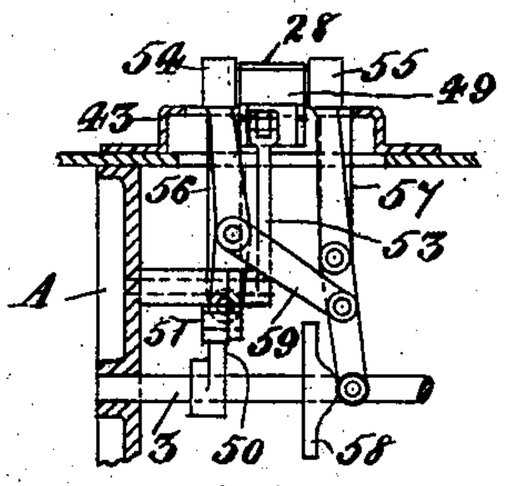


Fig. 11.



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MACHINERY FOR FORMING OR MAKING PAPER BAGS.

APPLICATION FILED NOV. 1, 1902.

NO MODEL. 6 SHEETS—SHEET 6

Fig. 14b.

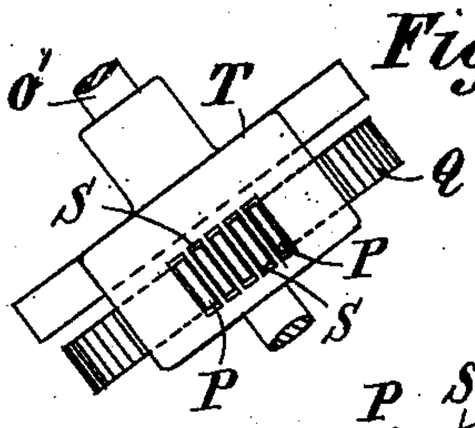


Fig. 14a.

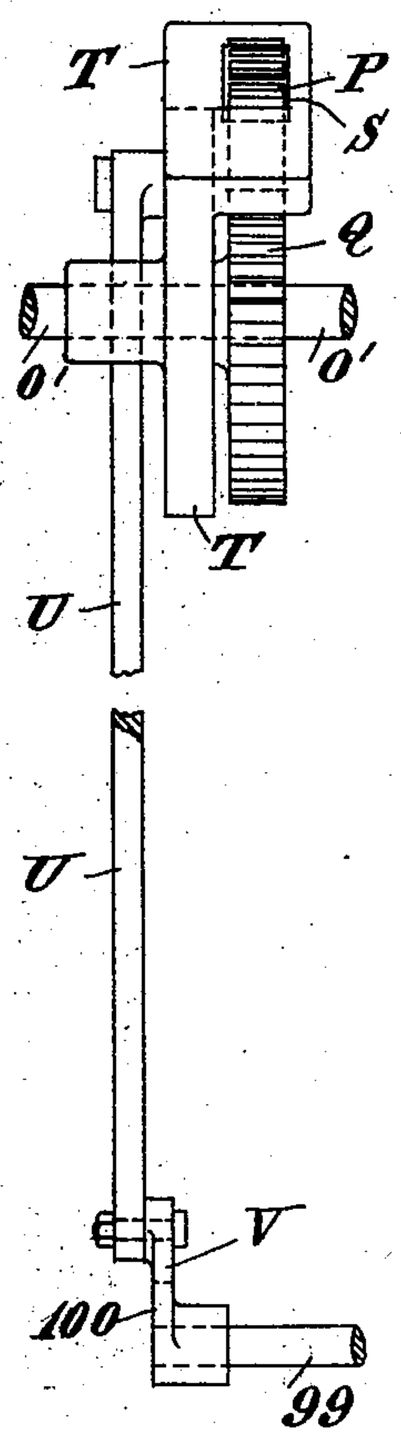


Fig. 14.

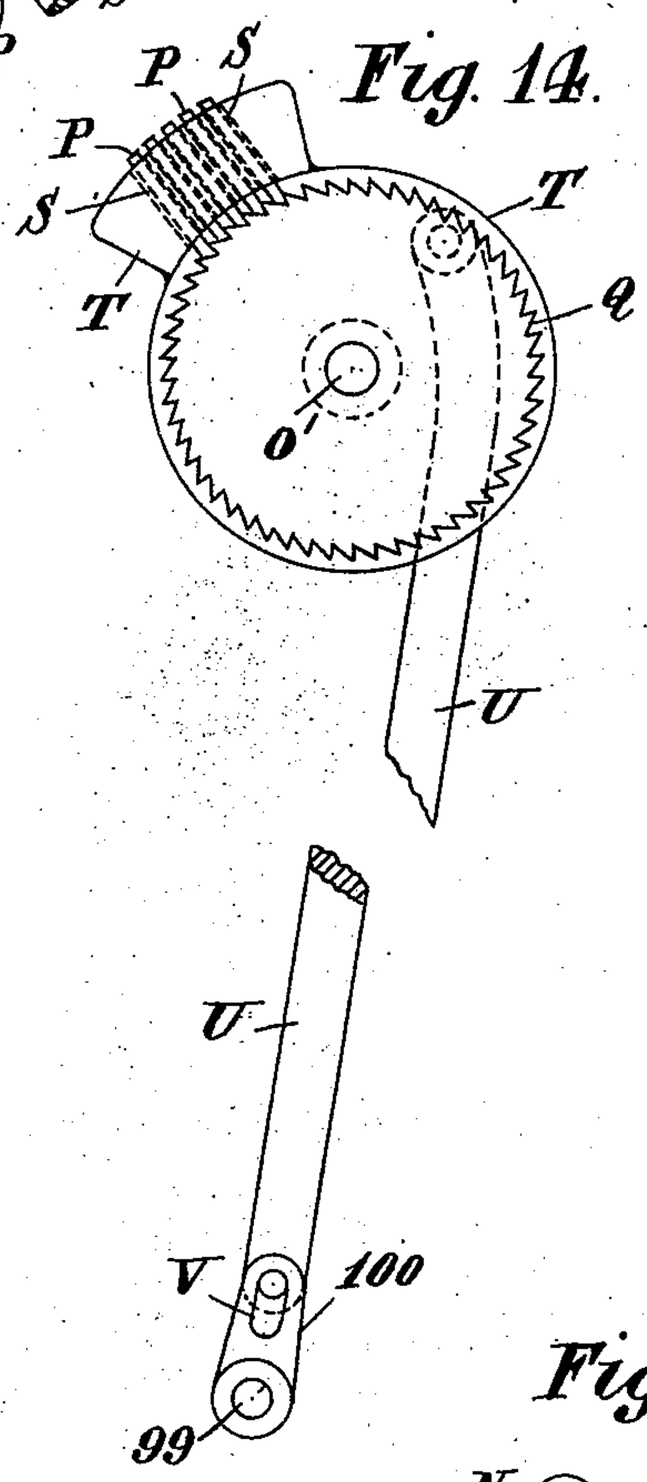


Fig. 18.

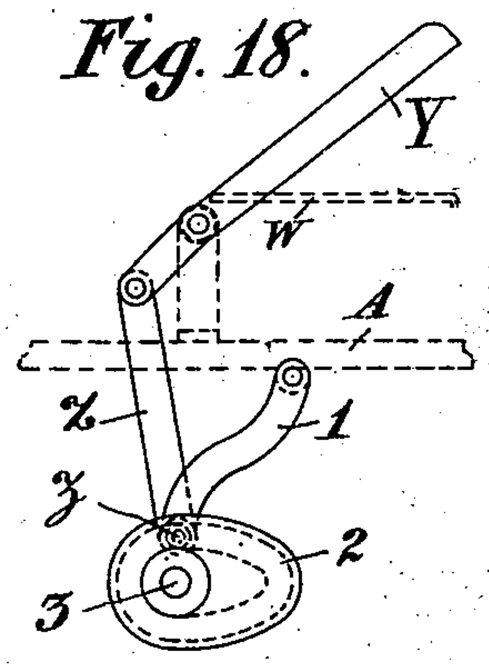
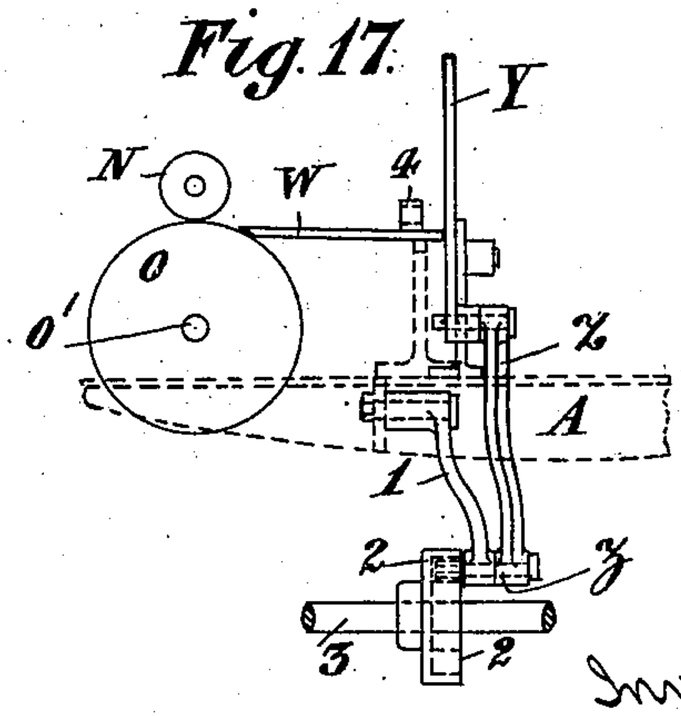


Fig. 17.



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No. 755,754. Patented March 29, 1904.

UNITED STATES PATENT OFFICE.

CHARLES HERBERT DAY AND ALBERT DAY, OF LEEDS, ENGLAND.

MACHINERY FOR FORMING OR MAKING PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 755,754, dated March 29, 1904.

Application filed November 1, 1902. Serial No. 129,770. (No model.)

To all whom it may concern:

Be it known that we, CHARLES HERBERT DAY, residing at 41 Shepherd's Lane, Roundhay Road, and ALBERT DAY, residing at 21 Hartley avenue, Hyde Park, in the city of Leeds, in the county of York, England, subjects of the King of Great Britain and Ireland, have invented new and useful Improvements in Machinery for Forming or Making Paper Bags, of which the following is a specification.

This invention has reference to improvements in machinery or apparatus employed for forming or making bags—say what are known as "open" bags—such, for example, as are used for packeting dry soap and the like or other goods in powder or granular form—or paper linings for tin boxes or canisters from either one or more continuous rolls of paper or from one or more sheets of paper that is or are separately or simultaneously fed to the machine.

The object of this invention is to produce a machine in which the hereinafter-named operations may be automatically and simultaneously performed on, say, separate sheets of paper drawn from, say, a continuous roll (or fed in separate sheets to the machine) and successively on the same piece while it is being formed or made into a bag or packet, (hereinafter termed a "bag,") which has the appearance of being hand-made after undergoing the following operations—namely, drawing and feeding the portion of paper from the roll or rolls to the formers, applying the adhesive material to the said paper, feeding and cutting the paper to the required length, wrapping or folding it around the "former," pressing down the overlapping edge of the paper with the adhesive material, folding, creasing, and pressing one end of the bag, and releasing the formers, so as to permit of the folded and machine-made bag being removed therefrom. We attain these objects by mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the entire machine; Fig. 2, an elevation of the right-hand end of the machine; Fig. 3, an elevation of the left-hand and of the machine; Fig. 4, a plan looking at the top; Fig. 5, a longitudinal sectional elevation of the bag-former; Fig. 6, a transverse section of same; Fig. 7, a transverse section on line *x x*, Fig. 4; Fig. 8, a transverse section on line *x x*, Fig 4, but with wiper-plates shown in a different position; Fig. 9, a part transverse section of the top-fold presser; Fig. 10, a part-sectional elevation of mechanism for performing the final pressing operation; Fig. 11, a part-sectional elevation of end-creasers; Fig. 12, an elevation of mechanism for rotating the formers; Fig. 13, a sectional plan of same; Fig. 14, an elevation of enlarged front ratchet and pawl for operating the paper-feeding mechanism; Fig. 14[a], an enlarged end elevation of same; Fig. 14[b], an enlarged plan; Fig. 15, an elevation in outline for supplying two papers to the machine simultaneously; Fig. 16, a plan of same; Fig. 17, a front elevation of knife and means for actuating the same for cutting the paper to length; Fig. 18, an end elevation of same.

Similar characters refer to similar parts throughout the several views.

The various parts for performing the above-mentioned operations are mounted or fixed upon suitable framework A, provided with bearings B for the driving-shaft C of the machine. A rotary motion is imparted to the driving-shaft C from any suitable source of power through, say, belting and fast and loose pulleys D and E or by shafting and gearing. (Not shown in the drawings.) Motion is also imparted to the various moving parts of the machine from the driving-shaft by any suitable mechanical means—such as, for example, say, by shafts, gearing, cams, levers, sprocket wheels and chains, or a combination of two or more of them, as hereinafter described.

When one or more continuous rolls of paper F are employed, it or they may or may not be mounted upon the framework H, which may be bolted to the main framework of the machine or placed at a distance therefrom. The roll F is placed over a plain or jacketed tank G or other receptacle containing glue, dextrine, mucilage, or any other suitable quick-drying adhesive material. The adhesive material in the tank or receptacle is kept in a warm or heated and liquid state by any ordinary suitable means—such as, say, by a gas-jet directed onto the said tank or its jacket, or

steam may be made to circulate through the water or other jacket of the tank or receptacle. The adhesive material is applied to the paper by any suitable arrangement—such as, for example, say, by the following arrangement, namely: Suitable bearings I are provided for one or more rollers or wheels J (hereinafter termed "wheels") of suitable width, arranged to partially rotate in the adhesive material in the said tank G, and by the frictional contact of the periphery or peripheries of the wheels J with the traveling paper the adhesive material is deposited upon the paper as it passes to the formers, to be hereinafter described. The said wheel or wheels J is or are caused to rotate by its or their frictional contact with the traveling paper, or, if preferred, by any suitable form of gearing. The paper is carried under and over a number of suitable rollers K L M to and between a pair of adjustable or other pressure or drawing rollers N O, to which an intermittent rotary motion is imparted by a pawl P and ratchet-wheel Q, having very fine teeth cut in its periphery. A groove or recess R is formed in one (or both) of the drawing-rollers—say N—to prevent the adhesive material adhering to its periphery. The pawl for intermittently operating the ratchet-wheel Q is formed of a number—say five or six—of plates P mounted. Each of the plates P is placed vertically and loosely in a separate opening or groove S provided for its reception in a suitably-shaped socket-like head T, mounted loosely on the bottom roller-shaft O'. The upper end of the actuating-lever U is attached to the lower and circular portion of the head T, as shown at Figs. 14 and 14ª, by which an intermittent rotary reciprocating motion is imparted to the pawl, as hereinafter described. The plates P are retained in contact with the ratchet-wheel Q by gravity. One or more slots V is or are provided in the actuating-crank 100, to which the lower end of lever U is connected for regulating the movement of the pawl P and ratchet-wheel Q, thereby varying as well as adjusting the traverse of the paper. The pawl P is actuated by bevel-gearing 98 on shaft 14 through shaft 99, crank 100, and lever U, attached to the socket-like head T. The object of using a pawl formed of a number of plates P is to insure that at the least one of such plates shall engage with one of the teeth of the ratchet-wheel Q at every return movement of the pawl irrespective of any adjustment that may be effected or of the movement of the lever U. By means of the plates P there is no loss of movement, as the danger of missing a ratchet-tooth is obviated and an accurate traverse at regular intervals of the paper is obtained. The roll (or rolls) of paper F may be either plain or printed, or, if desired, printing mechanism (not shown in the drawings) may be provided at a suitable position from the said drawing-rollers N O and operated from any suitable moving part of the machine. After a piece of paper of the required size has been cut off the roll it is carried forward over the adjustable folding-mold 5 by a slide 70, moving on stationary rod 76. The slide is actuated by eccentric 71 on shaft 14 through a connecting-rod 72, lever 73, fulcrumed at its lower end to fixed crank 74 on stay 75. The upper end of lever 73 is connected by a link 77 to the slide 70. When separate sheets of paper are employed instead of a roll or rolls, then they may be fed to the said drawing-rollers by any suitable means—such as, say, in a similar manner in which sheets of paper are fed to the cylinder of an ordinary printing-machine by attendant—or put onto small traveling bands provided with an automatic stop or check which allows the paper to travel as required. When this is done, adhesive-material-applying mechanism is arranged in close proximity to the said drawing-rollers or traveling bands. The paper, whether in rolls or sheets, is made of such a width as to permit of its longitudinal edges overlapping each other when wrapped or folded around one of the formers, to be hereinafter described. A second roll, as shown at Figs. 15 and 16, is useful when it is desired that the bag should be provided with a lining. Both papers are then led to and made to pass between the drawing-rollers N O or on traveling bands simultaneously.

In front of the drawing-rollers N O is provided a table or platform W, on which is mounted an adjustable gage X, parallel, or nearly so, with the said rollers, and two adjustable (or other) guides 4, arranged at a suitable distance apart and at or about a right angle to the said rollers. The last-named guides are adjusted to the width of the paper and made to act as guides for it as it passes beyond the rollers, while the first-named gage is regulated to suit the depth of the bag required. The table is suitably arranged to receive the paper as it issues from the said rollers. In front of the drawing-rollers N O and at the edge of table W is a guillotine or other knife Y. The knife is jointed to a separate fixing attached to the framework. An intermittent radial reciprocating (shear-like) motion is imparted to the knife Y by means of levers Z and 1, actuated by cam 2 on shaft 3 whenever it is desired to cut a length of paper which has been drawn forward by rollers N O and as soon as its outer end reaches the gage X. The lower ends of levers Z and 1 are connected together by stud *z*, and the upper end of lever 1 is pivoted to the frame A. The front edge of table W is made to form a fixed blade or knife for the guillotine or shear which is employed for intermittently cutting the paper into lengths. On the table W is provided a suitably-shaped recess 5 at or about a right angle to the drawing-rollers to form a mold rather larger in size than one of the formers

to be presently described. A pair of wiper-plates 6 7 are respectively arranged on each side of the recess and made to work in suitable guides. An intermittent reciprocating sliding motion is imparted to the wiper-plates by links 8 9, levers 10 11, and cams 12 13 on shaft 14, as shown at Fig. 7. Each wiper-plate is arranged to be operated at different times—that is to say, after wiper-plate 6 has been reciprocated, say, rather more or less than half-way over the said recess 5, when the wiper-plate 7 on the opposite side of the recess is similarly operated. It will readily be seen that by each wiper-plate being moved to its extreme outward position provision is thereby made for the said plates to first close the portions of the paper that stand vertically above the recess (after a portion of the paper has been forced and retained therein by one of the hereinafter-described formers) until their longitudinal edges overlap and, second, to hold the said edges in a closed and folded position until a vertically intermittent reciprocating plunger 15, with or without a facing of felt or india-rubber 16, is made to descend by lever 17, pivoted to the framework, (actuated by cam 18 on shaft 19,) connecting-rod 20, lever 21, pivoted to standard 22, and spindle 23. Motion is imparted to shaft 19 from shaft 99 by sprocket-wheels 101 and 102 and chain 103. By this means the plunger is made to press one portion of the paper with the adhesive material onto the other portion thereof. The levers 10 and 11 are returned to their normal position by a spring 69.

In front of the adjustable folding-mold 5 on the table W and at or about, say, a right or other suitable angle of the horizontal drawing-rollers N O, but at a suitable distance therefrom, is provided a vertical shaft 24, to which an intermittent rising-and-falling motion is imparted from a cam 86 on shaft 3 through runner 87, mounted on the projection 88 of weighted lever 89, fulcrumed on shaft C and connected by a link 90 to a boss 91, fixed to the shaft 24. On the upper end of the said shaft is mounted and fixed a cam 25 of suitable shape—say, for example, the major part of the cam may be concentric with the axis of the shaft and the remainder, say, flat or indented. Immediately below the cam 25 is mounted and fixed a boss 26, from which any desired number—say four—of horizontal radiating arms 27 project. On each of the said radiating arms is mounted a "bag-former" made in two parts 28 and 29, one of which parts, 29, is fixed to an arm. The two parts of the former are made in, say, the form of incline planes arranged so that part 28 will slide upon part 29, suitable dovetail or other guides or slides 30, Figs. 5 and 6, being formed therein or thereon for retaining them in the required position. Externally the former will be made to suit to one of the varying shapes of bag required—that is to say, for example, if a rectangular bag is required then the former will be rectangular in cross-section; if, say, cylindrical, then it will be circular in cross-section. Consequently as the former varies in its shape to suit the bag required the hereinbefore-mentioned adjustable folding-mold 5, wiper-plates 6 7, and top-presser 15 will also require to be varied to suit the perimeter of the former. The inner end of the sliding portion 28 of each former is provided with a projecting rod 31, in the end (fartherest away from the sliding piece) of which is mounted a runner 32, the periphery of which is retained in contact with the fixed cam 25 by means of a spring 33. The arms 27 are intermittently rotated, say, a quarter of a revolution when, say, four arms are employed, when they are in a raised position, by means of a skeleton ratchet-wheel composed of a number—say four, as at Figs. 12 and 13—of vertical bars arranged to form ratchet-teeth fixed to the under side of the radiating arms 27 and to a boss 35, mounted on the shaft 24. Motion is imparted to the ratchet-wheel by means of a pawl 36, carried by a stud fixed to a disk plate 37, mounted on shaft 24. An intermittent rotary motion is imparted to the disk plate 37 from shaft 14 through bevel-gearing 38, vertical shaft 39, crank 40, and connecting-rod 41. The rotation of the arms 27 is controlled by a stop 92, fixed to a boss 93 on rod 94. A second boss $95^{\times}$ is fixed on said rod, to which a lever 95, fulcrumed to the framework, is connected by a link 96. An intermittent reciprocating motion is imparted to lever 95 and thence to the stop 92 by a cam 97, mounted on shaft 3.

The end folder or creaser consists of a plate 42, pivoted to a bracket 43, fixed to the table A. To the rear side of the plate 42 is jointed a link 44, the outer end of which is attached to a double-ended lever 45, fulcrumed to the framework, as shown at Fig. 10. An intermittent reciprocating motion is imparted to the lever 45 by a cam 46 on shaft 3. As the upper end of lever 45 is moved inward it causes the plate 42 to be brought into a horizontal position and to press the overhanging upper horizontal portion of the paper against the outer vertical end of the former.

The lower horizontal overhanging portion of the paper is raised into a vertical position and pressed against the said end of the former by means of horizontal slotted plates 47, fixed to the sides of bracket 43. A pin 48 is made to slide freely in the slots of the said plates. On the pin is mounted so as to turn freely a second end-presser 49, Figs. 2 and 10. The end-folder 49 is first drawn outward, then raised, and afterward pressed against the end of the former by a cam 50 on shaft 3, arranged to act upon a runner 51, fixed to a lever 52, pivoted to the stud that carries lever 45. The outer end of lever 52 is connected to end-folder 49 by a link 53.

The end-creasers consist of two levers 54 55,

Fig. 11, pivoted to pendent arms 56 57, fixed to bracket 43. The said levers are actuated by a cam 58 on shaft 3, acting on lever 55. The two levers 54 and 55 are connected by link 59. By this means the said two levers are drawn toward each other for creasing purposes as soon as the end-presser 49 is pressed against the end of the former.

Levers 104 and 105, Fig. 10, are fulcrumed to a bracket 106, projecting from the framework. The levers have what are termed "side wiper-plates" 107 and 108, jointed, respectively, to their upper ends, with a spring inserted between each of the plates and runners 109 and 110, which are respectively acted upon by the cams 111 and 112 on shaft 14.

The side wiper-plates 107 and 108 are employed for closing the projecting side portions of the bag over the end of the former.

Spring 113, which is adjustable, is employed as a brake for controlling the rotation of the arms 27.

To force a folded bag off the former on the end of the radiating arm 27, the latter having been rotated to the fourth position by the pawl 36 acting on teeth 34 of the skeleton ratchet, a bifurcated holding-piece 60 is made to slide upon rod 61, fixed to the framework. Motion is imparted to the holding-piece 60 from a cam 62 on shaft 14 through a runner 63, mounted on a lever 64, pivoted at its lower end to a fixed crank 65, mounted upon the stay-rod 66. The upper end of the lever 64 is connected to the sliding holding-piece 60 by a link 67. A spring 68 is employed for retaining the runner 63 in contact with the periphery of the cam 62.

Motion is imparted to the driving-shaft C from any suitable source of power through pulley D, fixed thereon, and thence to shaft 3 through spur-gearing 79 and from shaft 3 to shaft 14 by chain 80 and sprocket-wheels 81 and 82. Chain 80 may, if required, be tightened by a wheel 83, mounted upon arm 84, jointed to a stay 85, fixed to the stay 75 and shaft C.

The size of the adjustable folding-mold 5 may be increased or diminished to suit the sizes of the formers employed by means of screws 114 and 115, having spiral springs 116 and 117 mounted thereon.

When two rolls of paper are employed, as at Figs. 15 and 16, the papers F' F^2 are made of different widths, and two wheels J' J^2, mounted on the same shaft at distances apart, are employed for applying the adhesive material to one edge and the center of the paper F'. The central line of adhesive material is employed for retaining the paper F^2 in its proper position.

For bags made, say, of very thin sheet-lead, such as are used for packeting tea and which are held together by the longitudinal fold without the use of any adhesive material, the wipers will require to be adapted for first passing the lead sheet round the former, with the two edges thereof arranged vertically and longitudinally at or about the center of the packet. The wipers are made to act as a gripper, the upwardly-projecting edges being folded over and pressed down onto the main portion of the bag.

When papers are put in separately, then the same may be supplied thereto from, say, a pile by pneumatic pressure supplied by an air-pump, as in envelop making and folding machines.

Should it be required to use card or wood-pulp boards instead of paper for forming, say, cartons in place of bags, then when separate sheets are used it may be found more advantageous to score or crease them either prior to or after passing them to the drawing-rollers; but if the cardboard or wood-pulp board is supplied from a roll then a number of, say, adjustable or other knives or cutters may be mounted, say, in front of or at the rear of the drawing-rollers, or they may be carried in an intermittently-reciprocating carrier, so as to descend upon the material prior to it being acted upon by the former.

The action of the machine is as follows: The roll or rolls of paper having been placed in position over the glue or other tank G the paper is passed over and under the guide-rollers K L M to the drawing-rollers N O, by which when the machine is set in motion it is drawn forward and a length cut off by the knife Y. The paper is then fed forward by slide 70 until it is over the adjustable folding-mold 5, the radiating arms 27 being then in a raised position. When a former has been brought over the adjustable folding-mold 5 on the table W and a piece or sheet of paper placed in position for being formed and folded into a bag, the arms 27 and formers are then made to descend and one of the formers carries or forces the paper into the adjustable folding-mold, with the longitudinal edges thereof projecting in a vertical position. The wiper-plates 6 7 are then operated, as previously described, for folding the paper over the upper surface of the former and for creasing the paper and holding the same in position, while the vertical presser 15 forces the upper overlapping edge of the paper, with the adhesive material on, say, the portion immediately under it. When this has been done and the wiper-plates are returned to their original position, the vertical shaft 24 is again raised clear of the table, carrying with it the paper wrapped round the former. The arms 27 are then given, say, another quarter of a turn, which brings the former opposite one portion of the end folder, creaser, and presser, when the shaft is again lowered. Simultaneously with this movement the paper will have been fed forward, cut to length, and another folder brought over the adjustable folding-mold on the table. At each, say, quarter-revolution

of the shaft more paper will be fed and cut and a fresh former brought over the said adjustable folding-mold. The outer end of the bag is, as just named, closed, folded, and creased at two operations, the shaft 24 rising and falling and the arms 27 making, say, a quarter of a revolution between the two operations, as follows: First, the radial and intermittent reciprocating creasing-plate 42 is made to descend for closing the upper horizontal surface of the paper against the end of the former, then it is withdrawn and an end-presser 49, mounted in the slotted bracket or bearings 47, is intermittently moved in a radial direction simultaneously with a portion of such movement and made to be forced upward and toward the end of the former. While it is in this position side portions of the paper are pressed by the pressers 54 55 against the sides of end-presser 49. After this has been done the side and end pressers are removed. Then the shaft is again raised and the arms rotated for bringing the bag into position for the sides to be closed by the sliding wiper-plates 107 and 108, which are actuated separately and intermittently. The shaft 24 is then again raised and the arms 27 rotated to the bag discharging or removing point—that is, the fourth and last portion of the rotation—where it is removed either by hand or automatically. During the last rotation of the arms 27 the runner 32, connected to the sliding piece 28 of each former, is caused to be moved by the spring 32 toward the axis of the shaft, the cam 25 at this point being arranged nearer the axis—that is, on the flat or indented portion—while during the remaining, say, three-fourths of the revolution the runner 32 impinges upon the concentric portion of the cam, thereby drawing the sliding portion down the incline of the fixed portion 29 of the former, thereby diminishing the size of the former and releasing the hold upon the bag.

The machine may be adapted to different kinds or classes of folds as required to those herein described.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination in a bag-forming machine of the radiating arms with a "bag-former" made in two parts sliding one upon the other, and mounted upon each of said arms, a rod connected to the sliding portion of the "former," a runner mounted upon said rod, a cam against which the runner presses, a vertical shaft upon which the cam is fixed, a skeleton ratchet constructed as described fixed to the under side of the radiating arms, a pawl upon a plate, and a brake-spring arranged to act upon the upper surface thereof, all substantially as set forth.

2. The combination in a bag-forming machine of the radiating arms with a "bag-former" made in two parts sliding one upon the other, and mounted upon each of said arms, a rod connected to the sliding portion of the "former," a runner mounted upon said rod, a cam against which the runner presses, a vertical shaft upon which the cam is fixed, a skeleton ratchet constructed as described fixed to the under side of the radiating arms, a pawl upon a plate, a brake-spring arranged to act upon the upper surface thereof, a stop and the means described for operating the same, all substantially as set forth.

3. The combination in a bag-forming machine of framework having a vertical shaft mounted thereon, with radiating arms mounted upon said shaft, a "bag-former" made in two parts sliding one upon the other mounted upon each of said arms, a runner connected to each "former," a cam fixed upon the said vertical shaft, against which the runner acts, the means described for raising and lowering the vertical shaft and rotating the said arms, a table with an adjustable folding-mold, and a plunger mounted vertically over the folding-mold, means for intermittently actuating the plunger, all substantially as set forth.

4. The combination in a bag-forming machine of framework having a vertical shaft mounted thereon, with radiating arms mounted upon said shaft, a "bag-former" made in two parts sliding one upon the other mounted upon each of said arms, a runner connected to each "former," a cam fixed upon the said vertical shaft, against which the runner acts, the means described for raising and lowering the vertical shaft and rotating the said arms, a table with an adjustable folding-mold, a plunger mounted vertically over the folding-mold, means for intermittently actuating the plunger, drawing-roller mounted on the framework of the machine, guide-rollers over which the paper is led to the drawing-rollers, an adhesive-material tank, rollers revolving in said tank, a knife for cutting the length of paper, the means described for actuating the said knife, and for conveying the paper over the adjustable folding-mold, all substantially as set forth.

5. The combination in a bag-forming machine, of the framework, a table mounted thereon, an adjustable folding-mold thereon, a pair of drawing-rollers, a ratchet-wheel mounted upon the end of one of the drawing-rollers, a pawl composed of a number of loose plates, a holder slotted to receive the pawl-plates, the means described for intermittently reciprocating the pawl, adhesive-material tank, the wheels for applying the adhesive material to the paper, a vertical shaft mounted upon the framework, with radiating arms mounted upon said shaft, a "bag-former" made in two parts sliding one upon the other mounted upon each of said arms, a runner connected to each "former," a cam fixed upon the said vertical shaft, against which the runner acts, the means described for rais-

ing and lowering the vertical shaft and rotating the said arms, a table with an adjustable folding-mold thereon, and a plunger mounted vertically over the folding-mold, means for intermittently actuating the plunger, and wiper-plates, levers upon which the said plates are mounted and the means for actuating the same, the means for imparting motion from the driving-shaft of the machine, wiper-plates working over the folding-mold, and the means described for intermittently actuating the same, and creasers constructed as described, and the means for intermittently actuating the same, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES HERBERT DAY.
ALBERT DAY.

Witnesses:
WILLIAM SADLER,
ANNIE PARK.