

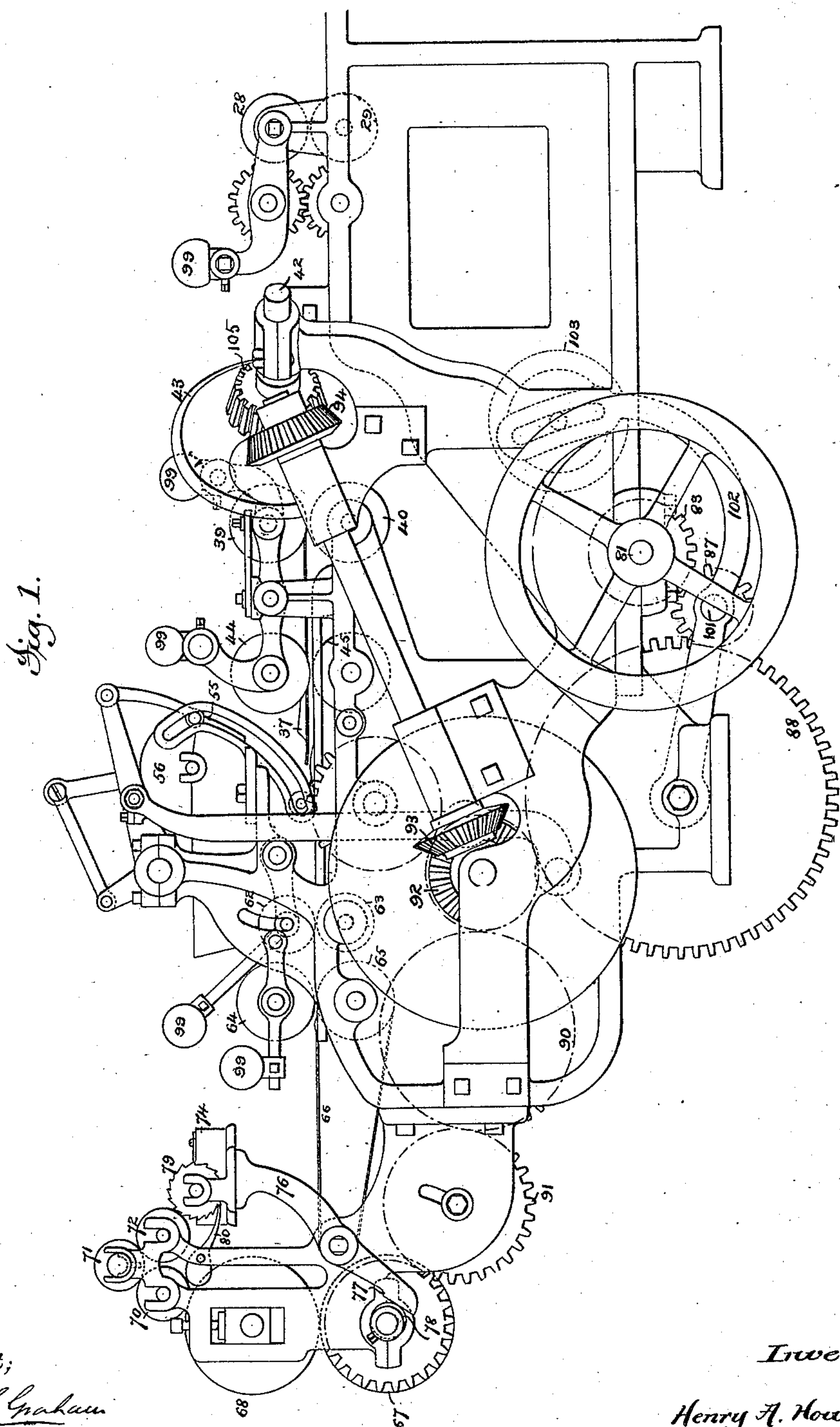
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5 Sheets—Sheet 1.

H. A. HOUSE.
PAPER BAG MACHINE.

No. 283,890.

Patented Aug. 28, 1883.



Attest,
Geo. H. Graham
A. N. Jasbera

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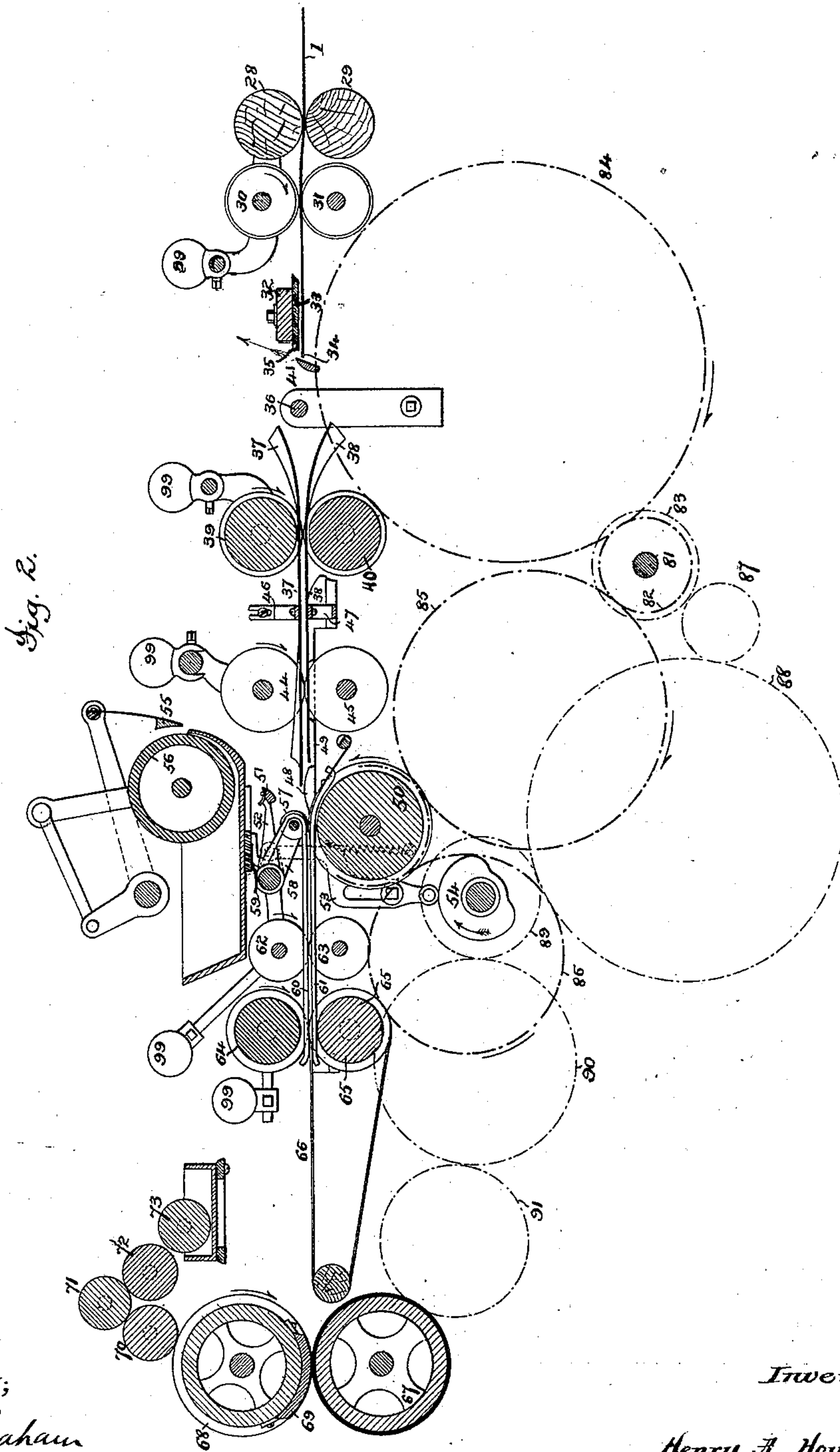
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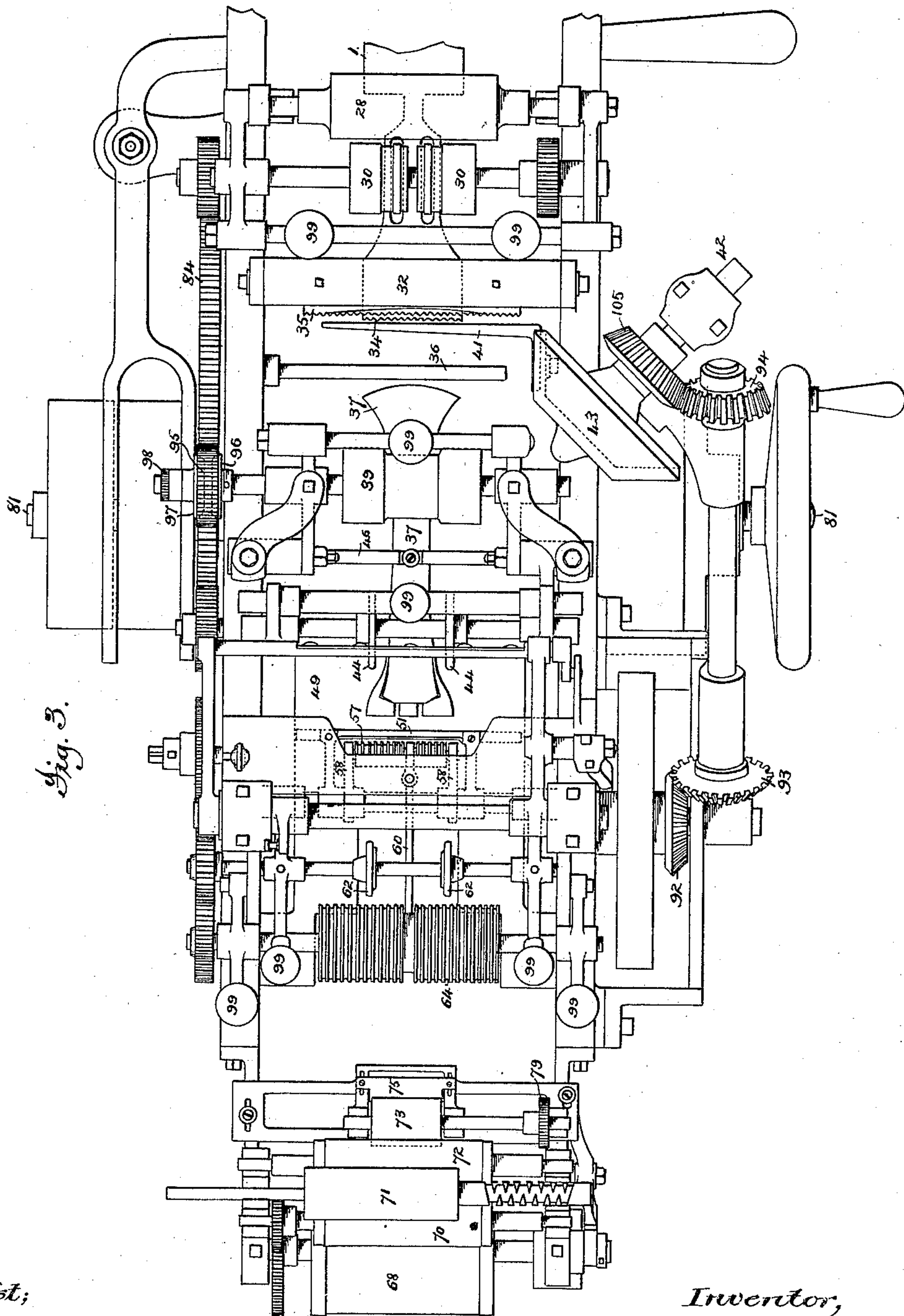
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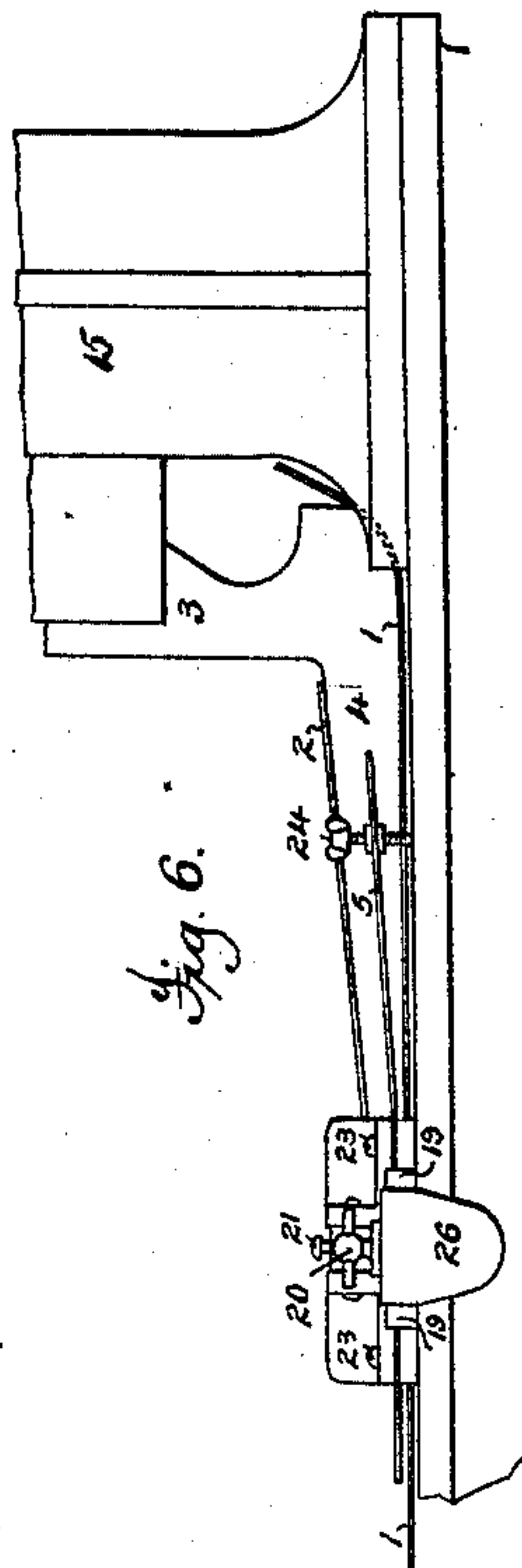
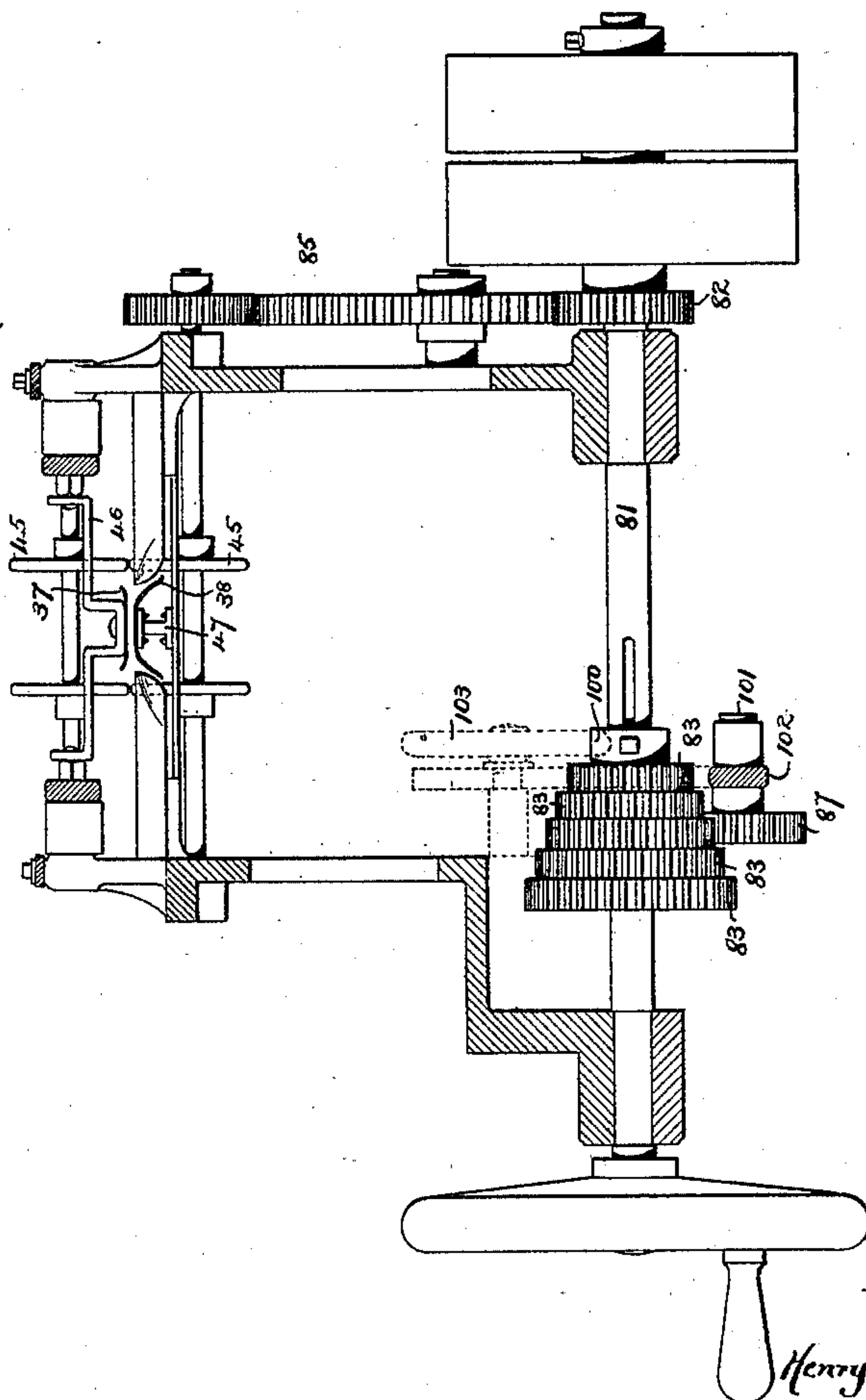


Fig. 6.

Fig. 4.



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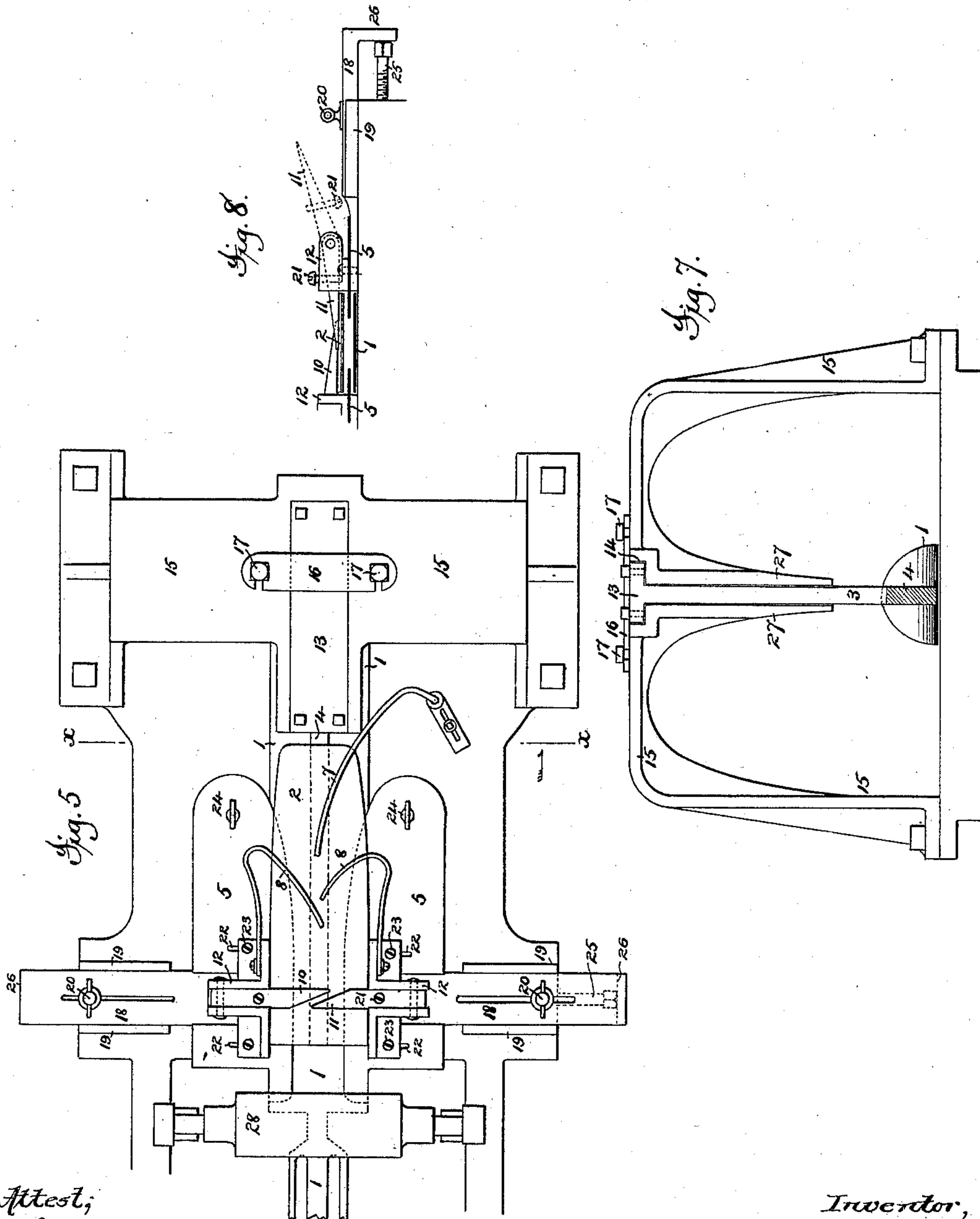
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UNITED STATES PATENT OFFICE.

HENRY A. HOUSE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE UNION
PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 283,890, dated August 28, 1883.

Application filed July 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. HOUSE, a citizen of the United States, residing in the city of Bridgeport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Paper-Bag Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The invention relates to a mechanism designed particularly for the manufacture of square-bottom paper bags of the style shown and described in United States Letters Patent No. 123,811, it being an improvement upon the machine shown in United States Letters Patent No. 38,452, when modified according to United States Letters Patent No. 138,844.

In said drawings, Figure 1 is a side elevation of a mechanism of this character embodying the present invention; Fig. 2, a longitudinal vertical section, and Fig. 3 a plan view of the same, the frame-work being omitted in the second figure and the paste-fountain and roll in the third for the sake of clearness of illustration. Fig. 4 is a transverse vertical section, showing the change-gearing by which the cutting, pasting, and printing mechanisms are operated to produce bags of various sizes. Fig. 5 is a plan view of the tube-forming apparatus. Fig. 6 is a side elevation of the same. Fig. 7 is a section upon the line *xx* of Fig. 5, looking in the direction of the arrow; and Fig. 8 is a detail to be hereinafter referred to.

In the production of bags of the style herein referred to, a web of paper of suitable width is first converted into what is known in the art as a "bellows-sided" tube—that is to say, a tube having its sides folded inward, like the sides of a bellows. The devices employed in the present case for making this tube are in their general construction substantially the same as in Patent No. 138,844, before referred to; but in their details they have been so modified as to capacitate the machine to produce tubes of different widths. This tube-forming mechanism consists, broadly, of an internal former, provided with recesses in its sides into which the paper is guided to form the bellows folds of the tube, and external guides or

fingers, which operate to fold the paper around the former and into its lateral recesses. The internal former, constructed upon this general plan, is composed in the present case of a curved lower plate, 1, and a straight upper plate, 2, the two being supported upon a pendent arm, 3, and maintained at a suitable distance from each other by a rib, 4, which extends forward from the arm 3, between the two plates, as shown in Fig. 6. Co-operating with this internal former are the side guides, 5, which extend inward and lie between the plates 1 2, as shown in Figs. 5 and 8, so as to guide the paper inward to form the bellows folds in the sides of the tubes, and the upper guides or fingers 7 8, which bring the margins of the web together upon the top plate, 2. In addition to these devices a pair of hinged fingers, 10, are provided, which rest upon or are supported in close proximity to the upper plate of the former, so as to smooth and lightly press the freshly-pasted seam in the tube. These fingers (the fingers 8) and the side guides, 5, are mounted upon brackets 12, carried upon arms 18, which move in and out between guides 19, and are provided with set-screws 20, by which they can be fixed in any desired position with relation to the internal former and moved farther apart or nearer together to co-operate with formers of different widths. The fingers 10, as will be observed, are provided with adjusting-screws 21, by which their position with relation to the plate 2 can be regulated with great nicety, and when the machine is being "threaded," or in case of a "choke," they can readily be turned back to the position shown by dotted lines in Fig. 8, so as to leave the former unobstructed. When the width of the tube is varied, the depth of the bellows-fold must of course be varied accordingly, which makes it necessary that the side guides, 5, should be so constructed that the distance to which they shall extend inward between the plates 1 2 of the internal former may be varied. To this end the guides are provided with slots 22, through which pass the screws 23, which secure the guides and the brackets 12 to the arms 18. It will readily be seen that by loosening these screws the guides can be ad-

justed so as to project to any desired distance between the plates 1 2 of the former, after which, by tightening the screws, the guides will be fixed in their adjusted position. The proper vertical position of the rear ends of the guides 5 is secured by adjusting-screws 24, which work in nuts in the guides and abut against the frame-work below. The finger 7 is also made adjustable, as shown in Fig. 5, so that its position and inclination can be varied to suit formers of various widths. When the arms 18 have been adjusted so as to bring the parts into proper position for any particular former, the set-screws 25 will be brought to bear against the downwardly-projecting portions 26 of the arms, as shown in Fig. 8. If then a choke occurs, or for any other reason it becomes necessary to free the internal former from all obstruction, the arms 18 can be moved outward, so as to draw the external guides away from the former, and again restored to, exactly the proper position without any necessity of experimenting as to adjustment. The arm 3, which supports the internal former, is provided upon its upper end with a plate or head, 13, which rests in a recess, 14, in an overhanging bracket, 15, and is held in place by a latch-plate, 16, extending across the recess 14, and held to the bracket by screws or bolts 17, in the manner clearly shown in Figs. 5 and 7, the arm 3 being held against lateral displacement by the cheek-pieces 27, which extend downward from the bracket. From this construction and arrangement it will be seen that the internal former can be readily removed and a wider or narrower one substituted, and that the external guides can be easily adjusted to co-operate with an internal former of any desired width, the result being that substantially the same mechanism is capacitated to produce bellows-sided tubes of widths suitable for the manufacture of bags of a great variety of sizes.

The operation of the mechanism just described in forming the bellows-sided tube is so well understood by those familiar with the art that a specific description thereof is unnecessary.

After being formed, and while still around the under plate, 1, of the internal former, the tube passes between pressing-rolls 28 29, which press and set the freshly-pasted seam, and feeding-rolls 30 31, which are provided with circumferential grooves, as shown in Figs. 2 and 3, so as to permit the plate 1, which is here reduced in width and slotted, to pass between them without interfering with their positive bite upon the tube. The plate 1, after passing these feeding-rolls, is restored to its full width, and extends forward a short distance, where it terminates in a cutting-edge, 34. Just back of the end of the plate 1 is a fixed transverse bar, 32, to the under side of which is secured a plate, 33, provided with a cutting-edge, 35, which lies just above and a short distance in the rear of the edge 34 of the plate

1, as shown in Figs. 2 and 3. As the tube is advanced by the rolls 30 31 its end will pass beneath the plate 33 and off the end of the plate 1, after which, as it continues to advance, it will pass beneath the transverse bar 36 and enter between the flaring guides 37 38, by which it will be guided into the bite of feed-rolls 39 40, said rolls being cut away, as shown, so as to permit the guides to pass between them and to grasp the tube only by its edges. When a sufficient length of the tube for the formation of a bag has passed the cutting-edges 34 35, the revolving striker 41, passing upward just in front of said cutting-edges, will sever the tube, leaving the bag-length so severed to be fed forward by the rolls 39 40.

In the operation of severing, just described, the under ply of the tube is severed by the edge 34 and the upper ply by the edge 35, and as the latter of these edges is somewhat in the rear of the former it results that the plies are not severed evenly, but that the lower ply of the advancing end of the tube is left extending some distance beyond the upper ply. This fact enables both plies to be pasted to the body of the bag when the bottom is formed, as will be hereinafter explained.

In the machine shown in the Letters Patent referred to the axis of the striker was arranged at right angles to the path of travel of the tube, from which it resulted that the striker, after severing a blank from the tube, was obliged to cross the path of the blank before coming into position to sever the next blank. This was very objectionable, because in so doing the striker would whip against the rear end of each blank as it was passing between the feed-rolls, and this often resulted in twisting or skewing the blanks, so that they would be improperly presented to the subsequent mechanisms, and a distorted and worthless bag was the result. It was also found objectionable to mount the striker at right angles to its axis, because in such case it is caused to sweep outward far beyond the frame of the machine, and becomes not only inconvenient but dangerous. In the construction shown in the patent referred to considerable difficulty was also experienced in adapting the mechanisms to produce bags of varying sizes. To obviate these difficulties the shaft 42, which forms the axis of the striker, is in the present case set at an angle of about forty-five degrees to the path of travel of the tube and blanks, and is provided with a conical head, 43, to which the striker itself is secured, so as to project from its axis at about the same angle, all as shown in Fig. 3. From this arrangement it results that the striker, instead of being, when at opposite points of its revolution, in planes parallel to each other, and consequently having to cross the path of the tube and blanks twice during each revolution, is, when at such points, in planes which are at right angles to each other, so that it only crosses the path of the tube and blanks once during each revolution, it passing, after per-

forming its work, around the side of the tube back to its position beneath it. After being severed from the tube the blank is advanced by rolls 39 40 into the bite of the feeding-disks 44 45, it being supported during its passage from said rolls to said disks between the guides 37 38, which are supported upon the brackets 46 47, secured to the frame-work of the machine. As the leading end of the blank, which is the end in which the fold is made to close the bottom of the bag, advances from between the feeding-disks 44 45, it will come into contact with the ridge 48, formed upon the plate 49, which spans the space between disks 44 45 and roll 50, and be deflected upward, so as to pass above the folding-bar 51, which, through the action of rock-arms 52, rod 53, and cam 54, will at that time be lowered to a position just above roll 50. When the blank has passed over the bar a sufficient distance, the blade 55, which has received paste from the roll 56, will descend and fold the projecting end of the blank between the roll 50 and bar 51, and at the same time supply paste to the fold to secure it in position. This pasting and folding apparatus is the same as that shown in United States Letters Patent No. 237,111, and for a more detailed description of its construction and operation reference is made to said patent. After the end of the blank has been thus folded it passes into the bite of rolls 50 57, and the blade 55 and bar 51 again assume the positions shown in Fig. 2. The function of roll 57 is to prevent the end of the blank just folded and pasted from springing away from the body, and also to press the fold, so as to partially set the paste. It is essential, however, that the freshly-pasted fold should be pressed only lightly at first, in order that the fresh paste may not be squeezed out from between the folds of paper, so as to smear the body of the bag and the machinery. In order that the fold may not be overpressed at this point, the roll 57 has its journals in swinging arms 58, so as to bear upon the paper only by its weight and the tension of light springs 59, which rest upon flattened portions of said arms, as shown in Fig. 2. It has also been found of great advantage to provide this roll with a series of circumferential grooves, as shown in Fig. 3, so as to leave narrow parts of the fold entirely unpressed. This permits the fresh paste to pass laterally instead of out upon the body of the bag if too much pressure is placed upon the fold. From this point the now completed bag passes between guides 60 61 and forwarding-disks 62 63 into the bite of rolls 64 65, from which it passes onto traveling tapes or cords 66. It is to be remarked that the rolls 64 65 are like the roll 57, and for the same purpose provided with series of circumferential grooves. From the tapes 66 the bag passes to a rotary printing apparatus consisting of an impression-cylinder, 67, and a form-cylinder, 68, carrying a plate or other form, 69, containing matter which it is desired to print upon each bag. After re-

ceiving the desired printed matter the bags are delivered from the machine to a drier, or in any approved manner. The form upon the cylinder 68 is inked by an ordinary form-roller, 70, which receives ink from distributing-rolls 71 72, the former of which receives an endwise movement in any ordinary manner, so as to secure a proper distribution of the ink, and the latter of which is supplied with ink from the fountain-roll 73, journaled in the fountain 74. This fountain and roll, which are provided with the usual scraper, 75, are mounted upon a pivoted carrier, 76, which, through an arm, 77, and a cam, 78, upon the shaft of the cylinder 67, is rocked so as to bring the fountain-roll periodically into contact with the distributing-roll 72 to give it a supply of ink. The fountain-roll 73 is provided with a ratchet, 79, which, as the fountain is rocked, engages with a fixed pawl, 80, so as to give to the roll a step-by-step movement and bring a new part of its surface to the distributing-roll at each oscillation. The driving-shaft 81, from which motion is communicated to the various mechanisms which operate to form the bag, is provided with a gear, 82, and a series of gears, 83, of various sizes, as shown in Fig. 4. The gear 82 engages with the gears 84 85, the former of which communicates motion to the rolls 31 40, and the latter to the roll 50, the roll 65 being in turn driven from the roll 50 through the intermediate, 86, while one of the gears, 83, through gears 87, 88, 89, 90, 91, 92, 93, 94, and 105, communicates motion to the cutting, folding, and pasting and printing mechanisms, said last series of gears being, of course, of such proportions that the said mechanisms operate uniformly. The gear 95, by which the rolls 39 40 are driven, is of such size as to give to said rolls a speed slightly greater than that of rolls 30 31, so that as soon as the tube enters into the bite of the rolls 39 40 it will be stretched taut across the space between said rolls and the rolls 30 31, which will facilitate the severing and insure a square even cut.

In order to prevent the rolls 39 40 from drawing so hard upon the tube as to tear it, the gear 95 is secured to the shaft of roll 40 by means of a friction-clutch, which can be set so that the rolls will stop when the tube is subjected to such a strain as to endanger it. This friction-clutch consists of two disks, 96 97, one of which is located on each side of the gear 95. The disk 96 is fast upon the shaft, while the disk 97 is capable of lateral movement, and is controlled by a nut, 98. From this it will be seen that the gear 95 can be clutched between these disks with any desired degree of firmness, and so as to move the roll 40 against any desired resistance.

It is to be remarked that the gears driving all of the subsequent feeding devices are so proportioned that the blanks, as they pass forward, are slightly accelerated, so as to afford small working spaces between them.

It will be observed that in all of the vari-

ous feeding rolls and disks only the under member of each pair is positively driven, the upper member in each case being driven by frictional contact. It will also be observed that the upper member is in each case journaled in a swinging frame, and held in feeding contact with its lower member by a weight or weights, 99. This system has been found very desirable, as it gives to all the rolls a yielding pressure, and at the same time makes them capable of being swung out of the way when the machine is to be threaded or has become choked.

When it is desired to change the width of the bag produced by this mechanism, it can be done, as already stated, by substituting a wider or narrower internal former and properly adjusting the other parts so as to produce a wider or narrower tube.

When the length of the bag is to be changed, the speed of the feeding devices will remain the same, but the speed of the cutting, folding, and pasting and printing mechanisms will be changed, so that a greater or less length of tube will be allowed to pass between the consecutive operations of these devices. To effect this change in the speed of the operating devices the gears 83 upon the shaft 81 (see Fig. 4) are all mounted upon a sleeve, 100, which is capable of a sliding movement upon the shaft, but is made to revolve therewith by means of a groove and feather or slot and pin, as shown. The gear 87, which connects gear 88 with one of the gears 83, turns upon a stud, 101, mounted upon a swinging arm, 102, the end of which is slotted and provided with an adjusting set-screw, 103, whereby the gear 87 can be fixed in position to mesh with either one of the series of the gears 83 when the same is moved into proper position upon the shaft 81. Thus by simply shifting the sleeve 100 a larger or smaller gear, 83, may be brought into use, and the cutting, pasting, and folding and printing devices made to revolve faster or slower so that each blank severed will contain a proportionately less or greater length of tube, which will correspondingly change the size of the bags produced.

What is claimed is—

1. The combination, with the removable internal former, of the adjustable side guides, as 5, and top guides, as 7 8, substantially as described.

2. The combination, with the removable internal former, of the adjustable side guides, as 5, top guides, as 7 8, and hinged fingers, as 10, substantially as described.

3. The combination, with the removable in-

ternal former, of the adjustable arms, as 18, carrying the side guides, as 5, and top guides, as 7 8, said side guides being adjustable upon said arms, substantially as described.

4. The combination, with the removable internal former, of the arm, as 3, and bracket, as 15, provided with cheek-pieces, as 27, substantially as described.

5. The combination, with the sliding arms, as 18, carrying the side and top guides, as 5 8, of the set-screws, as 25, for determining the position of the arms, substantially as described.

6. The combination, with the striker-shaft, as 42, of the striker, as 41, set at substantially an angle of forty-five degrees thereto, as set forth.

7. The combination, with the striker-shaft, as 42, of the conical head, as 43, and the striker, as 41, substantially as described.

8. The combination, with the feed-rolls, as 30 31, and the cutting mechanism, of the slightly-accelerated feed-rolls, as 39 40, connected to their driving-gear by a friction-clutch, all substantially as described.

9. The combination, with the feed-rolls, as 30 31, and the cutting mechanism, of the slightly-accelerated feed-rolls, as 39 40, provided with gear, as 95, held between friction-plates, as 96 97, all substantially as described.

10. The combination, with feeding mechanism, of the folding-bar and roll, as 50 51, folding-blade, as 55, and ridge, as 48, all substantially as described.

11. The combination, with the folding-bar and roll 50 51, of the pasting and folding blade 55, and the yielding grooved pressing-roll 57, substantially as described.

12. The combination, with pasting and folding mechanism, of feeding-rolls, as 64 65, provided with series of circumferential grooves, as and for the purpose set forth.

13. In a paper-bag machine, the combination, with feeding mechanism and cutting, pasting, folding, and printing mechanisms, of the driving-shaft, as 81, having the fixed gear, as 82, for driving the feeding mechanism, and the series of change-gears, as 83, and adjustable gear 87, for driving the cutting, folding, pasting, and printing mechanisms at varying speeds, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY A. HOUSE.

Witnesses:

E. P. CURTIS, Jr.,

S. D. CASTLE.