

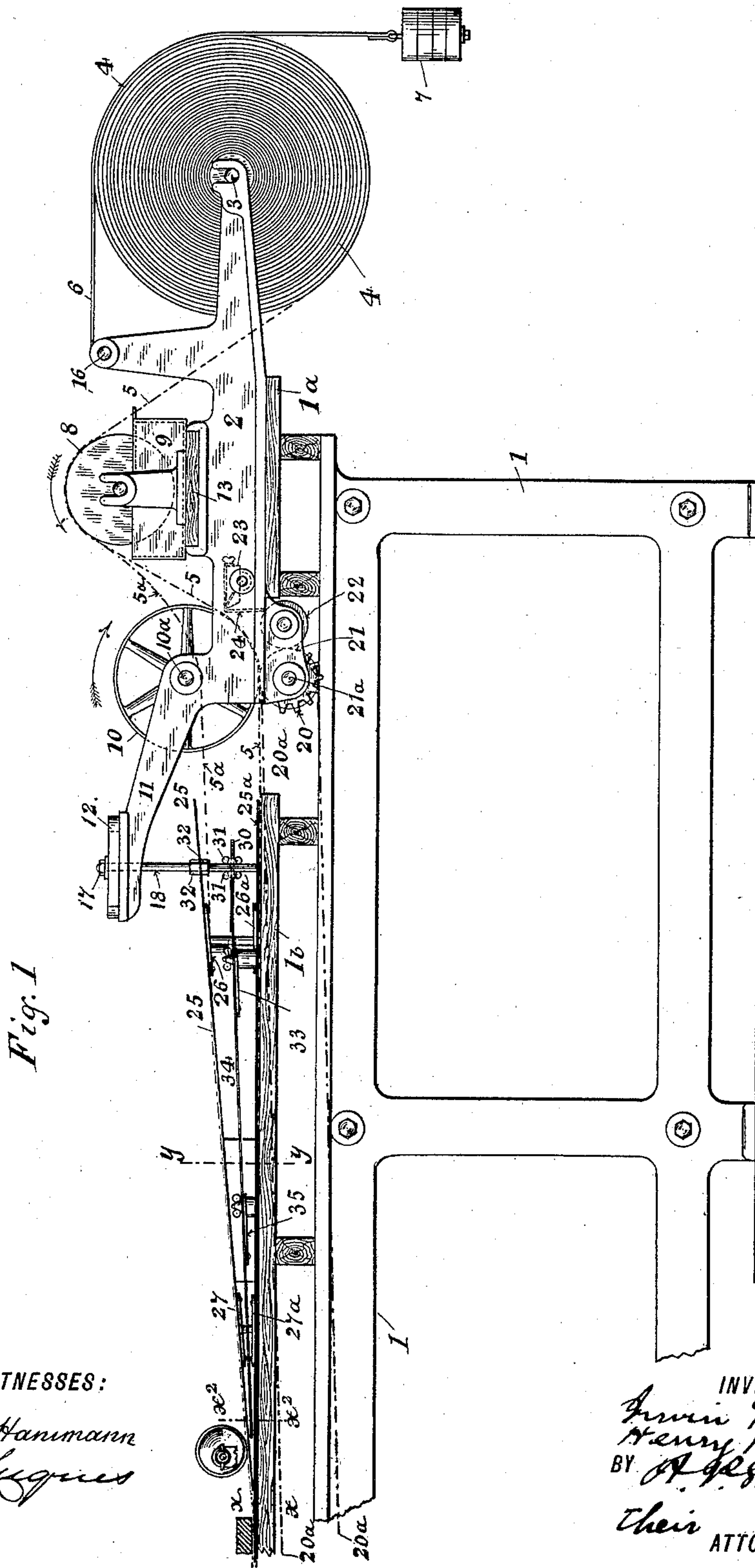
(No Model.)

6 Sheets—Sheet 1.

I. T. EHST & H. P. FIESTER.
PAPER BAG MACHINE.

No. 467,553.

Patented Jan. 26, 1892.



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(No Model.)

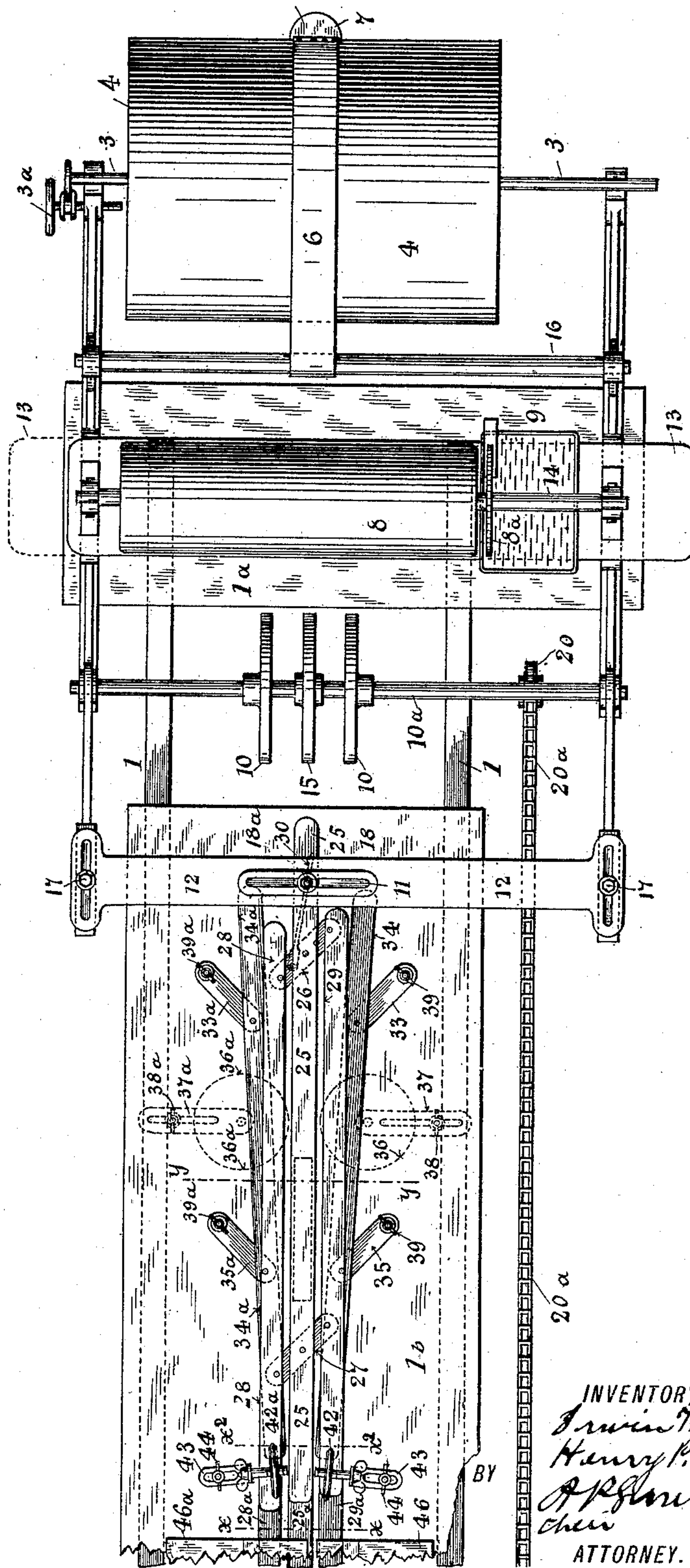
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Fig. 2.



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Fig. 3.

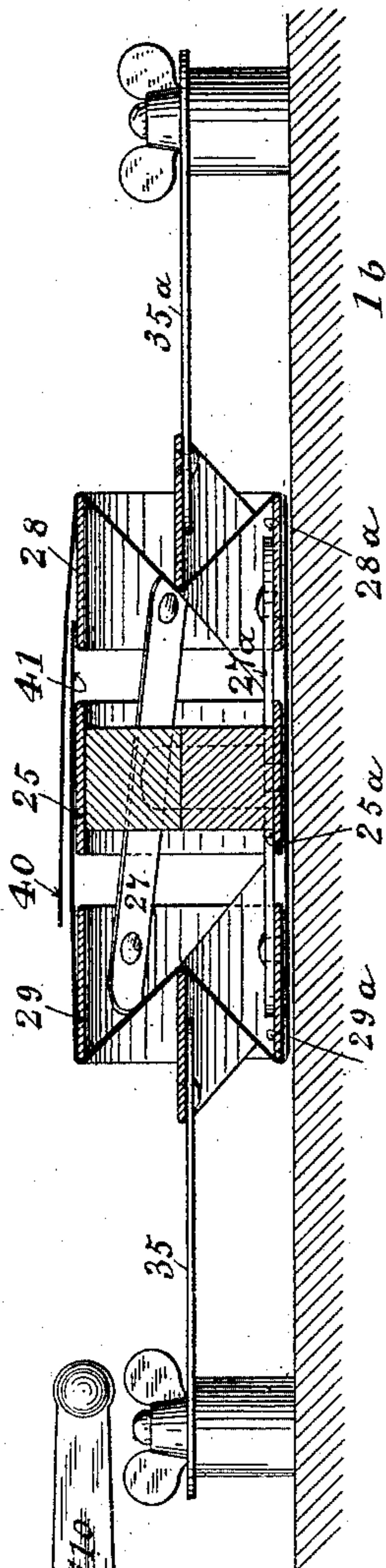


Fig. 4.

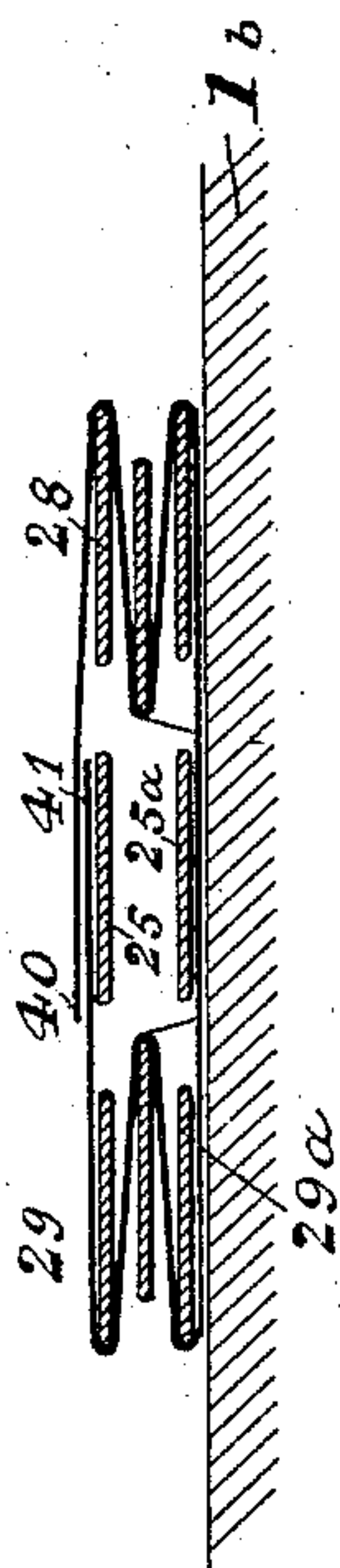


Fig. 5.

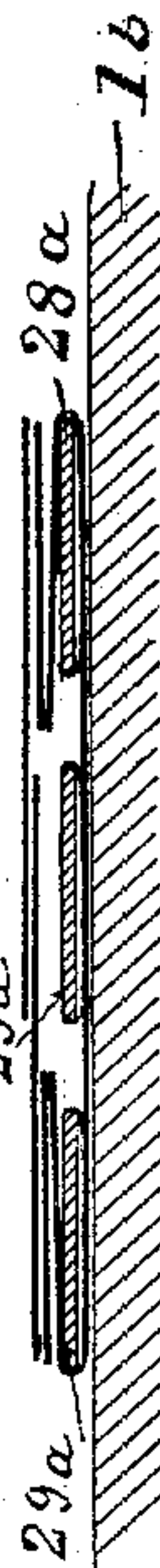
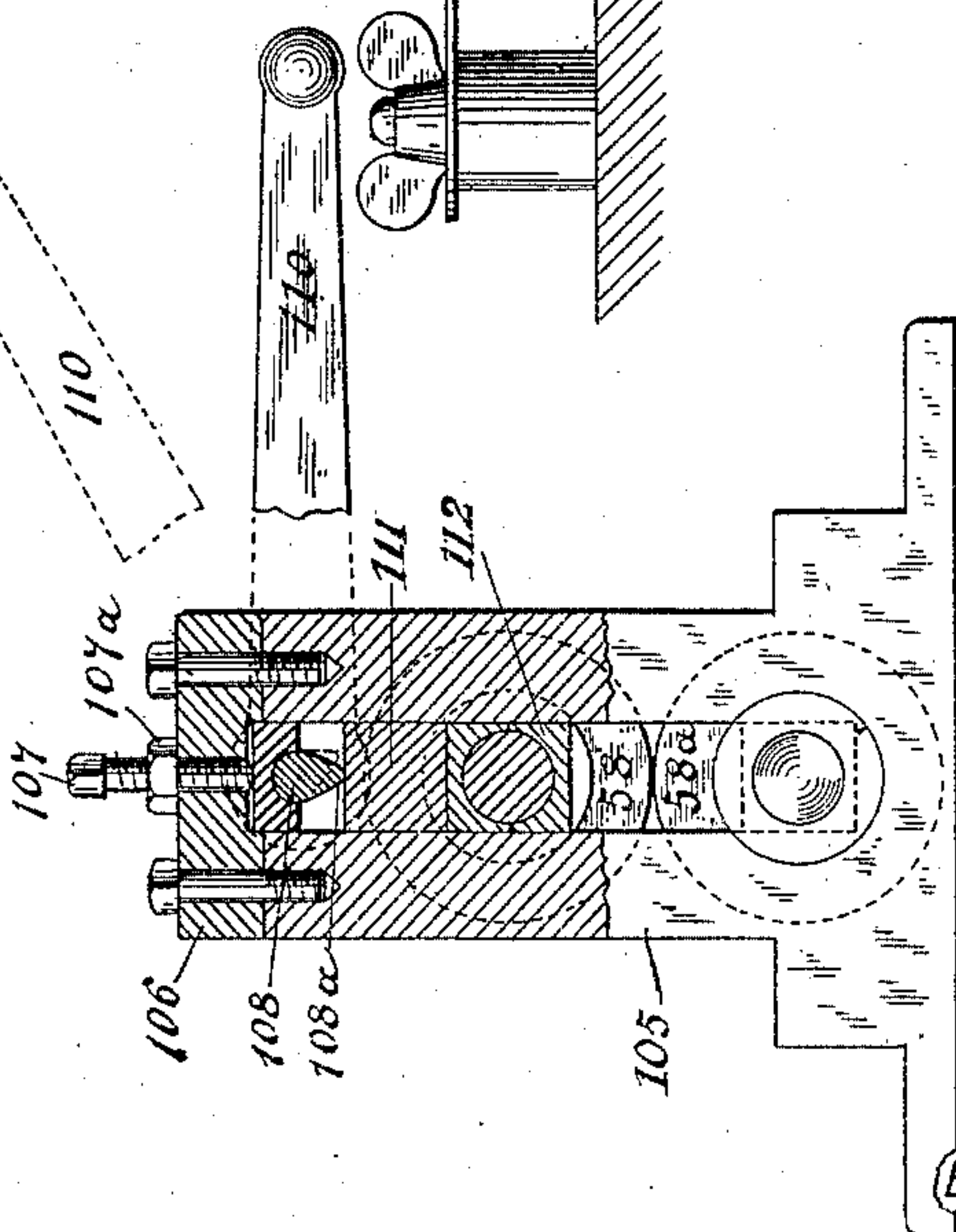


Fig. 13.



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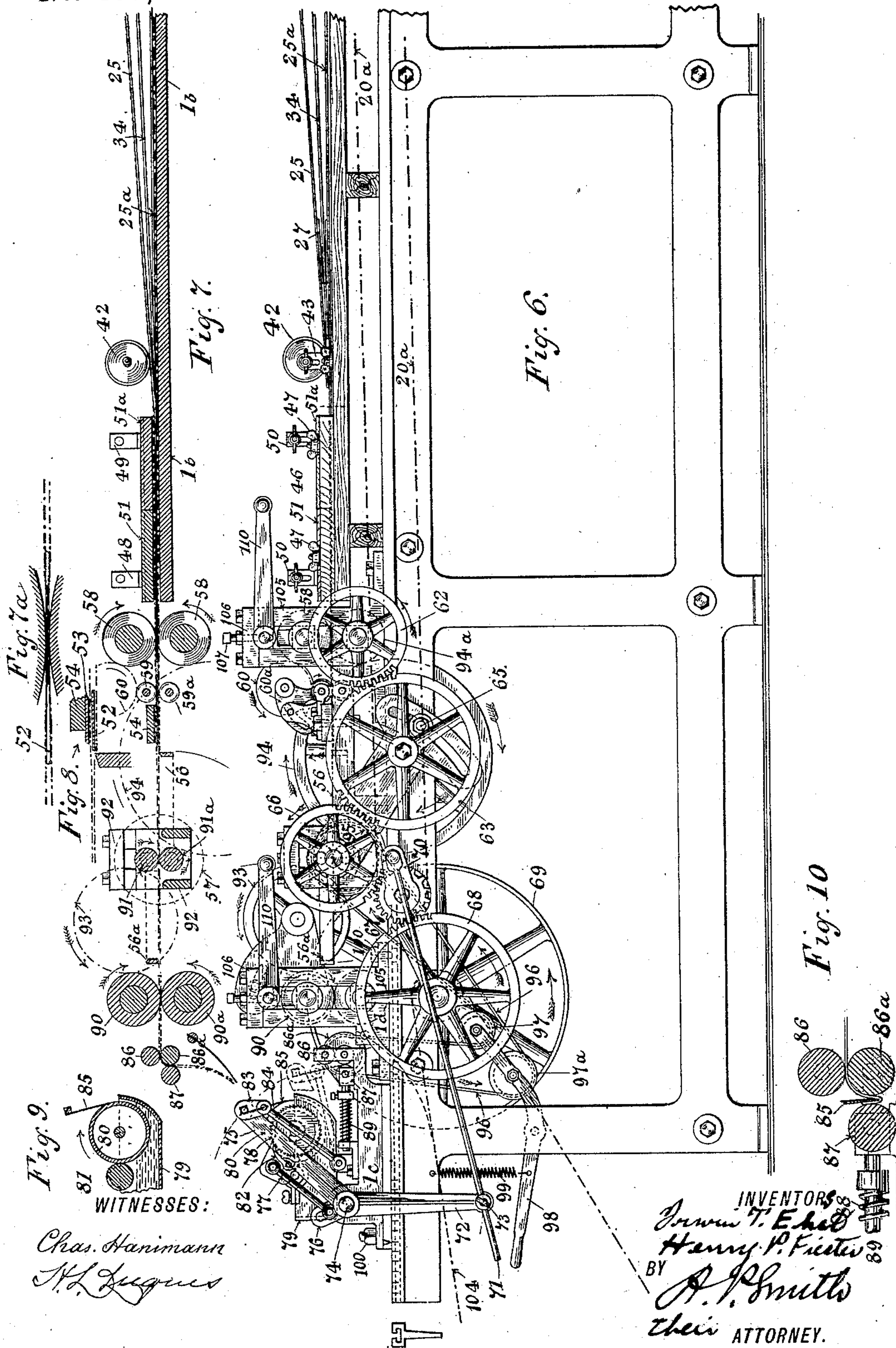
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No. 467,553.

Patented Jan. 26, 1892.

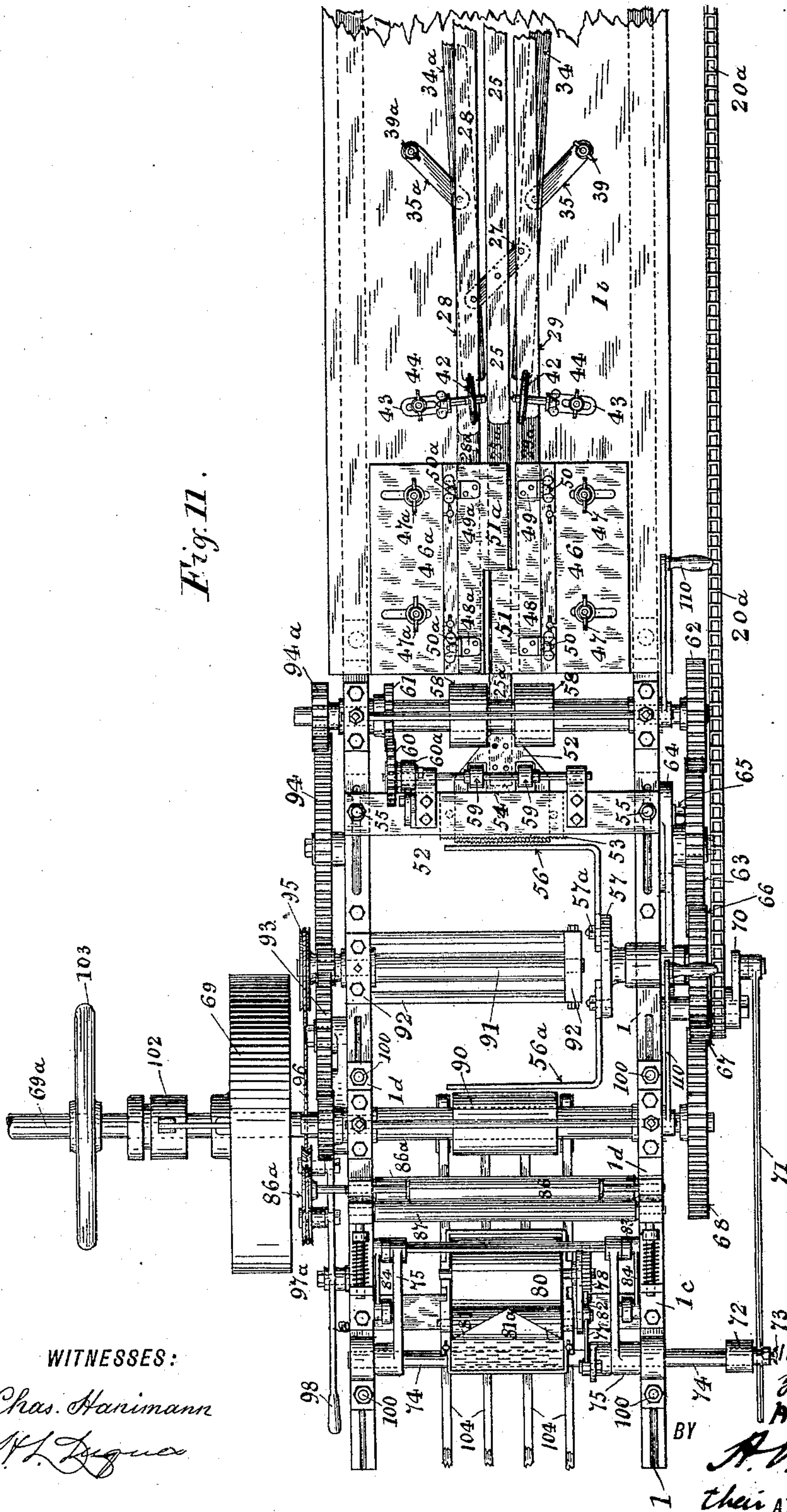


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Fig. 11.



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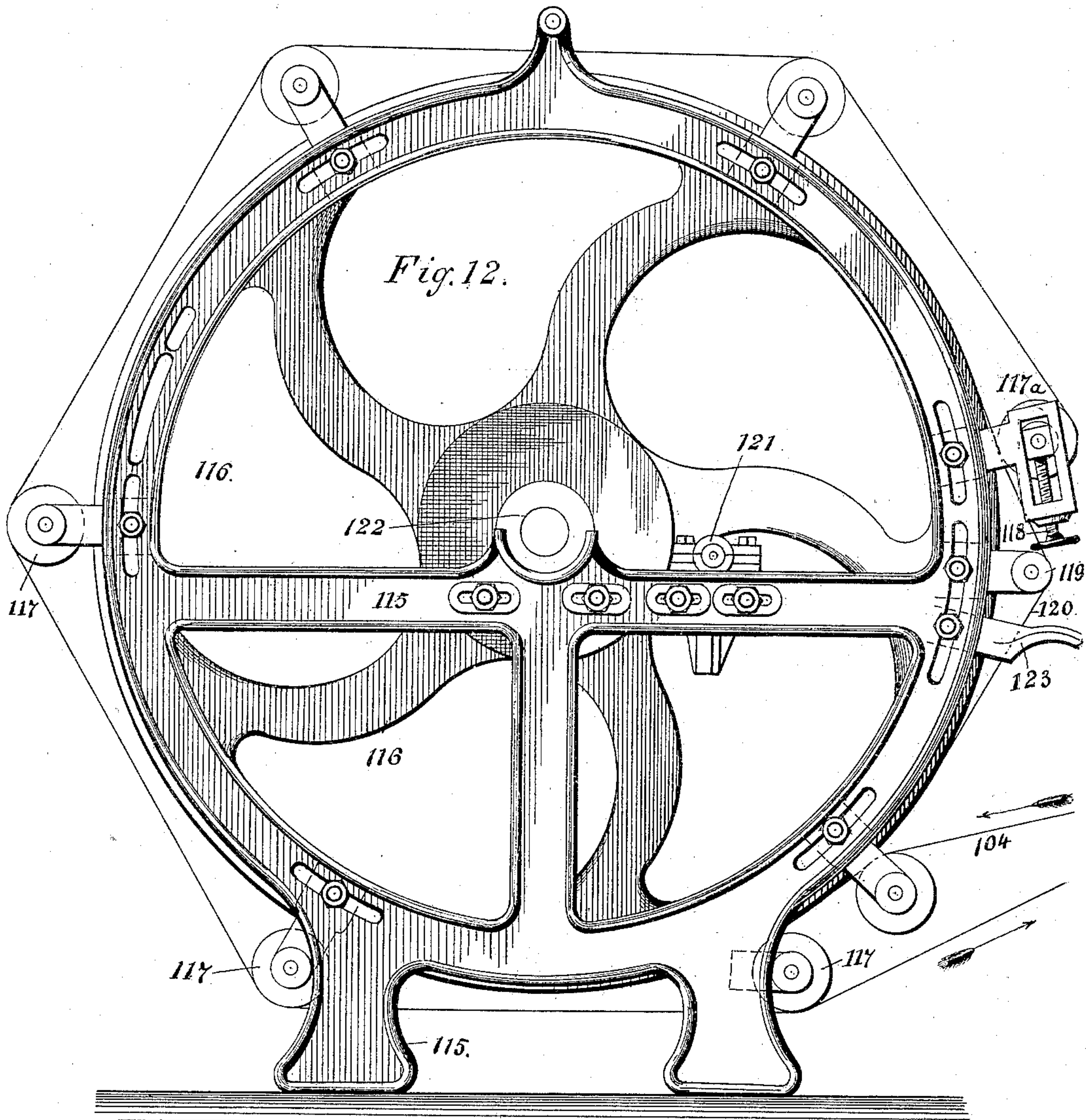
(No Model.)

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IRWIN T. EHST, OF BOYERTOWN, AND HENRY P. FIESTER, OF PHILADELPHIA,
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PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 467,553, dated January 26, 1892.

Application filed April 2, 1891. Serial No. 387,452. (No model.)

To all whom it may concern:

Be it known that we, IRWIN T. EHST, of Boyertown, in the county of Berks and State of Pennsylvania, and HENRY P. FIESTER, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Paper-Bag-Making Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention consists in the improved machine for making paper bags, hereinafter to be described and claimed.

In the drawings, Figure 1 is a side elevation of a portion of our machine. Fig. 2 is a plan view of the same. Figs. 3, 4, and 5 are cross-sectional views of the tube-former. Fig. 6 is a side elevation of the remaining portion of the machine. Figs. 7, 7^a, 8, 9, and 10 are detail sectional views, and Fig. 11 is a plan view, of the same. Fig. 12 is a side view of the drying-drum. Fig. 13 is a detail view showing the adjustment of the feed-rolls.

Among the various objections to paper-bag-making machinery as heretofore constructed may be mentioned its complication of construction resulting from the great number of moving parts and the great number of adjustments necessary, the fact that usually one machine can turn out only bags of one size, or that a change of many machine parts is necessary to adjust it to another size of bag, and other points of disadvantage unnecessary for us to enumerate.

To produce a machine which will be simple in construction and smooth in operation, and which will turn out a large number of bags per minute of any desired size with only a few changes of parts and a simple adjustment, we have designed the construction herein illustrated and described, in which—

1 is the main frame of the machine, carrying the tables 1^a, 1^b, &c., on which parts of the machinery are mounted.

2 is a frame supported on the table 1^a and having bearings for the shaft 3 of the paper-roll 4, the shaft 16, to which the smoothing-band 6 and weight 7 are attached, the cross-

slide 13, the shafts of the printing apparatus, and that 10^a of the breaker-wheels 10, 15, and 10. This frame 2 also supports the cross-piece 12, from which the tube-former is hung. This cross-piece 12 is adjustable lengthwise of the machine by reason of the slots through which the bolts 17 pass.

9 is a paste-fountain, in which the paste-wheel 8^a, equal in diameter to the roll 8, revolves.

3^a is a screw adjustment of the shaft 3, by which the center line of the ribbon or web of paper may always be adjusted, so that the paper will draw evenly.

The printing apparatus is driven by the sprocket-chain 20^a, coming from a part of the machinery, hereinafter to be described, and running over the sprocket-wheel 20. On the same shaft with sprocket-wheel 20 is the printing or type wheel 21. (Indicated by a dotted circle in Fig. 1.) This type-wheel is below and in contact with the middle breaker-wheel 15, and consequently would not show clearly in either Fig. 1 or Fig. 2. All the printing apparatus is therefore omitted from Fig. 2. It consists of the type-wheel 21, journaled on the shaft 21^a, and elastically geared thereto, the ink-roller 2, the ink-fountain 23, and the wick 24. This inking apparatus is not new, and we do not include the same in our invention.

The former, about which the ribbon of paper is folded into a tube having two inward folds or accordion-plaits in the manner well known in the art, is supported from the central tongue-piece, which has a lower main portion 25^a and a shorter upper portion 25. The bolt 18 supports this tongue-piece from the cross-piece 12 and renders it capable of lateral adjustment by means of the slot 11, through which it passes. On the tongue-piece are pivoted certain links 26 26^a 27 27^a, on the outer ends of which are pivoted the inner guide-strips of the former 28, 28^a, 29, and 29^a. The rod 30 is pivoted to the link 26, and is anchored to the bolt 18 or any other suitable anchorage by the set-screws 31 31. It is evident that as these set-screws are turned in one direction or the other the links 26 and 27 will be oscillated and the inner guide-strips of the former moved after the manner of parallel rulers.

The outer guide-strips 34 and 34^a are mounted on swinging links 33 35 and 33^a 35^a. These outer strips are also adjustable after the manner of a parallel ruler, and are held in any position by the set-screws 39 39^a. The former is also capable of a limited vertical adjustment by means of the nut 18^a and the jam-nuts 32 32. The friction-wheels 36 36^a are mounted on the adjustable slotted arms 37 37^a. These wheels assist in forming the inward fold and take the friction off the strips 34 34^a, which would otherwise receive the whole of it, as shown by Figs 3, 4, and 5.

The gathering-wheels 42 42^a are mounted on the slotted angle-pieces 43 43^a. These wheels are provided with tires of some yielding material, preferably with rubber tires. The wheels are capable of vertical adjustment by means of the set-screws 45 45^a, and, together with their supports 43 43^a, can be set at any angle to the line of travel of the tube of paper on which they press by loosening and tightening the set-screws 44 44^a.

The guide-box (shown in Figs. 6 and 7) is composed of the two guide-pieces 46 and 46^a, which are capable of lateral adjustment on the table by means of the slots through which the set-screws 47 47^a pass. The floats 51 and 51^a are supported from the guide-boards 46 46^a by the lugs 48 48^a and 49 49^a, which are held together by clamps 50 50^a, as shown. By loosening the clamps these floats may be adjusted vertically to press down upon and flatten the tube of paper to a greater or less degree, as desired. The floats have corresponding projections and depressions on their adjacent sides, which mesh one with another, as shown in Fig. 11, thereby covering the paper tube at all times, while the guide-pieces 46 46^a are adjusted in or out to correspond to different widths of the tube, giving different sizes of bags. The tongue-piece 25^a projects through the first set of feed-rolls 58 and 58^a, the latter being cut away to permit this to be done, and terminates in a detachable tongue-plate 52, with a serrated edge. Over the tongue-plate is arranged the serrated knife 53 on the adjustable cross-piece 54. This cross-piece is adjustable lengthwise of the machine by means of the slots in the frame of the machine through which the bolts 55 pass, as shown in Fig. 11. There are suitable openings in the tongue-plate 52, through which the second set of feed-rolls 59 59^a work. The double striker, which works in conjunction with the tongue-plate and serrated knife, consists of the two arms 56 56^a, which are mounted on the hub 57. They are attached to that hub by bolts and nuts 57^a. When desired, they can be adjusted to revolve with greater or less radius, according to the length of bag to be struck off.

Additional sets of feed-rolls are represented by 91 91^a, 90 90^a, and 86 86^a. The gearing of these rolls and of the machine generally is as follows: The belt-pulley 69 gives motion to the main shaft 69^a through the clutch

102. On the main shaft is keyed the gear 68, which meshes with the pinion 67, which in turn meshes with the gear 66 on the same shaft with the hub 57 of the striker. The adjustable arm 64 swings about the axis of the striker-shaft and carries the intermediate gear 63, which meshes with the gear 62 on the driving member 58^a of the set of feed-rolls 58 58^a. The free end of the arm 64 is supported in any position by the bolt 65, passing through a slot therein. There are a large number of change-gears 62 of different diameters, and by using different ones the feed-rolls may evidently be given different speeds of rotation, while the double striker 56 56^a revolves at a constant speed. The various sets of rolls 58 58^a, 59 59^a, 91 91^a, 90 90^a, and 86 86^a, making up the system of feed-rolls, must of course all revolve at the same circumferential velocity. This is accomplished by means of the system of gearing which we will now describe. The gear-wheel 61 on the axis of the roll 58 meshes with the intermediate gear 60, which transmits motion to the roll 59. Gear 60 is mounted on the adjustable arm 60^a, so that it may continue in mesh with the other members of the train, while the roll 59 moves back and forth with the adjustable cross-piece 54, to which it is attached. In the same way the gear 94^a on the roll 58^a meshes with the intermediate gear 94, which in turn meshes with a pinion on the roll 91^a. Motion is thus transmitted to the rolls 91 91^a, which are journaled in the bracket 92, as shown in Fig. 11. Another intermediate gear 93 again transmits motion to the roll 90 from the roll 91, and the belt 96, running over the grooved pulley 95 on the shaft of the roll 91^a, transmits motion to the roll 86^a by running over the grooved pulley 86^b on the shaft of said roll. This belt 96 is kept taut by the idler-pulleys 97 97^a on the lever 98. These idlers are pressed downward by the spring 99. In this way the five sets of feed-rolls 58 58^a, 59 59^a, 91 91^a, 90 90^a, and 86 86^a are connected together in one system, and all revolves with the same circumferential velocity, and it is also clear that a change of gear 62 on roll 58^a will change the speed of the entire system.

The bottom folding and pasting apparatus consists of the knife 85, journaled in the arms 75 of the bell-crank 74, and the roll 87 spring-pressed against the roll 86^a by the springs 88, encircling the rods 89. The other arm 72 of the bell-crank is adjustably connected to the pitman 71 by the set-screw 73. The pitman 71, being operated by the crank 70, is given two reciprocations for every revolution of the striker. The knife 85 is guided by the links 83, which are connected to the arms 75 of the bell-crank and to the swinging links 84, which latter oscillate about a center eccentric to that of the bell-crank 74. The result of this arrangement is that at the upper limit of its stroke the knife is brought in contact with the paste-roll 80 and at the lower limit of its stroke is introduced between the rolls 86^a and

87, as shown in Fig. 10. The paste-roll 80 revolves in the paste-fountain 79 and is in contact with the V-shaped raised surface 81^a of the doctor-roll 81. Thus a longer or shorter element of contact is presented by the doctor-roll to the paste-roll and more or less paste scraped from the latter. The slotted arm 76 on the bell-crank conveys motion to the ratchet motion 78 through the link 77. The pawl 82 in said ratchet motion is reciprocated thereby and gives the paste-roll a fraction of a turn for every reciprocation of the knife 85. The whole of this bottom folding and pasting apparatus is supported on the adjustable carriage 1^c, which, together with the similarly-arranged carriage 1^d, which carries the rolls 90 90^a, can be moved backward or forward as the striker - arms 56 56^a are lengthened or shortened. They are held in any desired position of adjustment by the bolts and nuts 100.

The tapes or belt 104 take the finished bag as delivered from the machine and carry it to the drying-drum 116. This drum is journaled in the frame 115. It is hollow and is supplied with steam through the hollow shaft 122. The belt 104 runs around the drum and back over the idlers 117. The first idler 117^a is adjustable by means of the screw 118, so as to take up the slack of the belt or tapes. A second belt 120 runs around the drum and over the idler 119, thereby insuring the delivery of the bags onto a table (not shown) supported by the arms 123. Rotation is given to the drum through the shaft 121 and gearing. (Not shown.)

The adjustment of pressure between the rolls of any one set is secured through the construction shown in Fig. 13 or its equivalent. The rolls are mounted in a housing 105, having a cap 106. The upper roll 58 is journaled in suitable bearings 112. Upon the upper bearing or upon a block 111 resting thereon bears a toe or projection 108^a on the shaft 108. When this shaft is turned by means of the crank 110, so that the toe 108^a does not press on the bearing, as shown in dotted lines, the rolls do not bite together. Otherwise they are forced together with a pressure determined by the adjusting-screw 107, which is held in place by the jam-nut 107^a.

Springs may be used at various points to give spring-pressure in place of the detachment resulting from the construction illustrated. When the clutch 102, Fig. 11, is thrown out of gear, the machine may be turned by the hand-wheel 103.

The operation of our invention is the following: The end of the roll of paper 4 is led (over the roll 8, under the breaker-wheels 10, around the former over which it is wrapped, so as to form a tube, as shown in Figs. 3, 4, and 5) under the gathering-wheels 42 42^a through the guide-box to the feed-rolls. The breaker-wheels hold the center of the ribbon of paper 5 down, while the edges 5^a draw up, as shown in Fig. 1. This permits the edges to fold over, as shown at 40 41, Fig. 3. The

edge 41 has had a line of paste deposited on it by the paste-wheel 8^a, and as the tube passes under the floats 51 51^a the edges are pasted together. The outer guide-strips 34 34^a tuck in the sides, as shown in Figs. 3, 4, and 5, and the tapering former flattens the tube down to the shape of Fig. 5. The gathering-wheels 42 42^a are set at such an angle as will draw the edges 40 and 41 together and cause them to overlap the proper amount before the pressure of the floats 51 51^a paste them. The tube of paper passes out over the tongue-plate 52, and then the striker 56 comes up and severs a portion sufficient for a bag length. As the knife 53 is withdrawn farther than the edge of the tongue-plate it cuts the upper side of the remaining continuous paper tube short and leaves the under side projecting in the form of a short flap. Each severed portion of tubing is forwarded by the rolls 91 91^a and 90 90^a to the last set 86 86^a. As the flap on the end of the tube appears through these last rolls, the knife 85 comes down loaded with paste, smears it on this flap, doubles it over, and forces the bight between the rolls 87 and 86^a. These draw the bag downward, sealing its bottom, and drop it on the tapes 104. These carry it around the drum on which it is dried, and from which it is delivered into any proper receptacle. The striker-arms 56 56^a are so adjusted radially that the distance between them is just equal to a bag length. Consequently as one arm is cutting off a bag the other is passing down between the front end of this bag and the rear end of its predecessor and does not interfere with the onward progress of the succession of bags. By causing the rolls 90 90^a to revolve at a slightly-higher rate of speed than the preceding sets and making the distance between arms 56 and 56^a a little more than a bag length, an open space for the passage of the idle striker is assured. The knife 85 on returning to the paste-roll 80 finds the latter turned slightly, so as to offer a paste-covered surface, from which a new load is taken up by the knife. The type-wheel 21 makes one revolution for every bag length as it is driven by the sprocket-chain 20^a, which runs over a wheel on the same shaft with the gear 67, so that every bag length has its size, &c, printed on one side. When bags of a smaller size are to be made, the gear 62 on feed-roll 58^a is changed to a larger one, so that the entire system of feed-rolls will run at a slower speed. The striker-arms are adjusted to a shorter radius. The rolls 90 90^a and the bottom-folding apparatus are moved forward so as to have the same position relative to the striker. The cross-pieces 54 and 12 are moved down, so that the serrated knife 53 and the tongue-plate 52 will also have the proper adjustment relative to the striker. The screws 31 are turned a sufficient amount to contract the former to the desired size. The outer guide-strips 34 and 34^a and the side pieces 46 46^a of the guide-

box are given a corresponding lateral adjustment. The slide 13 is moved over, as indicated in dotted lines in Fig. 2, so that the paste-wheel 8^a will register with the edge of the paper, and on starting the machine the smaller-sized bags will be delivered. A new web or ribbon of paper may be introduced into the machine and between the feed-rolls by simply throwing up the cranks 110, as before explained, without rendering a readjustment of the roll-pressure necessary. The gear 93 is supported on an adjustable arm, so that it may continue in mesh with other members of the train during the shifting of the rolls 90 90^a.

The advantages of our invention lie in the simplicity of construction of the machine in which it is embodied and the consequent high speed at which it may be run and the ease with which obstacles to proper working can be removed; also, in the wide range of adjustability, whereby one machine can turn out any size of bag, and in the ease and rapidity with which such adjustments may be made. By our plan of running the striker, bottom-folder, and printing apparatus at constant speed, the feed-rolls are the only parts which need a speed adjustment, and by connecting these rolls together in one system the whole matter is reduced to the changing of one gear-wheel.

The putting of one or more sets of rolls 91 91^a within the circle of revolution of the striker insures the positive control of the bag at all times, and the use of the double-armed striker reduces the number of revolutions one-half for the same number of bags.

It should be understood that either of the sets of rolls 90 90^a or 59 59^a, or both, may be dispensed with and that various changes in the shape of the parts may be made without departing from the spirit of our invention so long as their relative arrangement and modes of operation are preserved. It is also possible and sometimes desirable to run the machine with the floats 51 51^a so adjusted that there will be little or no pressure on the tube of paper running beneath the pressure necessary to paste the edges of the paper together, not being applied until the bag goes down between the rolls 87 86^a of the bottom-forming apparatus.

Having therefore described our invention, what we claim as new, and desire to protect by Letters Patent, is—

1. In a paper-bag machine, the combination of a striker which revolves at a uniform speed and has one or more arms of adjustable radius with a system of variable-speed feed-rolls, substantially as described.

2. In a paper-bag machine, the combination of a striker which revolves at a uniform speed and has one or more arms of adjustable radius with a system of several sets of feed-rolls, which system can be adjusted to various speeds, one or more of said sets of rolls

being within circuit of revolution of the striker, substantially as described.

3. In a paper-bag machine, the combination of a striker which revolves at a uniform speed and has arms of adjustable radius, a system of feed-rolls which can be adjusted to various speeds, those sets of feed-rolls nearest the striker being also adjustable upon the bed of the machine to correspond with the lengthening or shortening of the radius of the striker-arms, and adjustable connecting mechanism through which motion is transmitted to said sets of feed-rolls, substantially as described.

4. In a paper-bag machine, the combination of a folding and pasting knife, the bell-crank on which this knife is mounted, the adjustable carriage in which the bell-crank is journaled, the driving-gear to the bell-crank, the guide-links attached to said knife, and the oscillating links which are pivoted to said guide-links and oscillate about a center eccentric to that of the bell-crank, substantially as described.

5. In a paper-bag machine, the combination, with the bag-forming device, of one or more sets of feed-rolls, adjustable journal-bearings for the upper roll of each set, a crank-shaft which has toes or projecting portions bearing on said upper journal-bearing, and adjusting-screws which regulate the pressure of said crank-shaft on said journal-bearings, substantially as described.

6. In a paper-bag-making machine, a striker having arms radially adjustable, combined with a serrated knife and a serrated tongue-plate, both adjustable to correspond to the varying radius of the striker-arms, substantially as described.

7. In a paper-bag-making machine, the combination of an adjustable tongue-piece, a former composed of guide-strips adjustable relatively to said tongue-piece, and a detachable serrated tongue-plate, substantially as described.

8. In the former of a paper-bag machine, the combination of four inner guide-strips adjustable to and from each other and the two outside guide-strips, also adjustable, substantially as described.

9. In a paper-bag machine, the combination of the central tongue-piece, four inner guide-strips mounted on parallel links pivoted to said tongue-piece, means for adjusting said links, parallel outer guide-strips mounted on parallel links, and screws for holding said last-named links in any position of adjustment, substantially as described.

10. In a paper-bag machine, the combination of the central tongue-piece, four inner guide-strips mounted on parallel links pivoted to said tongue-piece, means for adjusting said links, parallel outer guide-strips mounted on parallel links, and screws for holding said last-named links in any position of adjustment, together with the external adjustable friction-wheels, substantially as described.

11. The combination of a paste-roll, a paste-fountain, and a doctor-roll which has a V-shaped portion of its surface raised, whereby a longer or shorter element of contact is presented to the paste-roll, according to the adjustment of the doctor-roll, as and for the purpose described.

12. In a paper-bag machine, the combination of the striker having arms radially adjustable, a serrated tongue-plate, openings in said tongue-plate, and feed-rolls operating through said openings, both said rolls and

said tongue-plate being adjustable along the bed to the machine to correspond to the varying radius of the striker-arm, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

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HENRY P. FIESTER.

Witnesses:

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