

B. F. Rice.

Paper Bag Mach.

3 Sheets.
Sheet. 3.

No 17,184.

Patented April 28, 1857.

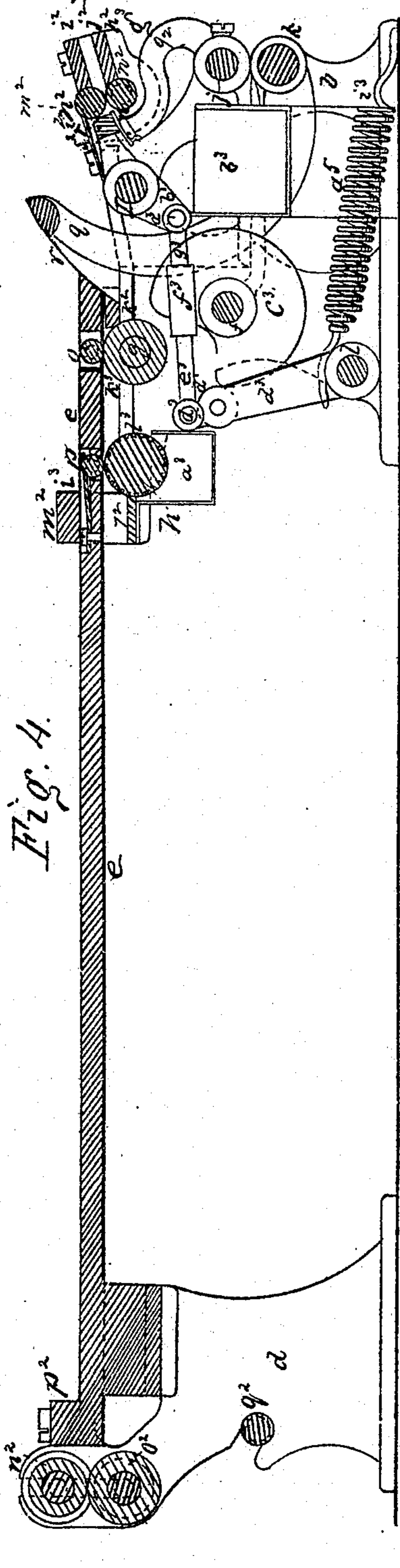


Fig. 4.

Fig. 5.



Fig. 6.



Fig. 7.



Fig. 12.



Fig. 8.

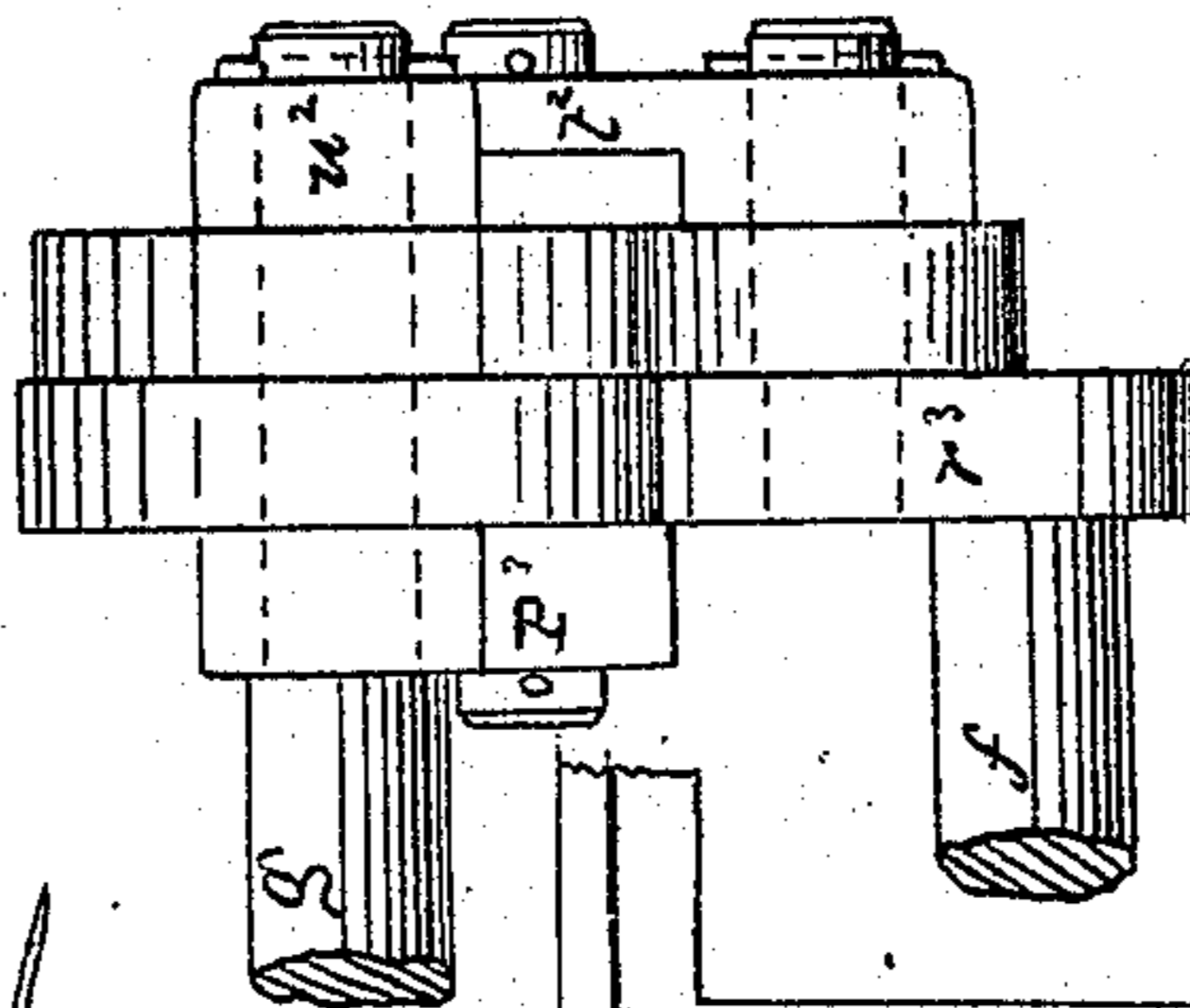


Fig. 11.

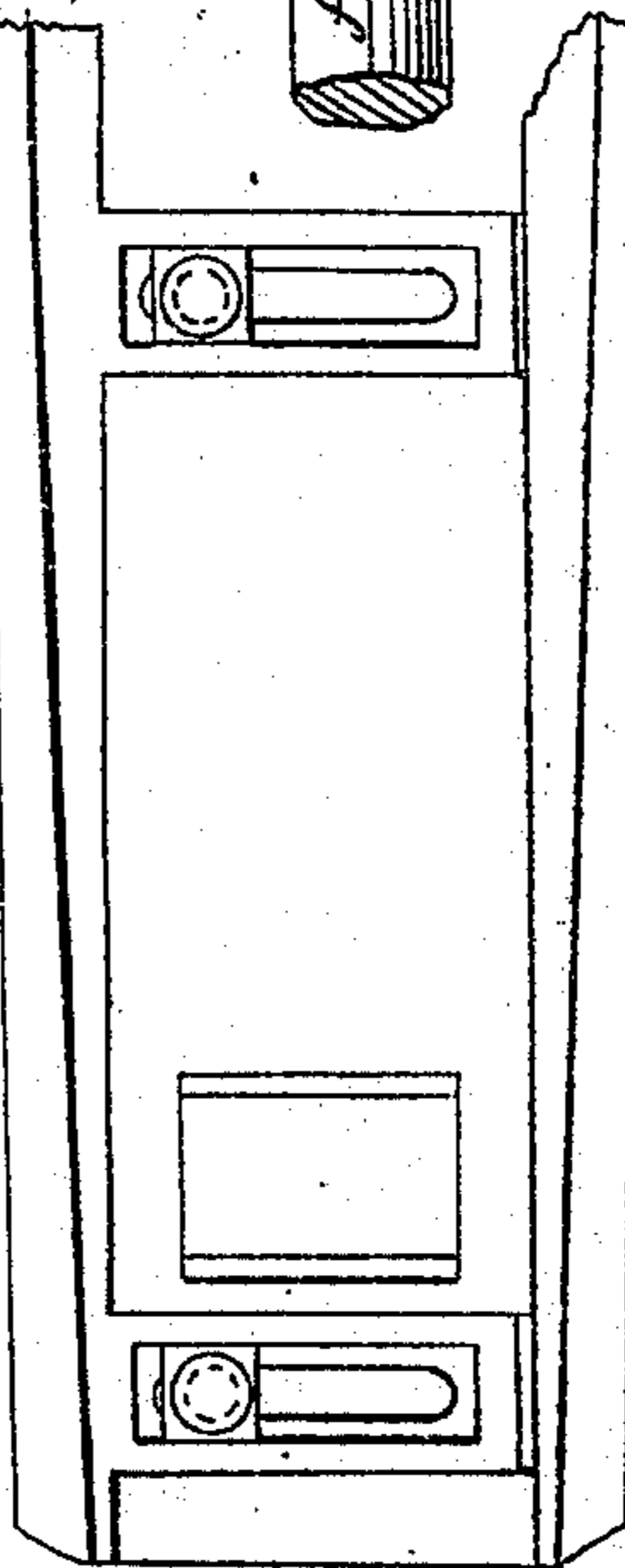
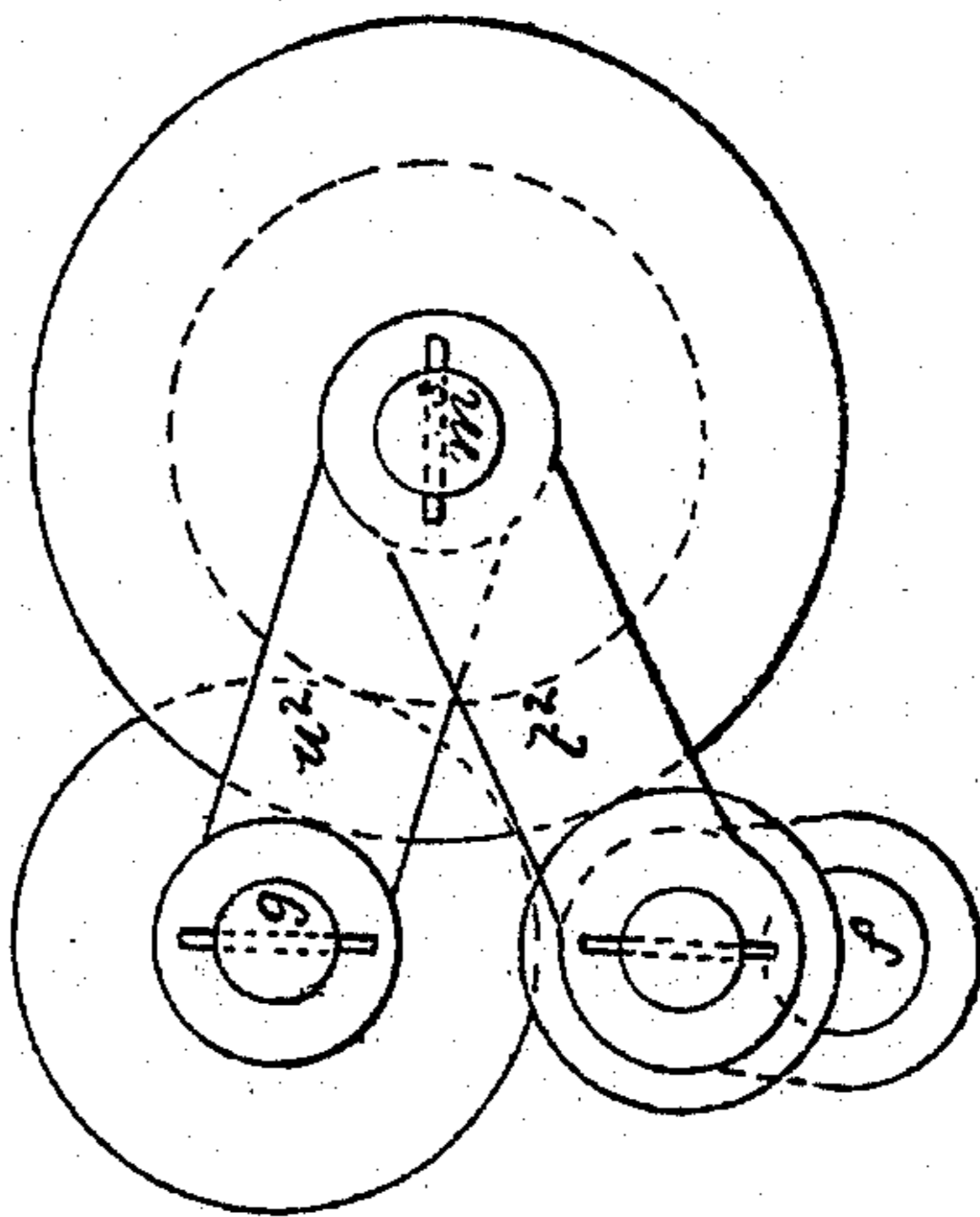


Fig. 10.



Fig. 9.



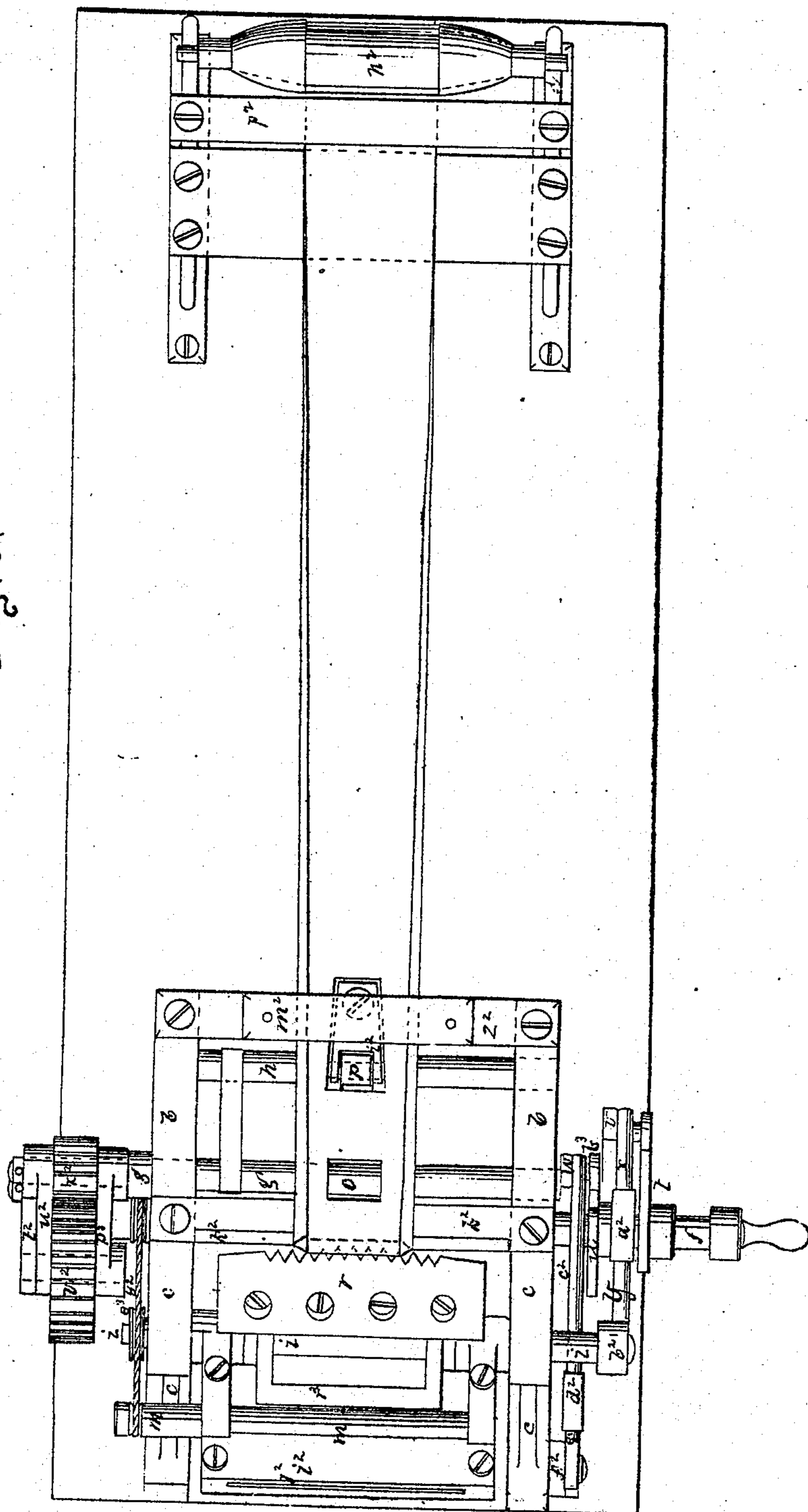
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Fig. 3.



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Fig 1.

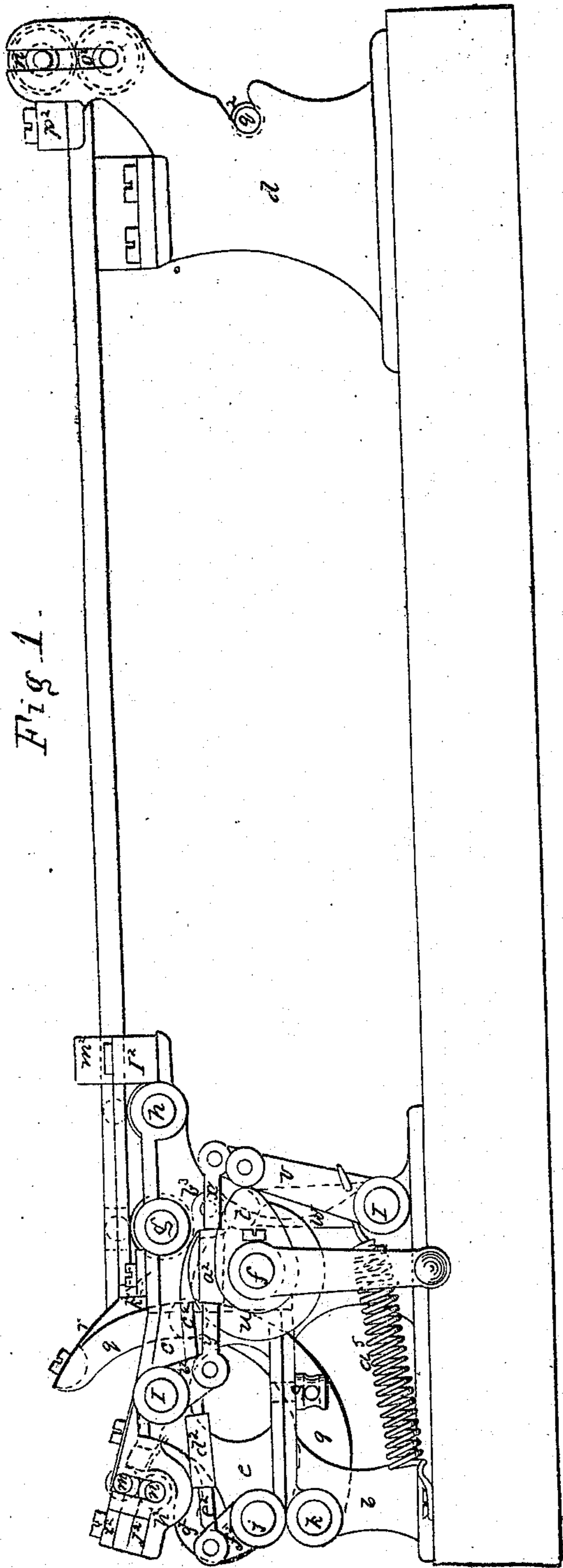
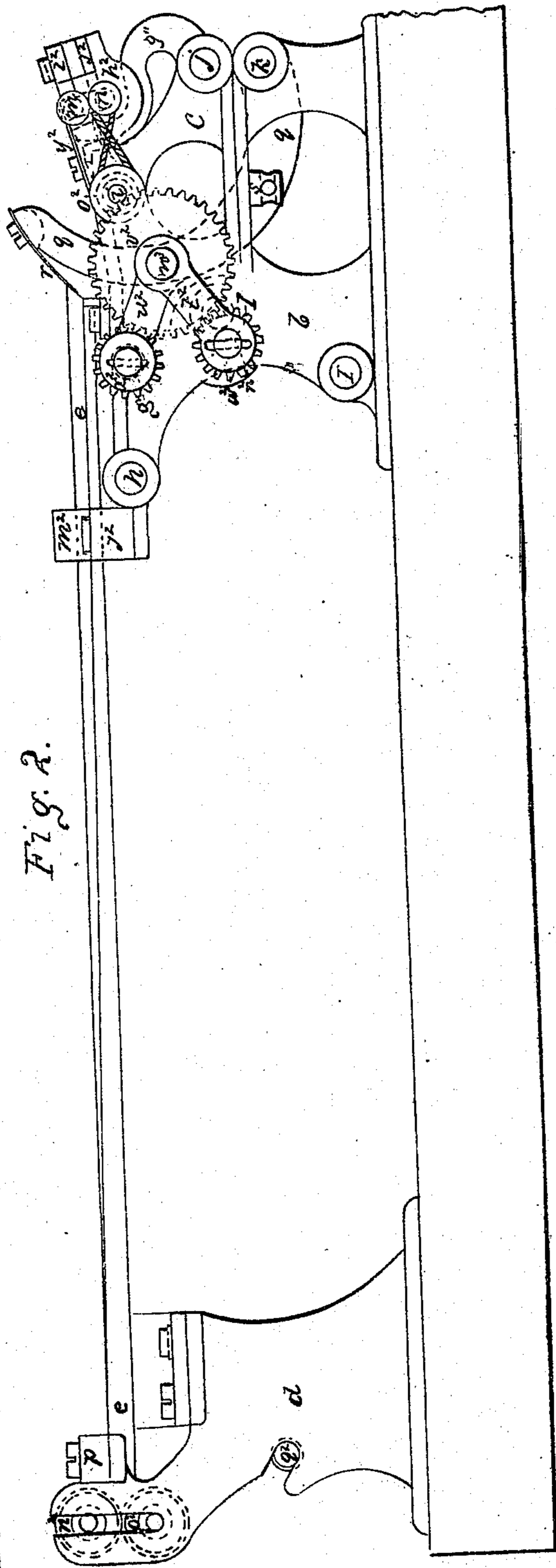


Fig. 2.



UNITED STATES PATENT OFFICE.

BENJAMIN F. RICE, OF CLINTON, MASSACHUSETTS, ASSIGNOR TO BR. SMITH
AND C. H. MORGAN.

IMPROVEMENT IN MACHINES FOR MAKING PAPER BAGS, &c.

Specification forming part of Letters Patent No. 17,184, dated April 28, 1857.

To all whom it may concern:

Be it known that I, BENJAMIN F. RICE, of Clinton, in the county of Worcester and State of Massachusetts, have invented a new or Improved Machine for Making Paper Bags, Tubular File-Slips, &c.; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1 exhibits a side elevation of the said machine; Fig. 2, an elevation of the other side thereof; Fig. 3, a plan or top view of it; Fig. 4, a vertical central and longitudinal section of it; Fig. 5, a transverse section of the tube-former e , the same being taken near the first guide p^2 , to be hereinafter described. Fig. 6 is another transverse section of said former, taken close to the guides $l^2 m^2$, (to be hereinafter explained,) and exhibits the said guide and the slot j^3 , through which one edge of the sheet of paper passes in order to keep the said edge from contact with the paster. Fig. 7 is another transverse section of the tube-former, taken near that end of it which is adjacent to the cutting-knife of the machine. Figs. 8 and 9 are enlarged edge and side views of the linked gearing for operating the feeding-rollers, the same being made to exhibit, by blue lines, the manner in which other or change gears can be applied and used so as to vary the velocity of the feed of the paper, in order to enable the machine to make bags or "file-slips" differing in length from those made by employing but three gears, the said Figs. 8 and 9 showing how four gears may be employed. Figs. 10 and 11 are respectively sectional and top views of the expanding tube-former, the same being constructed so that its width may be increased or diminished as occasion may require.

In such drawings, a exhibits the bed-plate of the machine, on which are elevated standards $d d$ for supporting a paper beam or roller q^2 and two creasing-rollers $n^2 o^2$, arranged as shown in Figs. 1, 3, and 4, the said rollers $n^2 o^2$ being constructed so that the lower one shall extend up into a space formed around and in the upper of them, as shown in Fig. 4, the length of the cylindrical part of the roller extending up into the upper roller being equal to the length of the space which receives it

diminished by twice the thickness of the sheet of paper that is to be run between the said two creasing-rollers.

When the machine is in operation, the roll of paper is wound around the roller q^2 and extends upward therefrom and passes between the creasing-rollers $n^2 o^2$, thence under a transverse bar p^2 and upon the top surface of a long bar or former e , arranged as shown in the drawings. After the paper has been extended on the former e as far as the guides $l^2 m^2$ it is bent around the said former e , so that one edge of it may lap a short distance over the other, the lapping part being extended into a curved slot j^3 , made through the lower guide l^2 , as shown in Fig. 6. The paper also passes between these guides and the former e and in a space made between the said guides and former, as shown in Figs. 4 and 6. The slot j^3 serves to keep one edge of the paper away from the paste-roller or paster l^3 , which is arranged directly in advance of the guides $l^2 m^2$ and works in a vat or paste-box a^3 . This paster or roller is made of a width just sufficient to lay upon one edge of the sheet of paper a narrow layer of size or paste, such edge of paper so pasted being pressed between a pressure-roller p and the paster l^3 . A spring i^3 serves to force the press-roller firmly down upon the paper, so as to force it in close contact with the paste-roller. The sheet of paper continuing forward has its lapping edges carried between feeding-rollers $o l^3$, by which the lapped parts of the paper are pressed together, one edge having been turned up against the other before being passed between the two rollers $o l^3$. These rollers not only perform the office of pressing the laps together, but of drawing the paper forward between the creasing-rollers $n^2 o^2$ and the former e and its guides. They also feed the paper forward or cause it to project at such distance from the front end of the former e as may be desirable to have it cut off by the knife-blade r , in order that the piece severed may be of the proper length for either a bag or file-slip, as circumstances may require.

The mechanism for operating the feed-rollers may be described as follows: The main driving-shaft f of the machine (such shaft being shown in Figs. 1, 2, 3, 4, and 8) has on one

of its ends a crank r^3 , the same being made to carry upon its wrist w^3 a gear-wheel w^2 . This gear should be fastened firmly to the wrist of the crank, so as to turn with it but not upon it when the shaft f is in revolution. The position of the gear w^2 relatively to the shaft is such that the circumference of its pitched circle may be in or very nearly in the prolongation of the axis of the shaft f . It is important that the arrangement of the pitch-circle with respect to the axis of the shaft should be borne in mind, for in consequence of it and the peculiar operation of the gears a stoppage of the feed-rollers is produced while the cutting-knife r is passing through the tube of paper; and besides this variable motions of the tube of paper on the former e are effected. The nature of these motions will be hereinafter more particularly described. The gear w^2 engages with a gear v^2 , arranged upon a shaft m^3 , connected with the wrist of the crank by a link t^2 , the shaft m^3 being also connected with the shaft g of the lower feed-roller k^3 by two links $u^2 p^3$, arranged as shown in Figs. 2 and 3. On the shaft g is a pinion x^2 , which engages with the wheel v^2 . The result produced by this combination of the crank and linked gearing is that the feed-rollers $o k^3$ are caused to remain at rest during about one-quarter of the time the crank takes to revolve; and besides this the paper is started gradually forward and its movement accelerated until one-half the required length to form a bag has been projected beyond the front end of the tube-former e . Next the forward motion of the paper will be gradually retarded during the remainder of its forward movement and before the movements of the feed-rollers are stopped. By thus gradually accelerating the forward movement of the paper I may start it at a very slow speed, so as to prevent it from being torn or injured by the inertia of the roller q^2 . I am also able to gradually arrest the motions of the rollers, so as not only to prevent the paper from being projected too far beyond the former e , but other evil consequences which might result from sudden stoppage of the feed and other rollers when at high speeds. The knife or cutter r is serrated or formed with saw-teeth, and is attached to radial arms $q q$, extending from a shaft k . A cam w^4 (shown in dotted lines in Fig. 1, and more particularly in Fig. 2) is affixed to the main shaft f , and works against a roller b' , projecting from one arm q of the knife r , such cam serving to elevate the knife and allow it to fall by its own gravity and that of the arms at such time as it may be necessary in order to cause the knife to properly operate with reference to the tube of paper. The knife makes an oblique cut through the said tube in order to leave the upper part of the tube projecting beyond the other, so as to form the bottom of the bag. In making file-slips, however, the cutter should be made to pass vertically by or at right angles to the

former e . By the term "file-slip" I mean a short tube of paper as generally used by merchants and others in filing bills or papers, they being inserted endwise into the tube or file-slip, which serves to hold them together. The cutting-knife may have the edges of each of its teeth made sharp, the bevel being on the underside of the tooth. This mode of making the knife is shown in Fig. 12.

Besides the mechanism for forming the paper into a tube and cutting it into pieces long enough to form bags, each of such pieces is operated upon by other portions of the mechanism whose office is to paste and bend down the front end of the bag so as to form its bottom and next discharge it (the bag) from the machine. For the performance of such operations I make use of a paster s^2 , a presser r^2 , and two discharging-rollers $m n$. The paster s^2 consists of a bar affixed to curved arms $g^2 g^2$, extended from a horizontal shaft j , arranged as shown in Fig. 4. This paster plays into and out of a paste vat or cistern b^4 , disposed underneath it, and is operated by means of a crank f^2 , connecting-rod $e^2 d^2 c^2$, a rocker-arm w , and a cam u . The cam is fixed on the driving-shaft f and works against a roller b^3 , applied to the side of the arm w . A spring is to be used to maintain the roller up to the cam, such a spring being shown in Fig. 1 as applied to another such arm marked U , and made to turn on the shaft l . The presser r^2 is extended from a horizontal rocker-shaft i , and is operated by a crank b^2 , a connecting-rod $y a^2 x$, the aforesaid arm U , and a cam t , operating against a roller arranged on the side of the arm U . Fig. 1 exhibits the spring a^5 applied to the arm U , and operating to maintain its roller in contact with the periphery of the cam t . The frame h^2 , carrying the rollers m and n , turns on the shaft i , (see Fig. 4,) and is operated by means of a crank-arm h^3 , connecting-rod $e^3 f^3 g^3$, an arm d^4 , (turning on the shaft d^3 ,) a cam c^3 , (affixed on the shaft f ,) and a spring b^5 , attached to the arm d^3 , as seen in Fig. 4.

In order to turn or revolve the discharging-rollers, an endless crossed band y^2 is made to work around their shafts or pulleys thereon, also around a pulley o^3 on the shaft i and a pulley on the driving-shaft. (See Fig. 3.) The frame for supporting the operative parts connected with the front part of the former e is seen at $b c$. During the movements of the cutter r , and before the bag portion is completely severed from the tube of paper, such bag portion projecting beyond the former e will be clasped between the paster s^2 and the presser r^2 , by which operation paste will be applied to the front end or part of the paper tube, which should project a short distance beyond and in front of the paster. Next the rollers m and n , with their frame, will be depressed so as to bend down the paper that projects beyond the paster and stand in a proper position to receive the bag between them when it is next moved forward. They

serve the purpose not only of closing the bottom lap down upon the pasted surface, but of discharging the bag from the machine. The rollers *m* and *n* are furnished with scraping-bars *i*² *j*², each of which has one of its edges very nearly in contact with one of the said rollers, such bars being arranged as shown in the drawings. They serve to prevent the bag from winding on either of the rollers. Immediately after the paster has performed its office of applying paste to the bag it descends into the paste-vat *b*⁴, and after receiving a fresh supply of paste rises upward into the position necessary for applying paste to the next bag.

What I claim as my invention is—

1. A combination or machine composed of machinery for bending a strip of paper around a former *e* and into a tubular form so that one edge may be lapped over the other, as described, machinery for pasting such edges or one of them and closing or pressing them together, and machinery for cutting the tube crosswise, as described.

2. The combination of machinery for bending a strip of paper around a former *e* and into a tubular shape, so that one edge may be lapped over the other, as described, machinery for pasting such edges or one of them and pressing them together, machinery for cutting the tube slantwise, as specified, while it is on the former or holder, and machinery for

pasting or cementing the said tube near its front end and bending or lapping the end of the tube on the cemented part so as to form the bottom of the bag and discharge said bag from the machine, as specified.

3. Arranging the pitch-line of the feeding-gear *w*² in or about in the prolongation of the axis of the shaft of its crank, whereby I obtain intermittent and variable motions of the paper, as described.

4. Arranging and operating the cutting-knife with respect to the former *e* so as to cause said knife to cut obliquely across the end of the former and through the tube of paper, as set forth.

5. The combination of the paster, the presser, and bending and discharging rollers or their equivalent, the whole being made to operate together substantially as described.

6. Combining with the rollers *m n* the mouth-bars or scrapers *i*² *j*², applied thereto in manner and for the purpose as stated.

7. The improved construction of the cutting-knife, viz., with a serrated edge beveled, substantially as set forth.

In testimony whereof I have hereunto set my signature this 18th day of November, A. D. 1856.

B. F. RICE.

Witnesses:

B. R. SMITH,
CHAS. H. MORGAN.