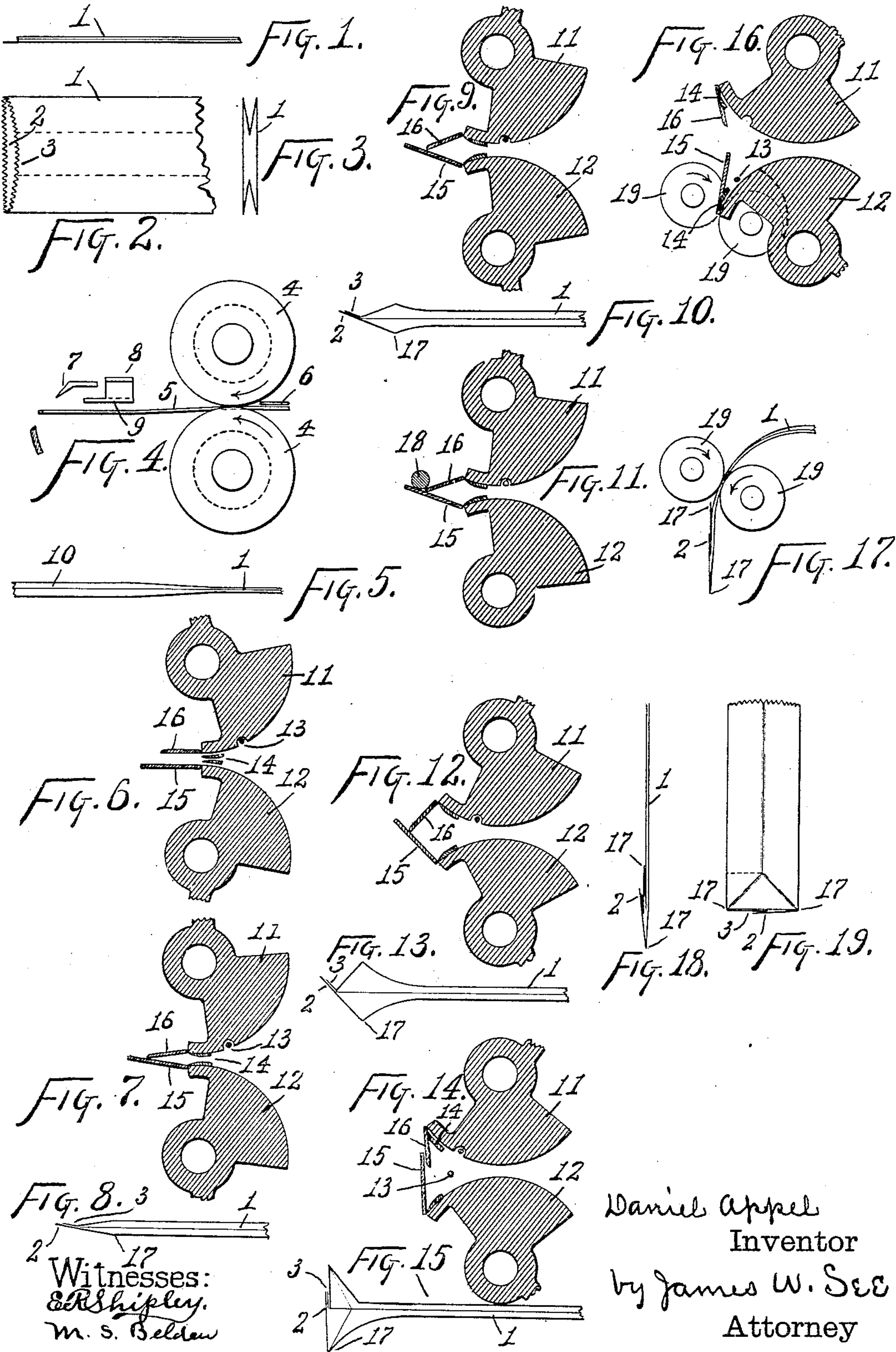


D. APPEL.
PAPER BAG MACHINE.
(Application filed Mar. 13, 1902.)

(No Model.)

7 Sheets—Sheet 1.



No. 712,633.

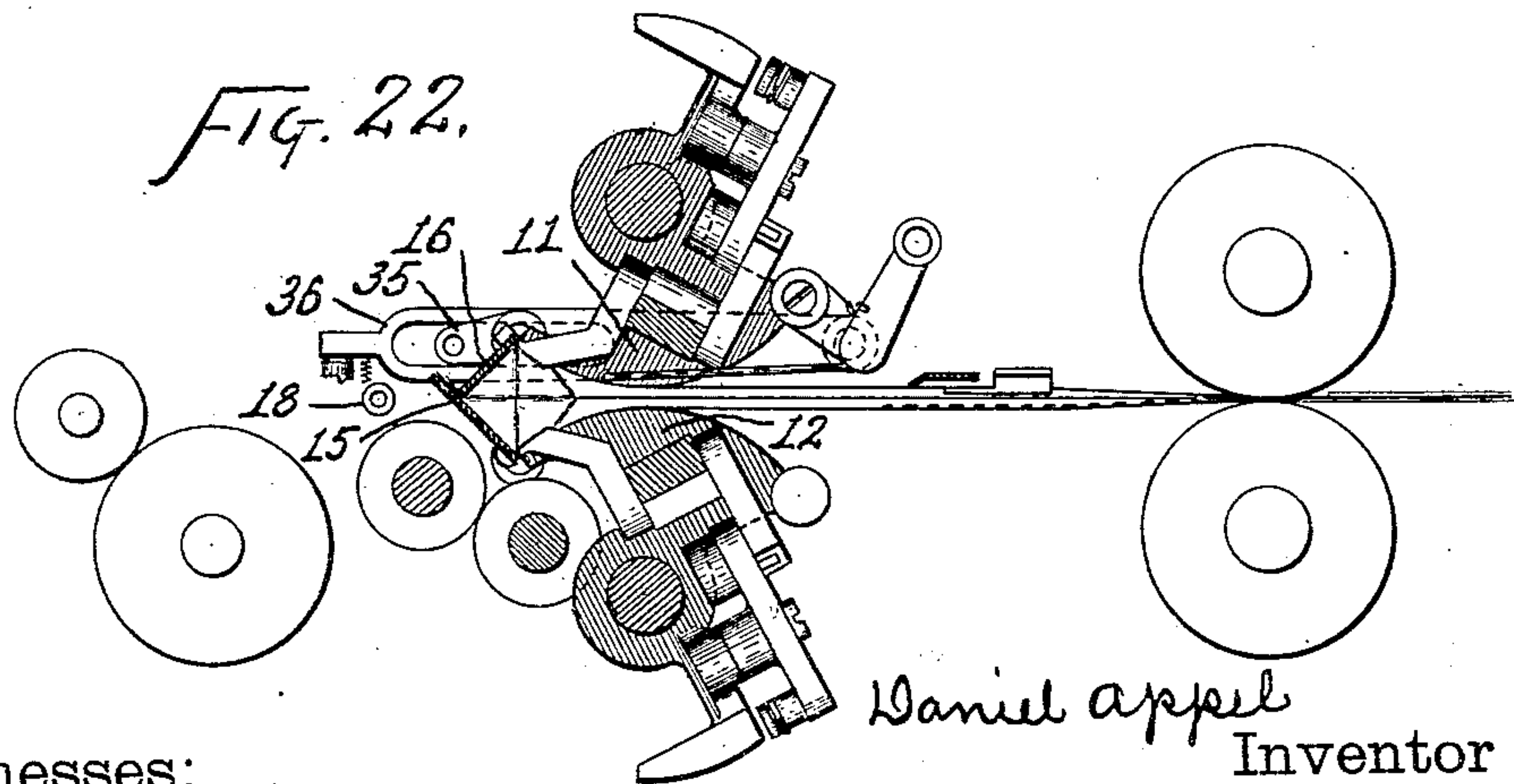
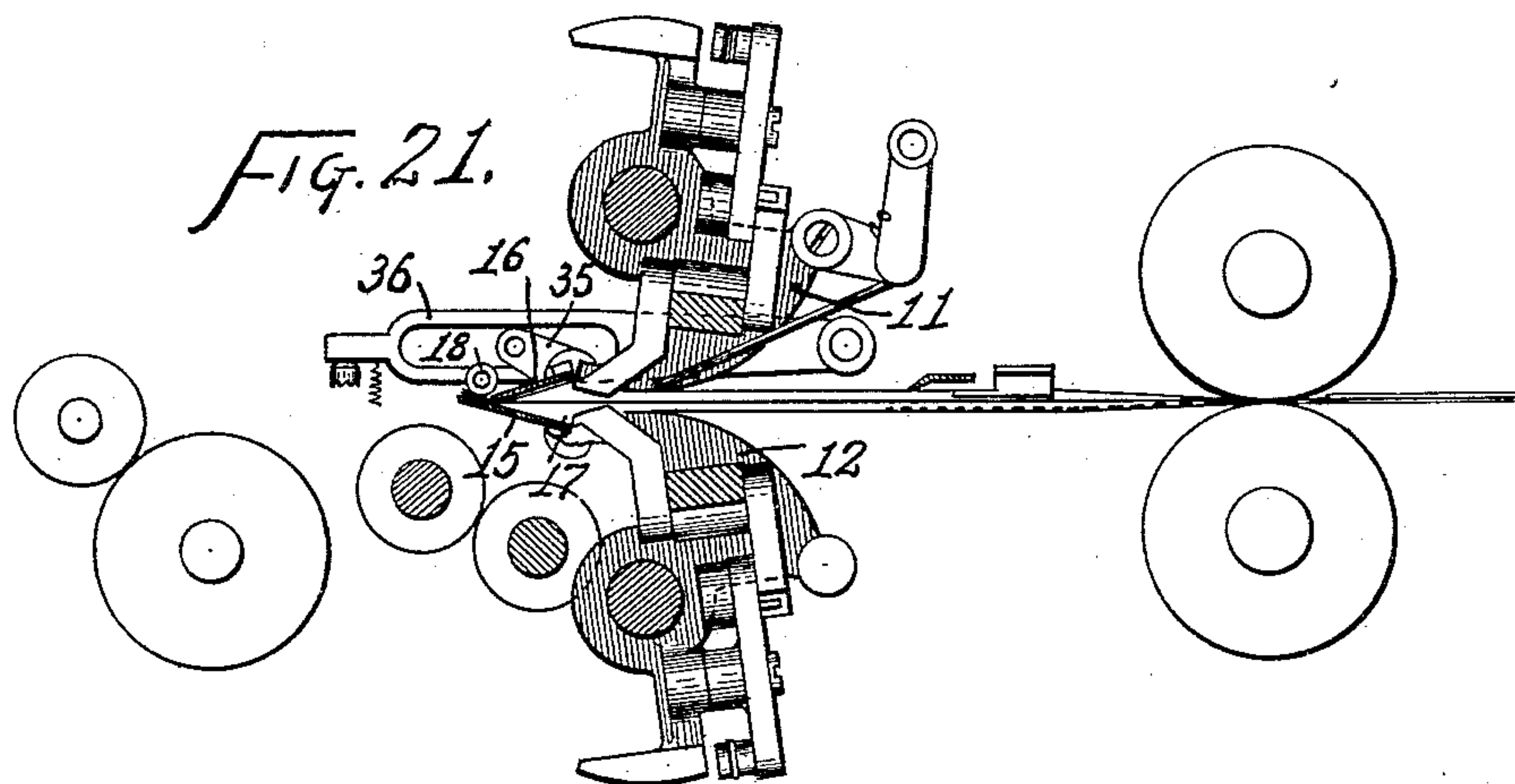
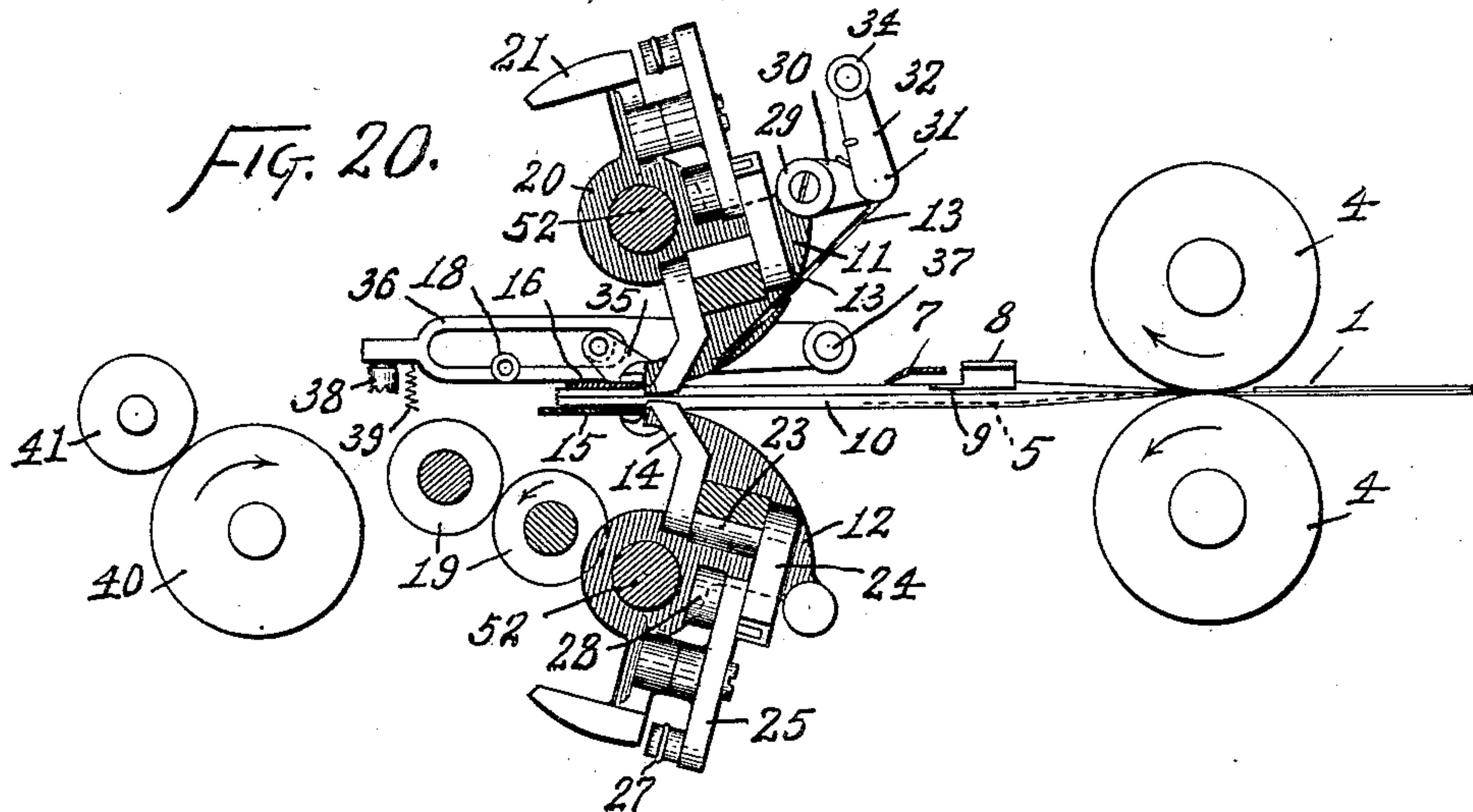
Patented Nov. 4, 1902.

D. APPEL.
PAPER BAG MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

7 Sheets—Sheet 2.



Witnesses:
E. B. Shipley.
M. S. Belden.

Daniel Appel
Inventor
by James W. See
Attorney

No. 712,633.

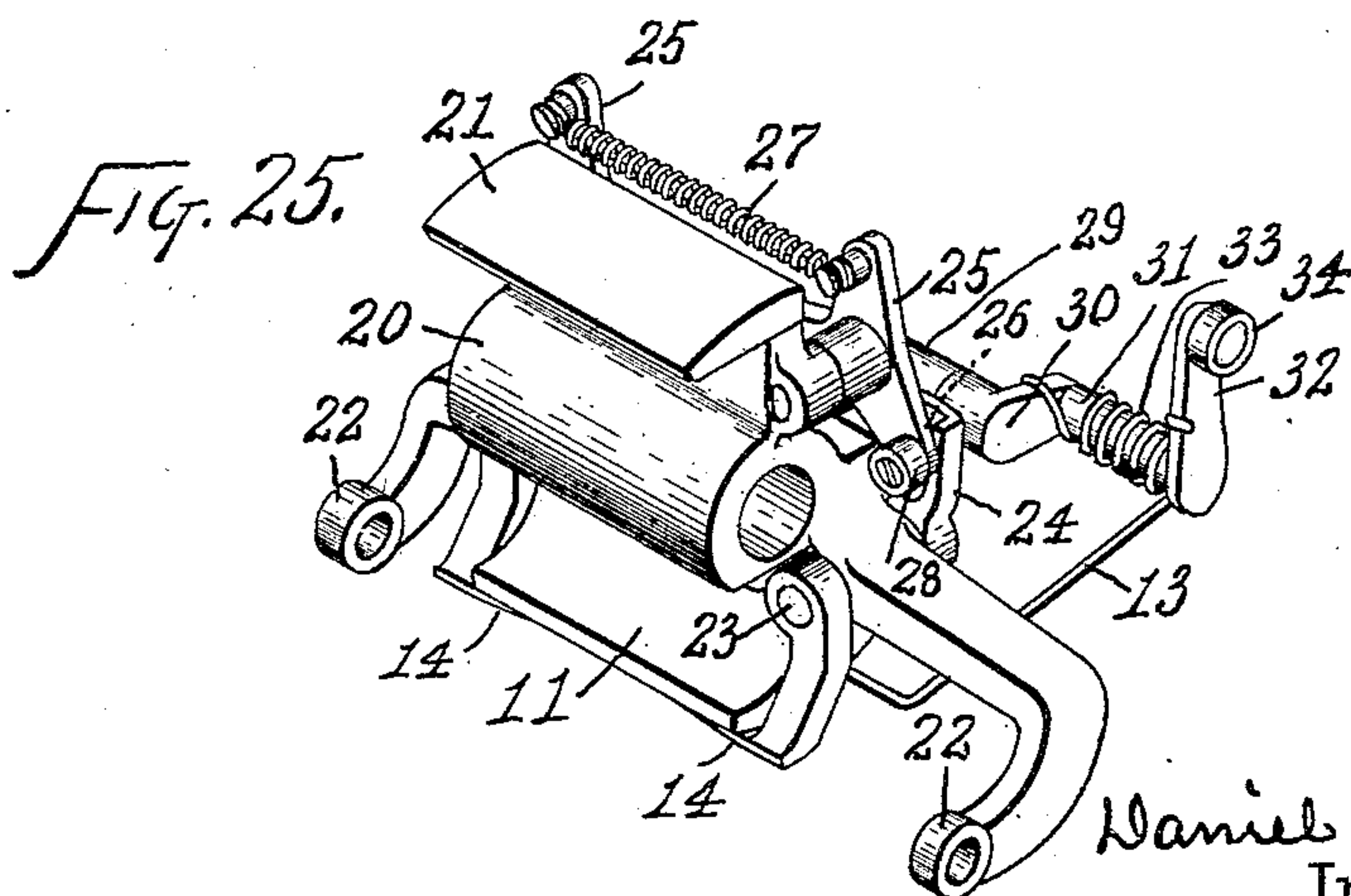
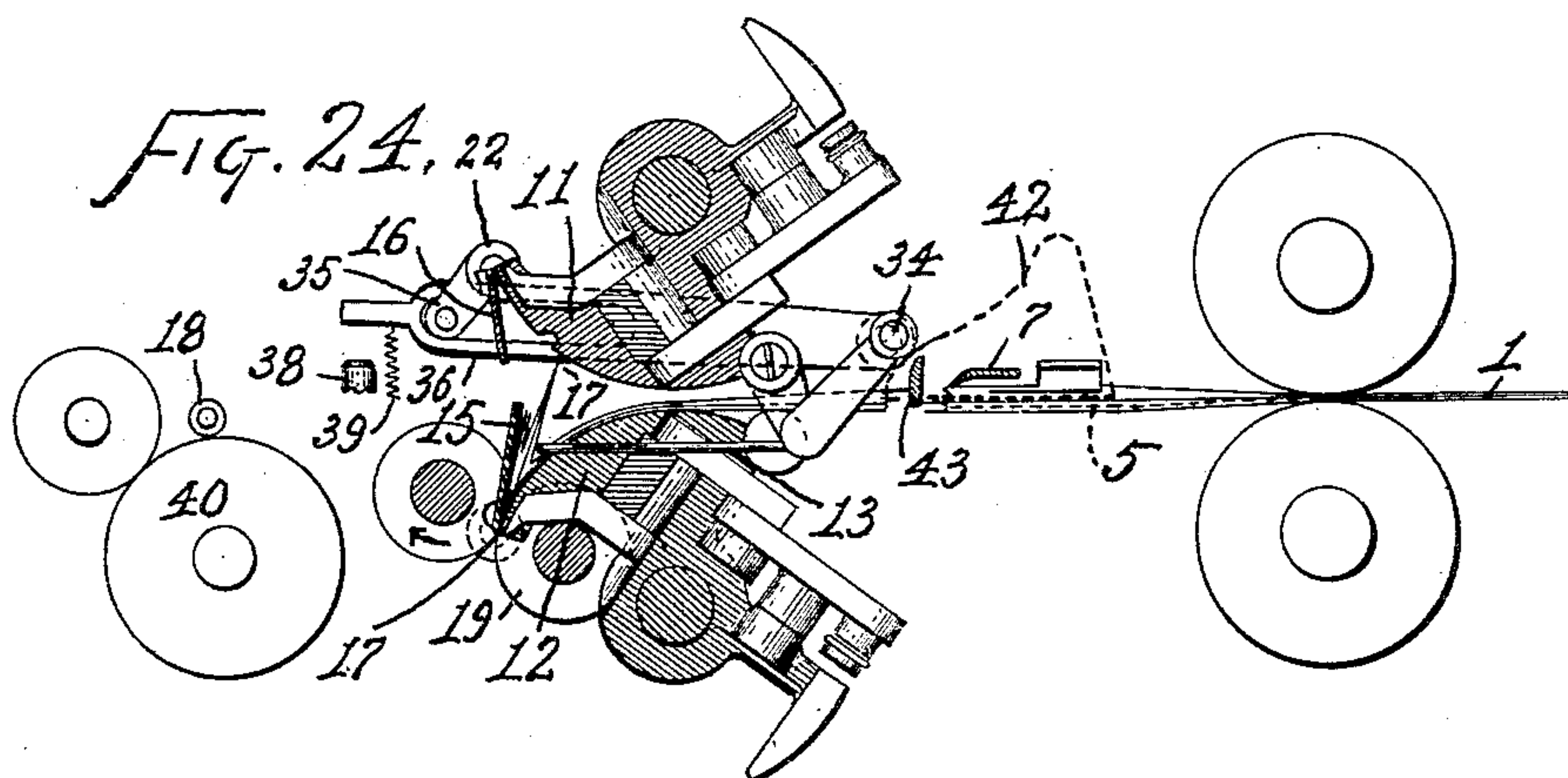
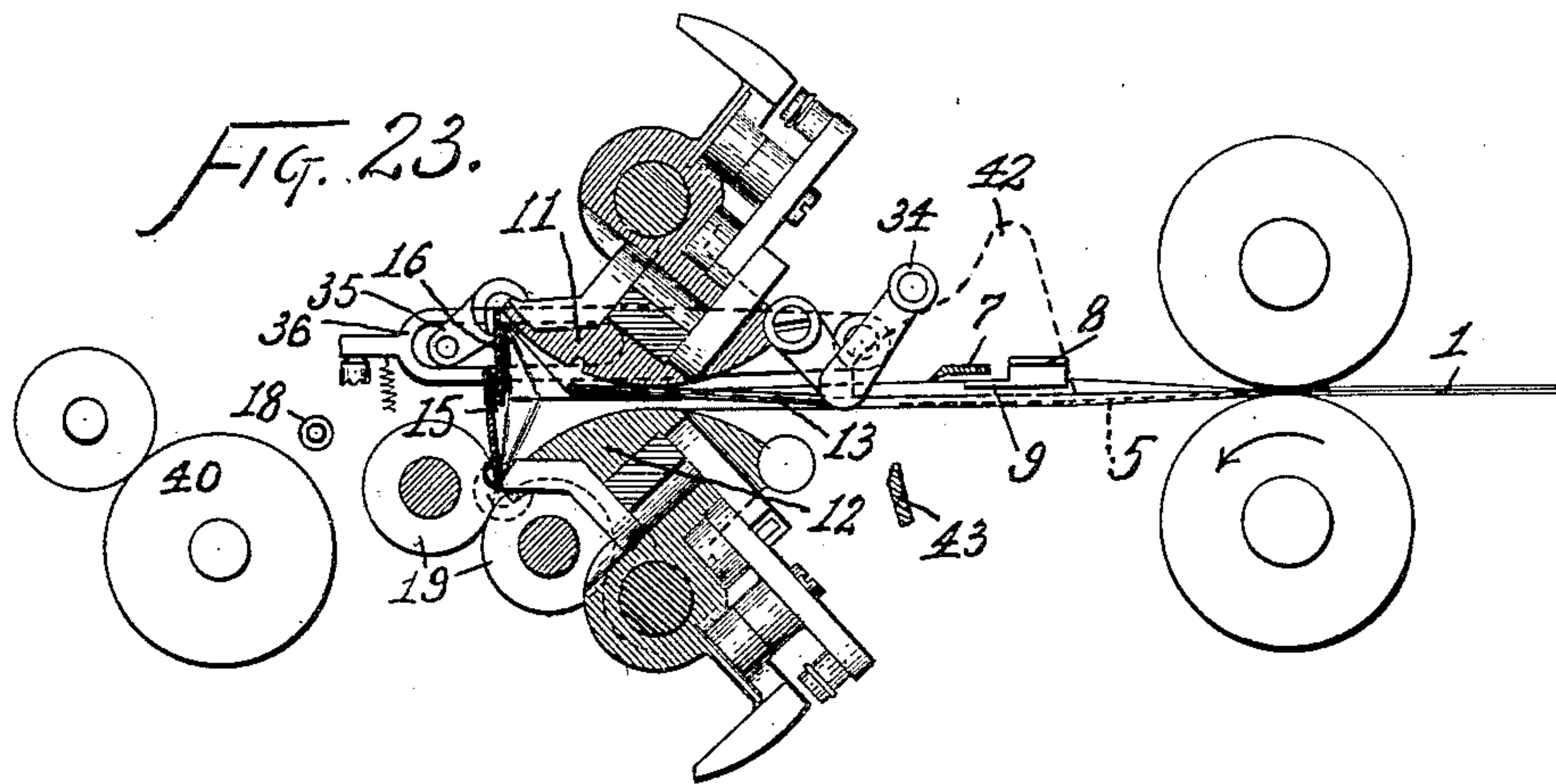
Patented Nov. 4, 1902.

D. APPEL.
PAPER BAG MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

7 Sheets—Sheet 3.



Witnesses:
E. Shipley,
M. S. Belden.

Daniel Appel
Inventor
by James W. See
Attorney

No. 712,633.

Patented Nov. 4, 1902.

D. APPEL.
PAPER BAG MACHINE.
(Application filed Mar. 13, 1902.)

(No Model.)

7 Sheets—Sheet 4.

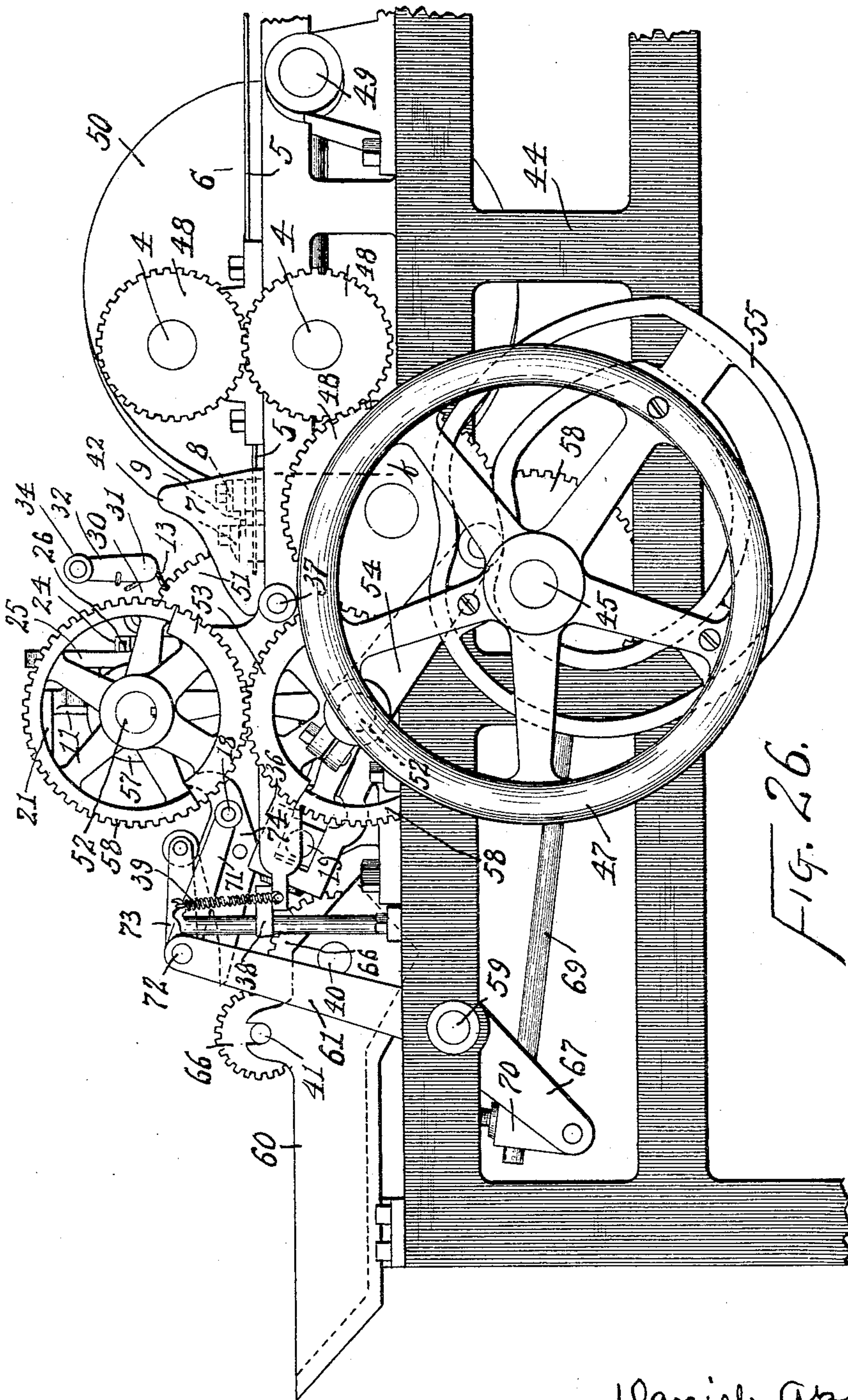


FIG. 26.

Witnesses:
E. Shipley
M. S. Belden

Daniel Appel
Inventor
by James W. See
Attorney

No. 712,633.

Patented Nov. 4, 1902.

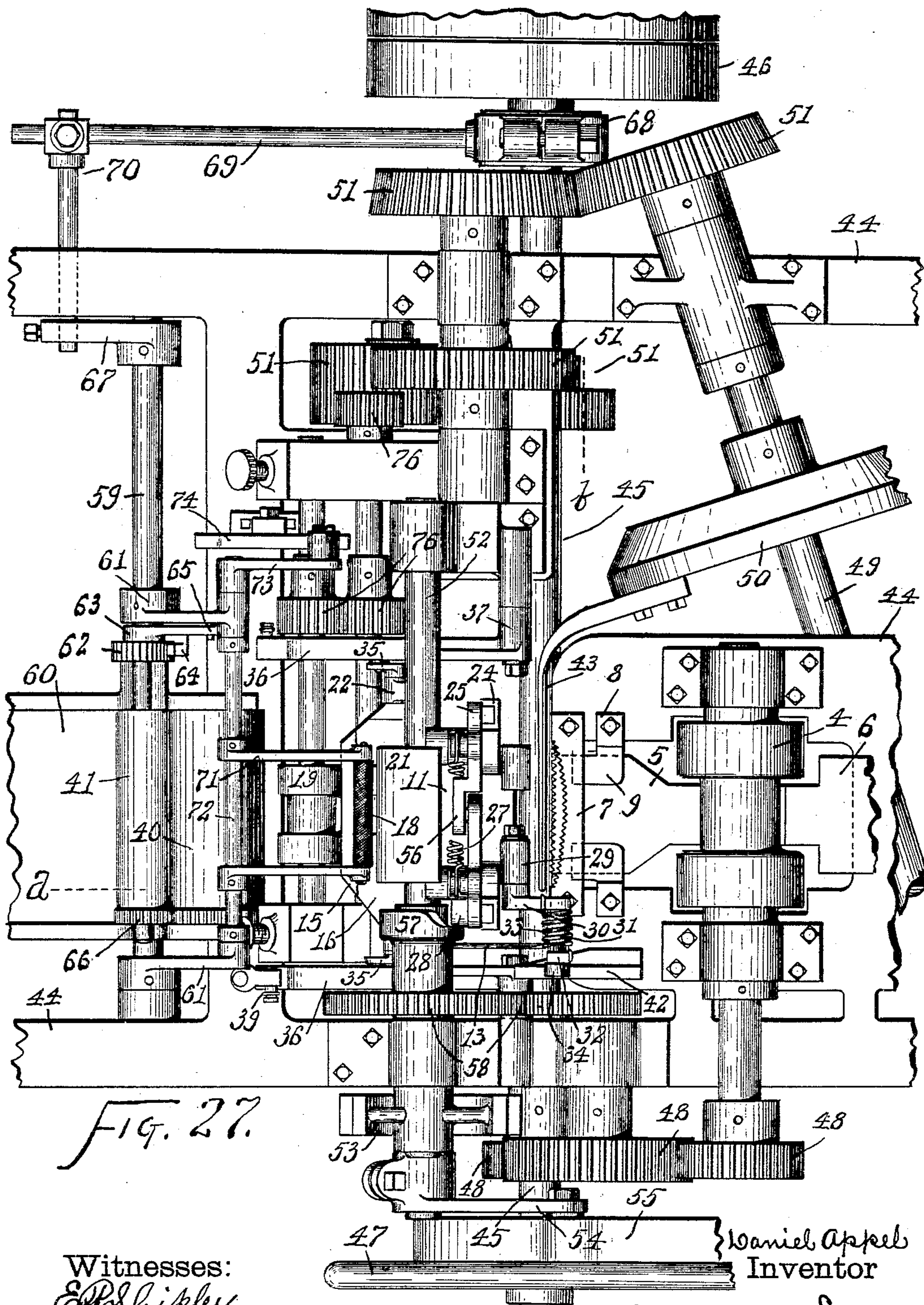
D. APPEL.

PAPER BAG MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

7 Sheets—Sheet 5.



Witnesses:
E. Shipley.
M. S. Belden.

Daniel Appel
Inventor
by *James W. See*
Attorney

No. 712,633.

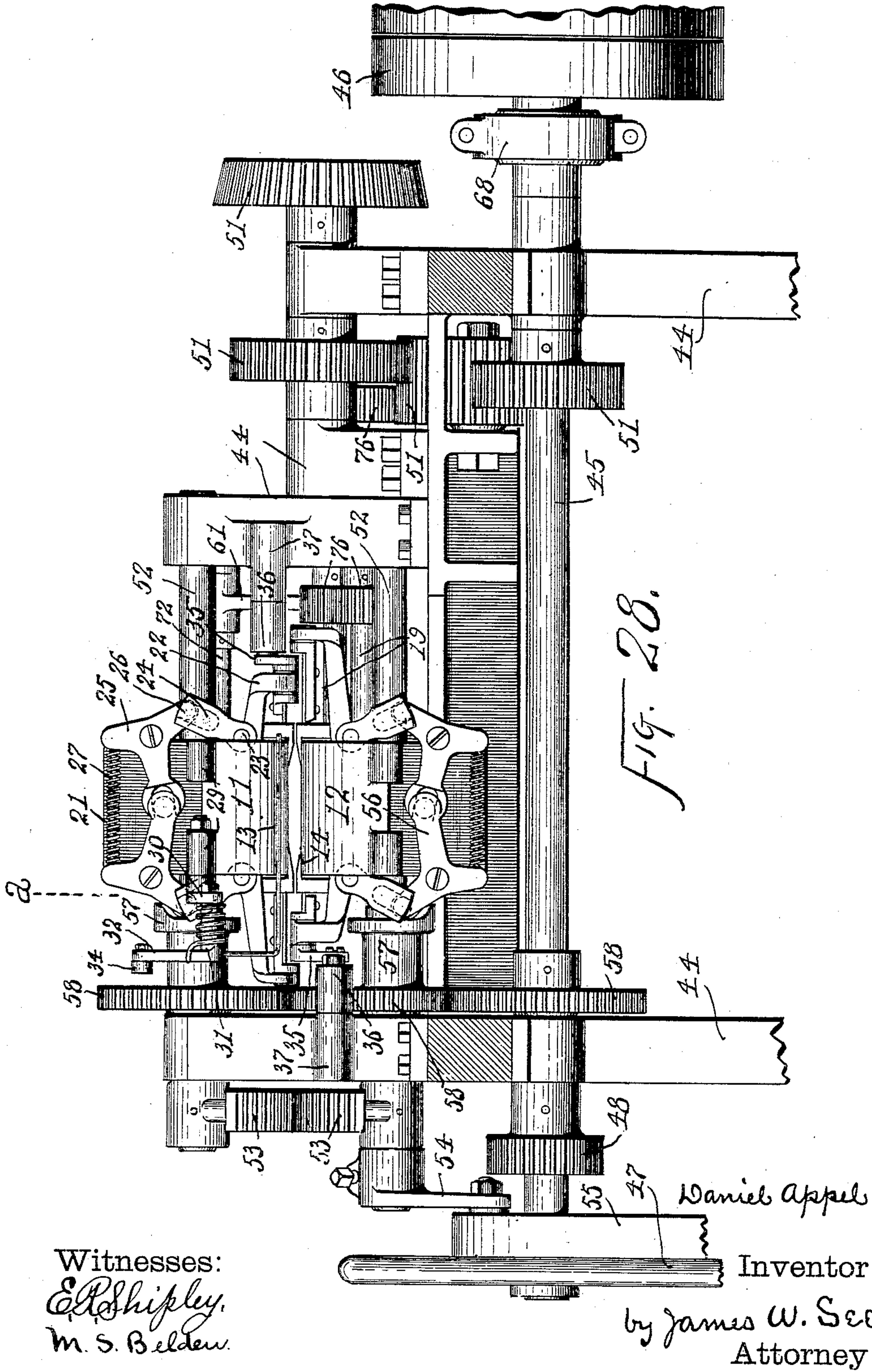
Patented Nov. 4, 1902.

D. APPEL.
PAPER BAG MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

7 Sheets—Sheet 6.



No. 712,633.

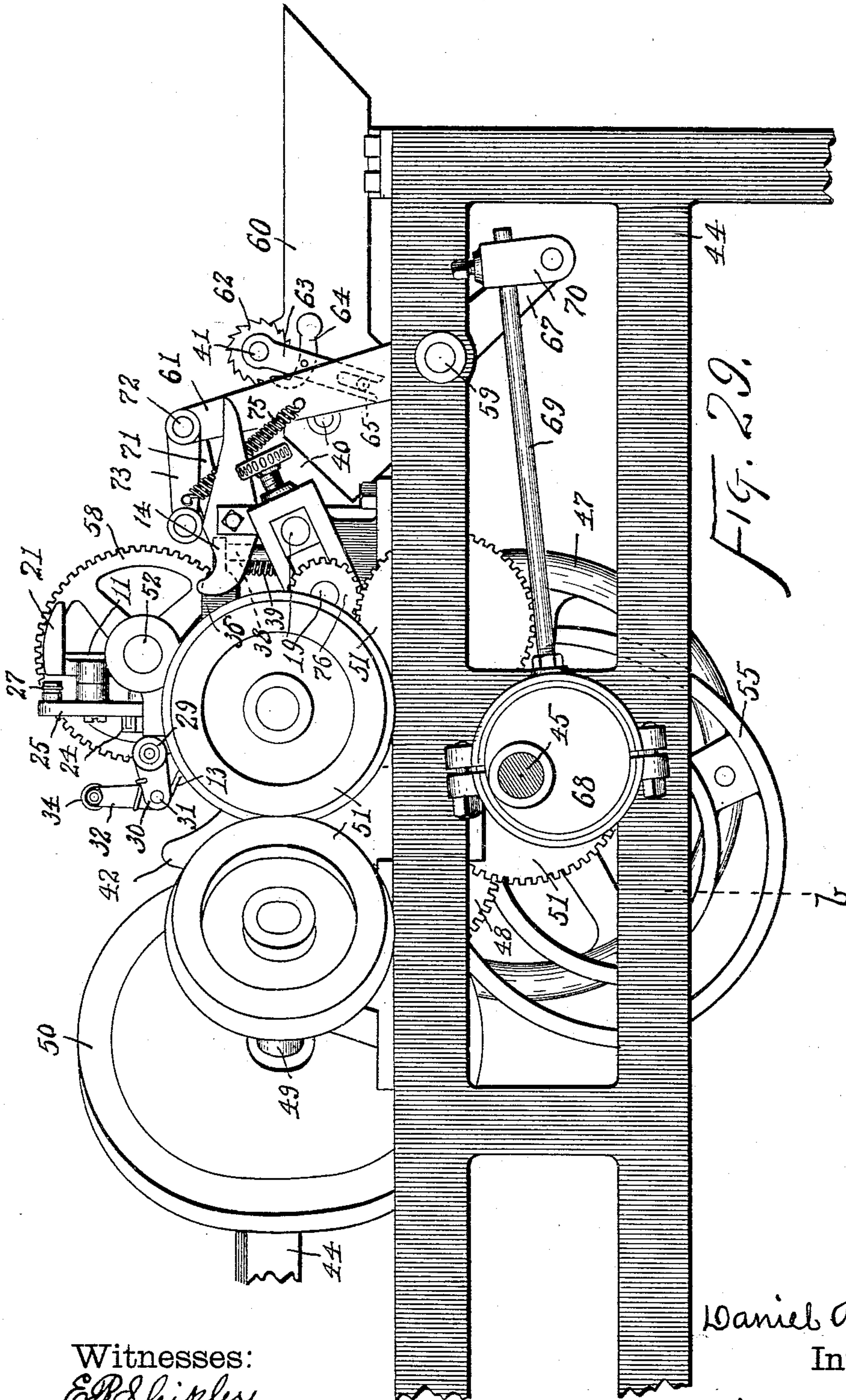
Patented Nov. 4, 1902.

D. APPEL.
PAPER BAG MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

7 Sheets—Sheet 7.



Witnesses:
E. B. Shipley.
M. S. Belden

Daniel Appel
Inventor
by *James W. See*
Attorney

UNITED STATES PATENT OFFICE.

DANIEL APPEL, OF CLEVELAND, OHIO, ASSIGNOR TO THE UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 712,633, dated November 4, 1902.

Application filed March 13, 1902. Serial No. 97,992. (No model.)

To all whom it may concern:

Be it known that I, DANIEL APPEL, a citizen of the United States, residing in Cleveland, Cuyahoga county, Ohio, (post-office address No. 62 Holyoke Place, Cleveland, Ohio,) have invented certain new and useful Improvements in Paper-Bag Machines, (Case H,) of which the following is a specification.

This invention, pertaining to improvements in paper-bag machines, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a plicated paper tube to be dealt with; Fig. 2, a plan of the same; Fig. 3, an end elevation of the same; Fig. 4, a side elevation of the tube feeding and severing instrumentalities; Fig. 5, a side elevation of the tube in condition to enter the folding devices; Figs. 6 and 7, vertical transverse sections of the folding devices in different stages of motion; Fig. 8, a side elevation of the tube at an early stage in the operation of the folding devices; Fig. 9, a vertical transverse section of the folding devices in a further stage of advance in motion; Fig. 10, a side elevation of the tube in a further stage of folding progress; Figs. 11 and 12, vertical transverse sections of the folding devices in a still further advanced stage of motion; Fig. 13, a side elevation of the tube in a still further advanced condition; Fig. 14, a vertical transverse section of the folding devices in a still further advanced stage of motion; Fig. 15, a side elevation of the tube in a still further advanced condition; Fig. 16, a vertical transverse section of the folding devices in their most advanced stage of motion; Fig. 17, a side elevation of the discharge-rolls at work upon the bag; Fig. 18, a side elevation of the completed bag; Fig. 19, a side elevation of the completed bag opened out for use; Figs. 20 to 24, inclusive, side elevations, partly sectional, in the plane of line *a* of Figs. 27 and 28 of the general functional mechanism in various successive stages of performance; Fig. 25, a perspective view of the upper rocker of the folding mechanism; Fig. 26, a front side elevation of the machine; Fig. 27, a plan of the machine; Fig. 28, a vertical transverse sec-

tion of the machine in the plane of line *b* of Figs. 26, 27, and 29, and Fig. 29 a rear side elevation of the machine.

The machine deals with an ordinary plicated paper tube, which is fed to it continuously by feed-rolls, the feed-rolls taking the tube from the ordinary tuber, of which the present machine may form a coöperating prolongation. The tube is fed forward continuously to a pair of oscillating segmental folders, which form the bottom of the bag and deliver the bag after severance from the tube to discharge-rolls.

I will first describe the functional instrumentalities in an elemental way in connection with the program of events brought about by them. I will then describe the folder mechanism in detail, after which I will describe the general machine as regards the assemblage of the instrumentalities and the gearing, &c., for giving them their functional motions, at the same time adding such further detailed description of the instrumentalities as may seem to be called for.

Program and instrumentalities, Figs. 1 to 19, inclusive.—Figs. 1, 2, and 3 illustrate the ordinary plicated paper tube from which the bags are to be made, the bottom end 3 of the upper face-ply as well as the side plies being cut farther back than the lower face-ply 2.

In Fig. 4, 4 indicates a pair of continuously-turning feed-rolls to advance the plicated tube; 5, the lower former-plate, inclosed by the advancing tube, this former-plate being flexible and projecting forwardly between the feed-rolls, which latter have deep central peripheral grooves to prevent pinching the tube upon the former-plate; 6, the upper former-plate, also inclosed within the paper tube, this upper plate projecting only to the rear of the feed-rolls; 7, a fixed tearing-blade disposed across over the lower former-plate 5 above and a short distance to the rear of its forward end; 8, side-ply openers disposed over the side edges of the lower former-plate 5 between the feed-rolls and tearing-blade 7, and 9 fingers projecting from these openers inwardly, so as to enter the exterior of the side folds of the paper tube and elevate the side plies and upper face-ply some distance from the lower ply thereof. The end of the

paper tube inclosing the former-plates 5 and 6 is fed forward by the feed-rolls 4, the opening-blades 9 elevating the upper plies of the tube, thus carrying the tube forward in the condition indicated in Fig. 5, where 10 indicates the opening of the side edges as effected by the opening-blades 9.

Fig. 6 illustrates the bottom-forming instrumentalities which receive the advancing paper tube. In this Fig 6, 11 indicates a segment of a cylinder extending across the path of travel of the advancing paper tube and presenting its segmental surface downwardly and rearwardly, this segment being herein-
 15 after termed the "upper" rocker; 12, a similar rocker disposed below the first one, so that the advancing paper tube may pass between the two rockers, whose contiguous surfaces stand far enough apart to permit the passage
 20 of the tube in the open condition indicated at 10 in Fig. 5; 13, a tucking-rod normally lying idle in a groove extending longitudinally along the segmental face of the upper rocker a short distance rearwardly of the forward margin of the segmental surface, this
 25 tucking-rod being adapted to move out of the groove in a substantially radial direction; 14, grippers mounted at the ends of the two rockers and standing when open outwardly beyond the ends of the rockers, but adapted to
 30 swing inwardly and enter the exterior side folds of the paper tube and clamp them to the upper and lower rockers; 15, a lower folding-blade forming a tangential prolongation
 35 of the forward extremity of the lower rocker, the rear edge of this folding-blade being pivoted to the forward margin of the lower rocker, the forward edges of grippers 14 also coinciding with the forward margin of the
 40 rockers, and 16 a similar folding-blade pivoted to the forward margin of the upper rocker, this upper blade projecting forward a less distance than the lower one.

In Fig. 6 the rockers are illustrated in initial position, grippers 14 being open and folding-blades 15 and 16 being separated. The paper tube, with its side plies opened, as at
 45 10 in Fig. 5, passes between the rockers and between the folding-blades, the forward extremity of the lower ply of the tube coming even with the forward edge of lower folding-blade 15. The rockers now rock forward at the speed of the advancing tube, and the grippers 14 move into the side openings of the
 50 tube and clamp the upper and lower plies to the respective rockers, the two folding-blades 15 and 16 then flexing toward each other, the forward edge of the upper blade 16 clamping the tube to the lower blade at a point somewhat rearward of the forward extremity of
 55 the upper ply 3. This condition of the mechanism is indicated in Fig. 7, and the condition produced upon the paper tube is indicated at Fig. 8, in which 17 indicates hips produced at the forward margin of the grippers by the convergence of the folding-blades.
 65 The rockers still advancing with the tube

reach the position indicated in Fig. 9 and put the tube in the condition indicated in Fig. 10, in which it will be observed that the hips 17
 70 have become farther separated into planes above and below the normal surface planes of the tube. While the parts and tube are in this condition the paste-roll 18 is applied to the tube ends lying upon blade 15 forward
 75 of blade 16, as indicated in Fig. 11, whereby these projecting portions of the tube end become supplied with paste, the paste-roll retreating after having done its work. The continued advance of the rockers and tube
 80 puts the parts in the position indicated in Fig. 12 and puts the tube in the condition indicated in Fig. 13, where it will be observed the hips 17 have been far separated and the folding-blades have put the bottom members
 85 on the tube-ply into planes at about right angles to each other. The advancing rockers reach the position indicated in Fig. 14 and put the tube into the condition indicated in Fig. 15, the hips 17 of the tube having
 90 reached their maximum degree of separation and the bottom members of the tube-ply having been brought into a substantially parallel plane, with the pasted surfaces facing toward, but not forcibly against, the front
 95 face of upper blade 16. That portion of the tube just rearward of lower hip 17 of Fig. 15 takes on a curved bend conforming to the surface of the lower rocker, and the same would be normally the case at the upper ply
 100 of the tube; but tucking-rod 13 has left its groove in the upper rocker and moved radially, as indicated in Fig. 14, thus developing an angular folding-line rearward of the upper hip of the tube. At the time the tuck-
 105 ing-rod 13 first becomes effective the grippers 14 on the upper rocker open, thus releasing the tube from the upper rocker, the lower grippers, however, still remaining active. The rockers advance still farther to
 110 the position indicated in Fig. 16, the upper rocker and its folding-blade 16 idly leaving the tube to the control of the lower rocker, the tucking-rod 13 having descended still
 115 farther, so as to render acute the folding angle produced by it. The advance of the lower rocker with the tube carries the lower hip 17 into the bite of a pair of discharge-rolls 19, the grippers of the lower rocker releasing, so that the tube may be taken from
 120 the rockers by the discharge-rolls, the result being that the tube is drawn through the discharge-rolls, as indicated in Fig. 17, all of the folded bottom work being pressed flatly and the pasted surfaces pressed against the un-
 125 derlying surfaces. Discharge-rolls 19 are speeded for higher surface travel than feed-rolls 4 of Fig. 4, which would now be referred to, the result being that the instant the discharge-rolls take hold they put the tube under
 130 tension between themselves and the feed-rolls. While the tube is in this stretched condition a severing-blade 43 rises rapidly just in advance of the forward edge of lower

folding-plate 5, thus flexing that plate upwardly against tearing-blade 17, the severing-blade 43 going on upwardly, the result being that the lower ply of the tube is severed at the forward edge of blade 5 and the upper plies at the forward edge of blade 7. Returning to Figs. 16 and 17, it follows that the discharge-rolls 19 deliver a severed, completed, and pressed bag, as indicated in Fig. 18, in which, however, for the purpose of clearer understanding the effect of the flat pressing has been somewhat suppressed in the drawings. Fig. 19 is a side view of the completed bag when opened out for use. The rockers having reached the position indicated in Fig. 16 and having delivered the end of the tube to the discharge-rolls 19 and the completed bag having been severed from the tube and quickly withdrawn from the rockers by the discharge-rolls the fresh end of the tube advances to the rockers and the rockers rock back to normal position, reaching the initial position (indicated in Fig. 6) by the time the fresh tube end shall have advanced, so that its forward end matches the front edge of lower folding-blade 15.

Folder mechanism, Figs. 20 to 25, inclusive.—These figures of the drawings again illustrate various steps in the regimen of the folding mechanism and show in some cases the tube in position being operated upon. In the figures now under consideration, and referring for the present particularly to Fig. 25, which shows the upper rocker in perspective, 20 is the hub of the rocker, by means of which it is secured to its shaft; 21, a counterbalance carried by the hub opposite the rocker proper, 11; 22, pivot-bearings carried by arms projecting from the rocker, their common axes being in line with the forward edge of the active segmental surface of the rocker; 23, pivots carried at each end of the rocker at right angles to the axis of the rocker and supporting the grippers 14, which grippers swing outwardly free of the rocker surface or swing inwardly, so as to clamp against that surface, Fig. 25 showing them in clamping position; 24, a slotted arm on the rear end of each of gripper-pivots 23, each of these pivots being, in fact, a spindle with a gripper fast on one end and an arm 24 fast on the other end; 25, a pair of arms pivoted on the rocker structure on pivots parallel with the pivots 23; 26, a roller on the lower end of each of the arms 25, engaging in the slots of arms 24, whereby the rocking of arms 25 results in the rocking of the grippers from closed to open position; 27, a spring drawing inwardly on the upper ends of arms 25 and tending to urge and hold the grippers to clamping position, and 28 a roller projecting from the lower end of one of arms 25 and adapted to engage a cam at proper time and be thereby moved inwardly, so as to open the grippers; 29, lugs projecting from the rear of the hub of the rockers; 30, an arm projecting rearwardly and rigidly from one of

these lugs, (on the upper rocker only,) being, in effect, a rigid rearward extension of the lug; 31, a spindle journaled in the rearward extremity of arm 30, its axis being parallel with that of the rocker tucking-rod 13, having a rearward extension at one end, the rear extremity of such extension being fast to spindle 31, so that as the spindle is turned the tucking-rod will be rocked in and out of its home groove in the segmental face of the rocker; 32, an arm fast on spindle 31; 33, a spring coiled on spindle 31 and engaging arms 30 and 32 and serving to urge and hold tucking-rod 13 home in its groove in the rocker, and 34 a roller projecting from arm 32 and adapted at proper time in the course of movement of the rocker to engage a cam whereby tucking-rod 13 is swung out of its groove and into the active positions heretofore referred to. The construction of the upper rocker having thus been described, it may be said that the lower rocker 12 is of similar construction, the only difference being that the lower rocker is not provided with a tucking-rod 13 and that its segment-face is grooved or recessed to make room for the discharge-rolls 19 when the parts have the position indicated in Fig. 16. Now turning to Fig. 20 the two rockers are seen in the initial position indicated by Fig. 6, the grippers being open and the folding-blades 15 and 16 being separated and the paper tube in position in the rockers ready to be gripped and clamped. Giving closer consideration to Fig. 20, 35 indicates an arm projecting from one of the trunnions of upper folding-blade 16, which folding-blade has its trunnions turning in the bearings 22, (best seen in Figs. 25 and 24,) this arm 35 having a roller projecting outwardly from its free extremity; 36, a horizontally-disposed guide-piece disposed alongside of arm 35 and having a horizontal slot engaged by the roller of that arm, guide-piece 36 being incapable of endwise motion; 37, a fixed pivot on which is mounted the rear end of guide-piece 36; 38, a fixed stop supporting the forward end of guide-piece 36; 39, a spring urging guide-piece 36 down against stop 38; 40, a fountain paste-roll disposed parallel with and forward of the discharge-roll and taking paste from a fountain; 41, a paste-distributing roll engaging the surface of paste fountain-roll 40 and serving to distribute and even the paste on roll 40 after the latter has taken it from the fountain, roll 40 being in such position that paste-roll 18 when it retreats after applying paste to the tube will go back and rest upon it and receive its supply of paste; 42, (see Figs. 23 and 24,) a fixed cam adapted to be engaged during the oscillation of the rockers by the roller 34, which operates the tucking-rod 13, and 43 (see Figs. 23 and 24) the severing-blade whose action has been heretofore referred to.

The regimen of the apparatus may be again, but briefly, described by reference to Figs. 20 to 24, inclusive. In Fig. 20 the rockers

are in initial position, with grippers open and folding-blades 15 and 16 separated, the paper tube feeding continuously forward by feed-rolls 4, opening-blades 9 opening up the side folds of the tube, so that it tends to fill the space between the rockers and present open side folds for the entrance of the grippers. Each folding-blade 15 and 16 is actuated by a guide-piece 36, such as has been described for the upper blade, and the forward horizontal travel of the roller of arm 35 along its guiding-slot causes the forward edges of the folding-plates to approach and clamp elastically upon each other as the rockers oscillate forward. In Fig. 21 the rockers have advanced somewhat, the grippers have closed and clamped the tube to the rockers, the folding-blades 15 and 16 have converged and clamped the forward end of the tube, their rear edges have separated along with the gripped points of the tube, thus beginning the development of the hips 17 of the tube, and paste-roll 18 has moved rearwardly and engaged the exposed projecting ends of the tube. It should be understood that the paste-roll 18 has no connection with guide-piece 36. In Fig. 22 the paste-roll having done its work is moving forward out of the way and the movement of the rockers has brought about the more advanced condition of the bottom formation of the tube, as explained earlier in the specification. In Fig. 23 the folding-blades 15 and 16 are about parallel, and the expansion at the hips of the tube is complete. The grippers of the upper rocker have opened, thus releasing the tube from that rocker, and roller 34 has engaged fixed cam 42, thus causing tucking-rod 13 to leave its groove in the upper rocker and press downward upon a folding-line across the upper ply of the tube. The lower hip of the tube is now ready for the bite of discharge-rolls 19, and severing-blade 43 is in position for work. In Fig. 24 the roller in arm 35 has swung its folding-blade 16 rearwardly past the vertical, and the same condition obtains with regard to the lower folding-blade 15, it being understood that both folding-blades are operated by similar mechanism. Guide-piece 36 being pulled upwardly by arm 35 yields against the resistance of spring 39. Tucking-rod 13 has urged the acute fold of the tube down toward the discharge-rolls. The grippers of the lower rocker open as soon as the discharge-rolls have gripped and strained upon the tube. Severing-blade 43 has risen and severed the finished bag from the tube. The discharge-rolls quickly carry the completed bag away, pressing its folds, and the rockers return to normal position, meeting the advancing fresh tube end as they do so, the mechanism and the tube finally again reaching the initial position and condition indicated in Fig. 20.

In Fig. 20, showing the rockers in initial position, it will be observed that guide-piece 36 is down on its stop 38 and holding up arm 35, and understanding that the lower rocker

is similarly provided the folding-blades 15 and 16 are thus held open for the admission of the tube end. When the rockers advance, as in Figs. 21, 22, and 23, the restraint of arms 35 by the slotted guide-pieces 36 while the hinge-pivots of the folding-blades separate causes the forward convergence and clamping action of the folding-blades, the clamping being rendered elastic by the capacity of the guide-pieces 36 to leave their stops 38 against resistance of springs 39.

Further details of instrumentalities.—Referring to Fig. 25, there is an arm 25 for each of the grippers, a pair on each rocker; but the pair is actuated by the cam acting on a roll 28 on but one of the arms of the pair. Consequently the two arms or grippers of the pair must be connected, so as to act in unison. This is accomplished as indicated in Fig. 28, where it will be observed that arms 25 have inward bell-crank extension 56, knuckled together, so that the two arms of a pair, and consequently the two grippers of a pair, must move in unison.

Referring to Fig. 27, it is to be observed that severing-blade 43 moves in an orbital path, the axis of the orbit (represented by shaft 49,) being at an angle to the general framing of the machine, so that the blade in passing through the rear portion of its orbit will clear the rear side of the framing of the feed-rolls, as well, of course, as the paper-tube and its guide-blades.

The details of the paste-applying mechanism will be described under the heading of the general machine.

The general machine, Figs. 26 to 29, inclusive.—In Figs. 26 to 29, inclusive, 44 indicates fixed frame parts; 45, the main driving-shaft; 46, tight and loose pulleys thereon to receive the power; 47, a hand-wheel on the driving-shaft; 48, a train of gears from driving-shaft 45 to feed-rolls 4 to give continuous rotation to the feed-rolls; 49, the diagonally-disposed axial shaft of severing-blade 43; 50, a disk secured thereon and having the heel of the severing-blade secured to it; 51, a train of gears from the driving-shaft to severing-blade shaft 49 and serving to sweep the severing-blade continuously through its orbital path, the timing of the motion being such that the blade will effect the severing of the tube, as hereinbefore explained—that is to say, at the instant the discharge-rolls get their bite upon the completed bag-bottom; 52, the shafts of the rockers 11 and 12, the rockers being fast on these shafts, which shafts are journaled in the framing; 53, a toothed segment fast on each of these rocker-shafts, these segments intermembering, so that the rockers will rock in unison; 54, an arm fast on one of the rocker-shafts and projecting toward driving-shaft 45; 55, a cam fast on the driving-shaft and engaging a roller at the end of arm 54, whereby the continuous rotation of the driving-shaft results in the previously-described oscillations

of the rockers; 56, the bell-crank arms for unifying the motions of the two grippers of a pair, as heretofore explained; 57, sleeve-cams loose on the rocker-shafts 52, their end
 5 cam-faces engaging rollers 28, whereby the turning of the cams relative to the rockers will result in the opening of the grippers against the resistance of springs 27, tending to hold the grippers closed; 58, a train of gears
 10 connecting these two sleeve-cams with each other and with driving-shaft 45, so that the cams turn continuously, the cams being so timed that the grippers of the upper rocker will be opened before those of the lower
 15 rocker, as heretofore explained, the grippers being closed during the greater portion of the forward motion of the rockers and being open during the retreating motion of the rockers through some corresponding stages of travel;
 20 59, a cross-shaft in the framing forward of the rockers; 60, the paste-fountain, setting upon the frame forward of the rockers and over cross-shaft 59; 61, a pair of arms fast on shaft 59 and projecting upwardly at each side of the
 25 paste-fountain, in which fountain is mounted fountain-roll 40 and distributing-roll 41; 62, a ratchet-wheel fast on the shaft of paste-distributing roll 41; 63, a pawl-arm loose on this shaft; 64, a pawl carried by this pawl-arm and
 30 engaging ratchet-wheel 62; 65, a pin projecting from one of arms 61 into a radial slot in pawl-arm 63, whereby the rocking of shaft 59 results in the intermittent turning of paste-distributing roll 41; 66, intermembering
 35 gears on the fountain-roll and distributing-roll, whereby the two rolls turn intermittently in unison; 67, a driving-arm fast on rock-shaft 59; 68, an eccentric on driving-shaft 45; 69, the eccentric-rod thereof; 70, a wrist-head
 40 connecting the eccentric-rod with arm 67, whereby at each turn of the driving-shaft the arms 61 are given an oscillation and the fountain and distributing rolls are given a partial turn; 71, a pair of arms supporting the paste-
 45 roll 18 in their rear ends and projecting forwardly therefrom; 72, a rock-shaft mounted in the upper extremities of arms 61 and having the forward ends of arms 71 secured to it; 73, a third arm fast on rock-shaft 72; 74, a
 50 fixed cam supported by the frame and traversed by a roller at the end of arm 73; 75, a spring connected with arm 73 and one of arms 61 and tending to urge the paste-roll downwardly and to keep the roller of arm 73 in contact with cam 74, and 76 a train of gears connecting the discharge-rolls 19 with each other and with a gear in train 51, so that the discharge-rolls are given continuous rotation at peripheral speed in excess of that of the feed-
 60 rolls, as heretofore explained.

The paste-roll makes excursions from the fountain-roll to the tube end lying upon the lower folding-blade, its vertical motions being controlled by fixed cam 74, the timing of
 65 the paste-roll motions being such that, referring to Fig. 21, the paste-roll will meet and traverse the projecting end of lower folding-

blade 15 just after the tube is clamped by the folding-blades and the lower blade begins to flex upwardly.

70

I claim as my invention—

1. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rockers adapted to receive a plicated paper tube between them, and having
 75 segmental surfaces with longitudinal forward margins, grippers carried by said rockers at opposite ends of the forward edges of their segmental surfaces, a pair of folding-blades projecting tangentially forward in prolonga-
 80 tion of the forward edges of the segmental surfaces of the rockers, and having their inner surfaces free from projection beyond the segmental surfaces of the rockers, pivots at the heels of the folding-blades parallel with the
 85 axes of the rockers, bearings for said pivots oscillating in unison with the rockers, means for opening and closing the grippers, and springs urging the forward edges of the folding-blades toward each other.

90

2. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rockers adapted to receive a plicated paper tube between them, and having
 95 segmental surfaces with longitudinal forward margins, grippers carried by said rockers at opposite ends of the forward edges of their segmental surfaces, a pair of folding-blades projecting tangentially forward in prolonga-
 100 tion of the forward edges of the segmental surfaces of the rockers, and having their inner surfaces free from projection beyond the segmental surfaces of the rockers, pivots at the heels of the folding-blades parallel with the
 105 axes of the rockers, bearings for said pivots oscillating in unison with the rockers, means for opening and closing the grippers, springs urging the forward edges of the folding-blades toward each other, and a pair of coacting discharge-rolls with their point of
 110 contact in the arc of the segmental surface of one of said rockers and in position to be closely approached by the folding-blade pivot moving with such rocker.

3. In a paper-bag machine, the combina-
 115 tion, substantially as set forth, of a pair of co-operating rockers adapted to receive a plicated paper tube between them, and having segmental surfaces with longitudinal forward margins, grippers carried by said rockers at
 120 opposite ends of the forward edges of their segmental surfaces, a pair of folding-blades projecting tangentially forward in prolongation of the forward edges of the segmental surfaces of the rockers, and having their inner
 125 surfaces free from projection beyond the segmental surfaces of the rockers, pivots at the heels of the folding-blades parallel with the axes of the rockers, bearings for said pivots oscillating in unison with the rockers,
 130 means for opening and closing the grippers, springs urging the forward edges of the folding-blades toward each other, a pair of coacting discharge-rolls with their point of contact

in the arc of the segmental surface of one of said rockers and in position to be closely approached by the folding-blade pivot moving with such rocker, a tucking-rod disposed between and parallel with the rockers, and mechanism for moving said tucking-rod toward the point of contact of the discharge-rolls.

4. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rockers adapted to receive a plicated paper tube between them, and having segmental surfaces with longitudinal forward margins, grippers carried by said rockers at opposite ends of the forward edges of their segmental surfaces, a pair of folding-blades projecting tangentially forward in prolongation of the forward edges of the segmental surfaces of the rockers, and having their inner surfaces free from projection beyond the segmental surfaces of the rockers, one of said folding-blades projecting forwardly beyond the other, pivots at the heels of the folding-blades parallel with the axes of the rockers, bearings for said pivots oscillating in unison with the rockers, means for opening and closing the grippers, and springs urging the forward edges of the folding-blades toward each other.

5. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rockers adapted to receive a plicated paper tube between them, and having segmental surfaces with longitudinal forward margins, grippers carried by said rockers at opposite ends of the forward edges of their segmental surfaces, a pair of folding-blades projecting tangentially forward in prolongation of the forward edges of the segmental surfaces of the rockers, and having their inner surfaces free from projection beyond the segmental surfaces of the rockers, one of said folding-blades projecting forwardly beyond the other, pivots at the heels of the folding-blades parallel with the axes of the rockers, bearings for said pivots oscillating in unison with the rockers, means for opening and closing the grippers, springs urging the forward edges of the folding-blades toward each other, a paste-roll disposed forward of and parallel with the axes of the rockers and mounted for movement to and from the rockers, and mechanism for pressing said paste-roll over the forward projection of the farthest projecting one of said folding-blades.

6. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rockers adapted to receive a plicated paper tube between them, and having segmental surfaces with longitudinal forward margins, grippers carried by the opposite ends of the forward edges of the rockers, pivot-bearings carried by the rockers with their axes in line with the forward edges of the segmental surfaces of the rockers, a pair of folding-blades projecting tangentially forward in prolongation of the segmental surfaces of the rockers and having their inner surfaces free

from projection beyond the segmental surfaces of the rockers and having their heels pivoted in said pivot-bearings, and springs urging the forward edges of the folding-blades toward each other.

7. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rocking segments adapted to receive a plicated paper tube between them, grippers carried by the opposite ends of the forward edges of the rockers, pivot-bearings carried by the rockers with their axes in line with the forward edges of the segmental surfaces of the rockers, a pair of folding-blades projecting tangentially forward from the segmental surfaces of the rockers and having their heels pivoted in said pivot-bearings, an arm connected with each folding-blade, and slotted guide-pieces traversed by the free extremities of said arms.

8. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rocking segments adapted to receive a plicated paper tube between them, grippers carried by the opposite ends of the forward edges of the rockers, pivot-bearings carried by the rockers with their axes in line with the forward edges of the segmental surfaces of the rockers, a pair of folding-blades projecting tangentially forward from the segmental surfaces of the rockers and having their heels pivoted in said pivot-bearings, an arm connected with each folding-blade, slotted guide-pieces traversed by the free extremities of said arms and mounted for movement to and from each other, and springs urging said guide-pieces in a direction corresponding with the approaching direction of movement of the forward edges of the folding-blades.

9. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rocking segments adapted to receive a plicated paper tube between them, grippers carried by the opposite ends of the forward edges of the rockers, pivot-bearings carried by the rockers with their axes in line with the forward edges of the segmental surfaces of the rockers, a pair of folding-blades projecting tangentially forward from the segmental surfaces of the rockers and having their heels pivoted in said pivot-bearings, an arm connected with each folding-blade, slotted guide-pieces traversed by the free extremities of said arms and mounted for movement to and from each other, springs urging said guide-pieces in a direction corresponding with the approaching direction of movement of the forward edges of the folding-blades, and stops to limit such motion of the guide-pieces when the rockers are near the extremity of their rearward motion.

10. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating segmental rockers adapted to receive a plicated paper tube between them, folding-blades pivoted at the forward edges

of the segmental surfaces of the rockers, gripper-spindles mounted across the ends of the rockers, grippers carried by said spindles and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a spring connected with each pair of grippers and urging them to gripping position, mechanism connecting the two gripper-spindles of a pair to cause them to move in unison, an arm on one gripper-spindle of each pair, and cams engaging the free extremities of said arms and serving to rock the arms and open the grippers.

11. In a paper-bag machine, the combination, substantially as set forth, of a pair of cooperating segmental rockers adapted to receive a plicated paper tube between them, folding-blades pivoted at the forward edges of the segmental surfaces of the rockers, gripper-spindles mounted across the ends of the rockers, grippers carried by said spindles and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a spring connected with each pair of grippers and urging them to gripping position, mechanism connecting the two gripper-spindles of a pair to cause them to move in unison, an arm on one gripper-spindle of each pair, a cam mounted at the axis of each rocker and engaging the gripper-arm of the rocker and rotatable independently of the rocker, and mechanism for turning said cams while the rockers are rocking.

12. In a paper-bag machine, the combination, substantially as set forth, of a pair of cooperating segmental rockers adapted to receive a plicated paper tube between them, folding-blades pivoted at the forward edges of the segmental surfaces of the rockers, gripper-spindles mounted across the ends of the rockers, grippers carried by said spindles and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a spring connected with each pair of grippers and urging them to gripping position, mechanism connecting the two gripper-spindles of a pair to cause them to move in unison, an arm on one gripper-spindle of each pair, a cam mounted at the axis of each rocker and engaging the gripper-arm of the rocker and rotatable independently of the rocker, and mechanism for turning said cams continuously while the rockers are rocking.

13. In a paper-bag machine, the combination, substantially as set forth, of a pair of cooperating segmental rockers adapted to receive a plicated paper tube between them, folding-blades pivoted at the forward edges of the segmental surfaces of the rockers, gripper-spindles mounted across the ends of the rockers, grippers carried by said spindles and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a spring connected with each pair of grippers and urging them to gripping position, mechanism connecting the two gripper-spindles of a pair to cause them to move in

unison, an arm on one gripper-spindle of each pair, a cam mounted at the axis of each rocker and engaging the gripper-arm of the rocker and rotatable independently of the rocker, one of said cams being set relatively in advance of the other.

14. In a paper-bag machine, the combination, substantially as set forth, of a pair of cooperating segmental rockers adapted to receive a plicated paper tube between them, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers, gripper-spindles mounted across the ends of the rockers, grippers fast on the gripper spindles and adapted to clamp to the forward and end portions of the segmental surfaces of the rockers, slotted arms fast on the gripper-spindles, actuating-arms carried by the rockers, one for each slotted arm, rollers carried by the actuating-arms and engaging the slotted arms, springs connecting the two actuating-arms of a rocker, a roller carried by one actuating-arm of each rocker, and cams engaging said last-mentioned rollers.

15. In a paper-bag machine, the combination, substantially as set forth, of a pair of cooperating segmental rockers adapted to receive a plicated paper tube between them, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers, grippers mounted on the rockers and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, an arm pivoted on one of the rockers, a tucking-rod connected with said arm and lying in a longitudinal groove in the segmental surface of the rocker carrying said arm, a spring engaging said arm and urging said tucking-rod into its groove in the rocker, and a cam adapted to act on said arm and swing said tucking-rod out of its groove and away from the segmental surface of the rocker.

16. In a paper-bag machine, the combination, substantially as set forth, of a pair of cooperating rockers adapted to receive a plicated paper tube between them, and having segmental surfaces with longitudinal forward margins, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers, and forming forward tangential prolongations of said surfaces and having their inner surfaces free from projection beyond the segmental surfaces of the rockers, grippers mounted on the rockers and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a pair of coacting feed-rolls disposed to the rear of the rockers and adapted to feed the paper tube to the rockers, and side-ply openers disposed between said rockers and feed-rolls.

17. In a paper-bag machine, the combination, substantially as set forth, of a pair of cooperating rockers adapted to receive a plicated paper tube between them, and having segmental surfaces with longitudinal forward

margins, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers in tangential prolongation of those surfaces and having their inner surfaces free from projection beyond the segmental surfaces of the rockers, grippers mounted on the rockers and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a pair of coacting feed-rolls disposed to the rear of the rockers and adapted to feed the paper tube to the rockers, side-ply openers disposed between said rockers and feed-rolls, and severing mechanism disposed between the rockers and side-ply openers.

18. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating rockers adapted to receive a plicated paper tube between them, and having segmental surfaces with longitudinal forward margins, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers in tangential prolongation of those surfaces and having their inner surfaces free from projection beyond the segmental surfaces of the rockers, grippers mounted on the rockers and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a pair of continuously-rotating feed-rolls disposed to the rear of the rockers and adapted to feed the paper tube continuously toward the rockers, a pair of continuously-rotating discharge-rolls disposed forward of the rockers and adapted to receive the folded tube end therefrom, said discharge-rolls being geared to have a peripheral rate of speed in excess of that of the feed-rolls, and severing mechanism disposed between the rockers and the feed-rolls.

19. In a paper-bag machine, the combination, substantially as set forth, of a pair of feed-rolls adapted to feed a plicated tube continuously forward, a pair of discharge-rolls in advance of said feed-rolls, adapted to grip and strain forward upon the paper tube, folding mechanism disposed between and independent of the feed-rolls and the discharge-rolls, a former-plate projecting forward from between the feed-rolls and adapted to be inclosed by the paper tube, a tearing-blade disposed over said former-plate to the rear of its front end, and a severing-blade mounted for upward movement across in front of said former-blade and tearing-blade.

20. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating segmental rockers adapted to receive a plicated paper tube between them, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers, grippers mounted on the rockers and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, intermembering toothed segments on the shafts of the rockers, a driving-shaft, a cam on the driving-shaft, and an arm fast on the

shaft of one of the rockers and having its free end in engagement with said cam.

21. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating segmental rockers adapted to receive a plicated paper tube between them, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers, grippers mounted on the rockers and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a paste-fountain forward of the rockers, a fountain-roll mounted therein, a rock-shaft, arms on the rock-shaft at each side of the fountain, mechanism for rocking said rock-shaft in harmony with the rocking of the rockers, a rock-shaft carried by the free ends of said arms, arms carried by said last-mentioned rock-shaft and projecting toward the rockers, a paste-roll carried by the free extremities of said last-mentioned arms, a third arm on said last-mentioned rock-shaft, a fixed cam traversed by and supporting the free end of said third arm, and a spring urging said third arm to said cam.

22. In a paper-bag machine, the combination, substantially as set forth, of a pair of co-operating segmental rockers adapted to receive a plicated paper tube between them, folding-blades with their heels pivoted to the forward edges of the segmental surfaces of the rockers, grippers mounted on the rockers and adapted to clamp against the forward and end portions of the segmental surfaces of the rockers, a pair of coacting feed-rolls at the rear of the rockers and adapted to feed the paper tube to the rockers, a pair of coacting discharge-rolls in advance of the rockers, a fountain-roll in advance of the rockers, a paste-roll mounted for excursions between the fountain-roll and the forward portion of the folding-blades, a driving-shaft, gearing connecting the driving-shaft with the feed-rolls and the discharge-rolls to rotate those rolls continuously, a cam on the driving-shaft, mechanism connecting said cam with the rockers to oscillate the rockers, a second cam on the driving-shaft, and mechanism connecting said second cam with the paste-roll to cause the latter to make one excursion at each oscillation of the rockers.

23. In a paper-bag machine, the combination, substantially as set forth, of a pair of feed-rolls adapted to feed a plicated tube continuously forward, a pair of discharge-rolls in advance of said feed-rolls, adapted to grip and strain forward upon the paper tube, folding mechanism disposed between and independent of the feed-rolls and the discharge-rolls, a flexible former-plate projecting forward from between the feed-rolls and adapted to be inclosed by the paper tube, a tearing-blade disposed over said former-plate to the rear of its front end, and a severing-blade mounted for upward movement across in front of said former-blade and tearing-blade.

24. In a paper-bag machine, the combina-

tion, substantially as set forth, of a pair of
coöperating segmental rockers adapted to re-
ceive a plicated paper tube between them,
folding-blades with their heels pivoted to the
5 forward edges of the segmental surfaces of
the rockers, grippers mounted on the rockers
and adapted to clamp against the forward
and end portions of the segmental surfaces
of the rockers, a slotted guide-piece across
10 the end of each rocker, a fixed pivot support-

ing one end of each guide-piece, an arm con-
necting each folding-blade with the slot of
one of the guide-pieces, fixed stops support-
ing the free ends of the guide-pieces, and
springs urging the free ends of the guide- 15
pieces to their fixed stops.

DANIEL APPEL.

Witnesses:

HARRY E. ORR,
H. J. WILLIS.