No. 640,719. Patented Jan. 2, 1900.

C. T. THOMPSON.

APPARATUS FOR COMPACTING FEATHERS INTO TUBES.

(Application filed Nov. 3, 1898.)

(No Model.) 5 Sheets—Sheet 1.

FIG. 1.

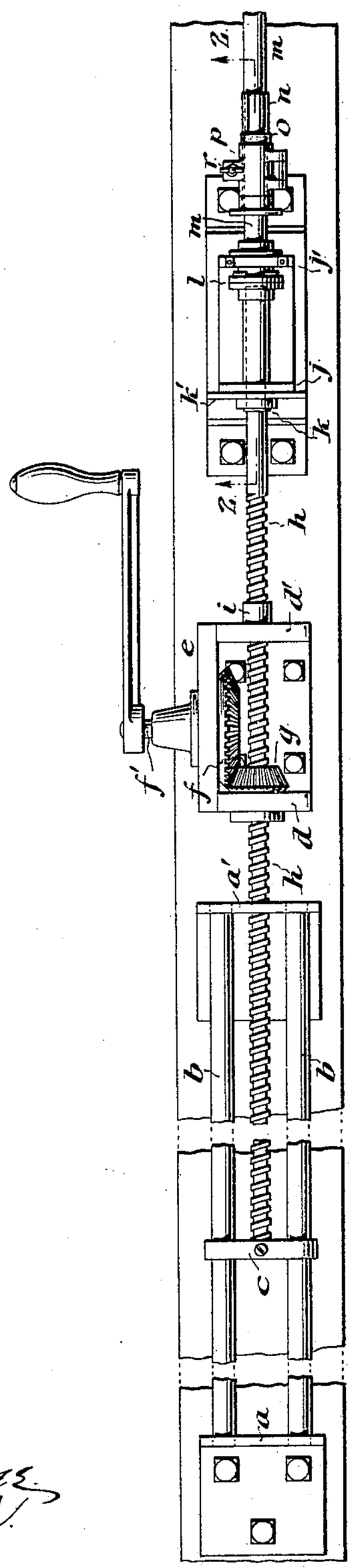
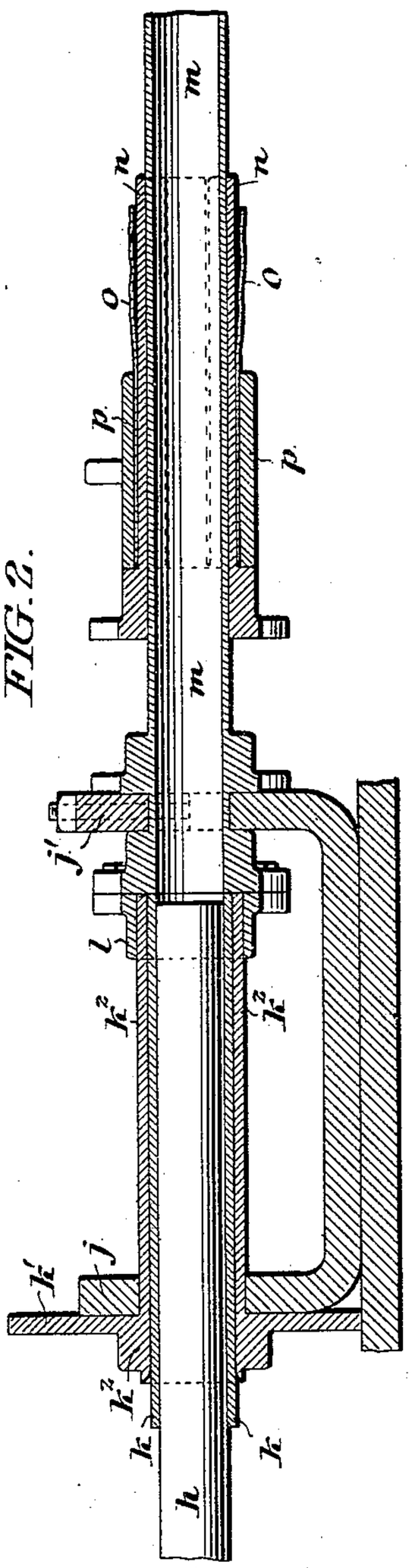


FIG. 2.



WITNESSES:

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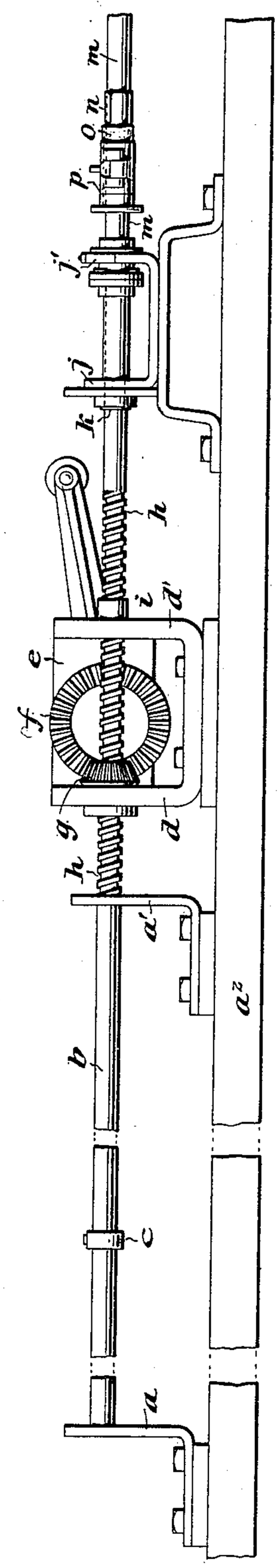
FIG. 3.



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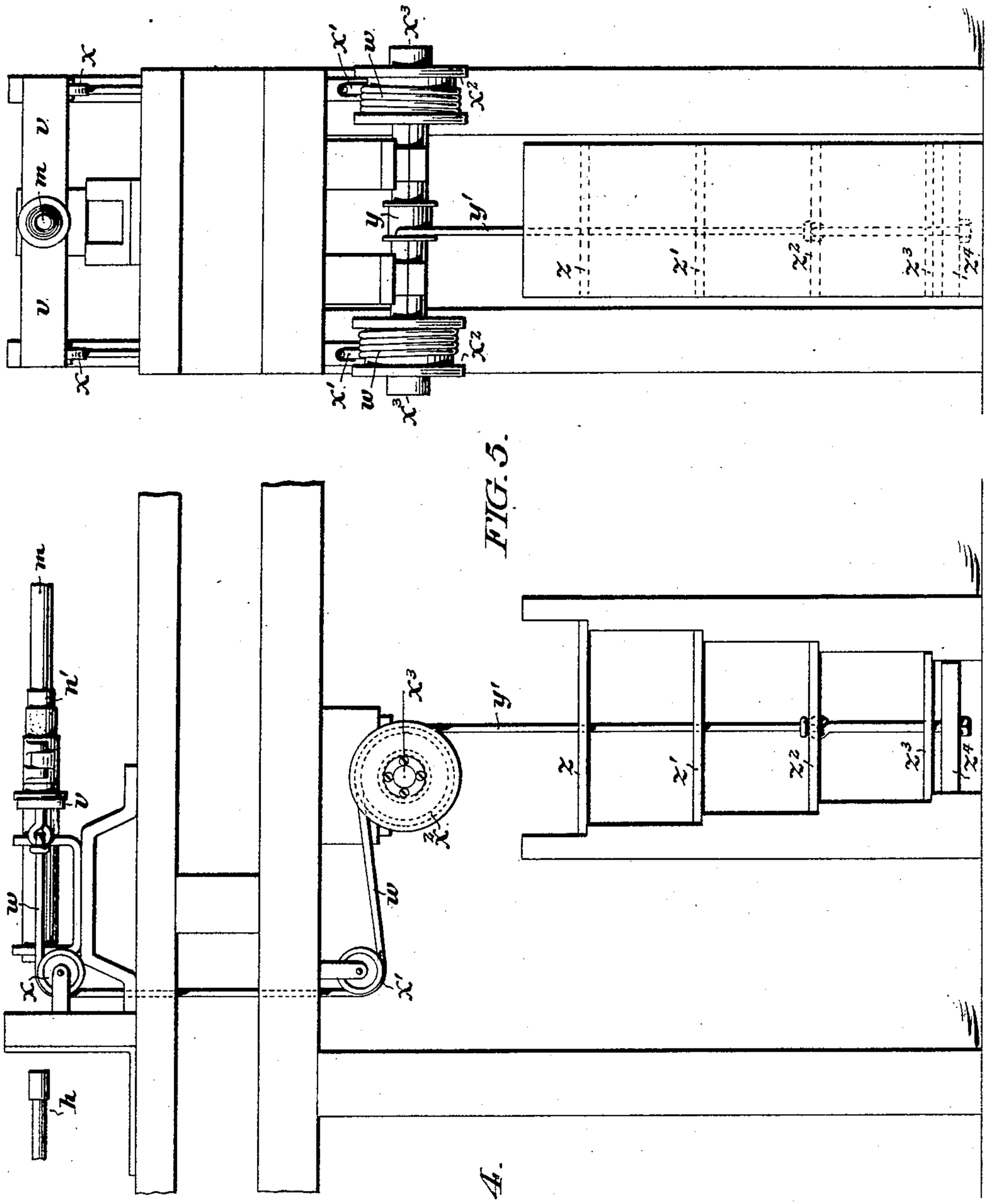

FIG. 5.

FIG. 4.

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(No Model.) 5 Sheets—Sheet 4.

FIG. 6.

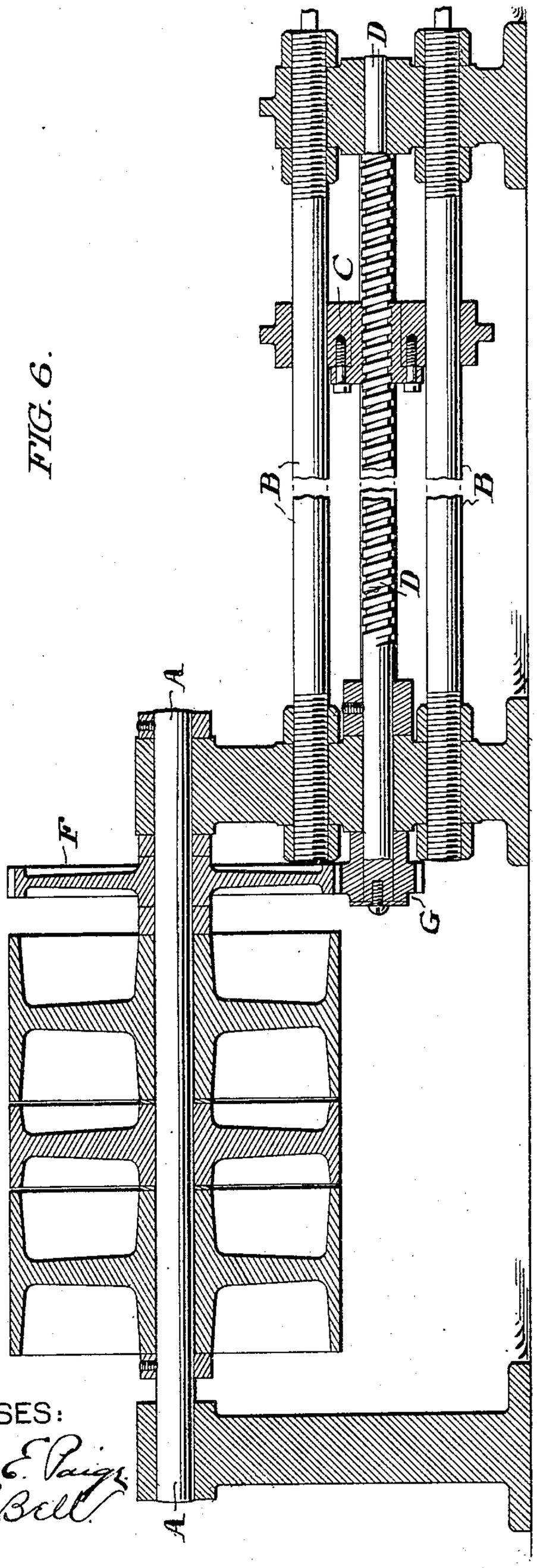

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FIG. 10.

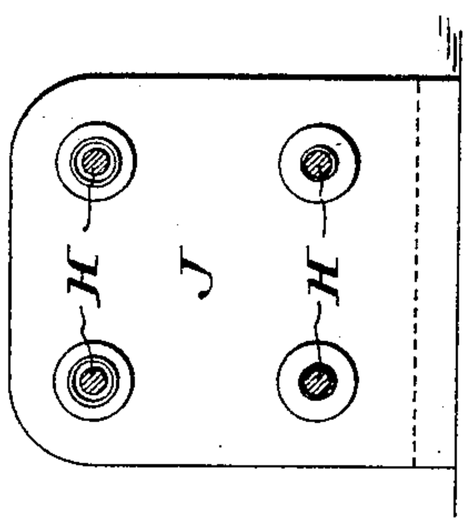


FIG. 9.

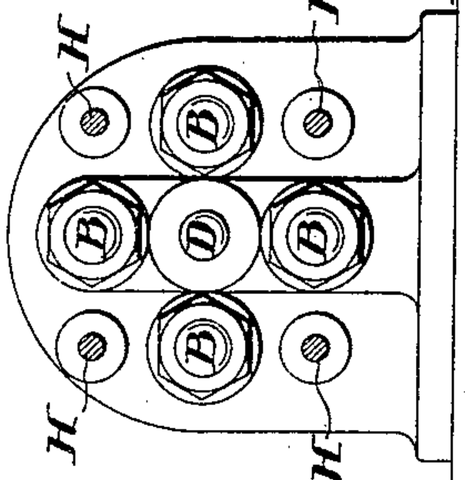


FIG. 8.

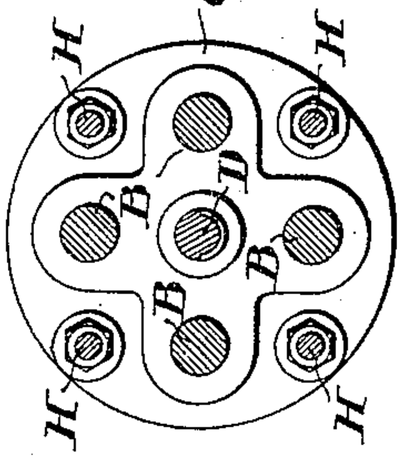


FIG. 7.

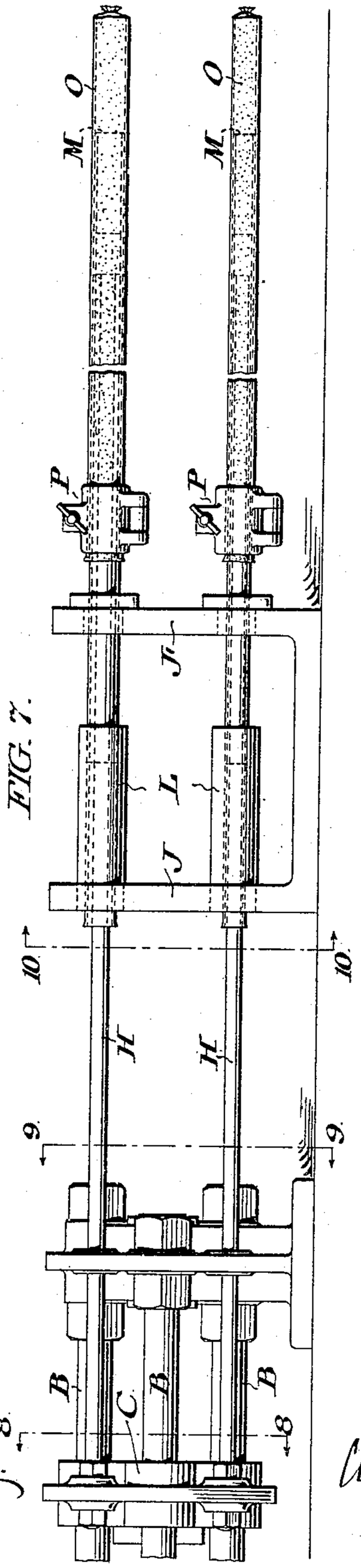


FIG. 11.

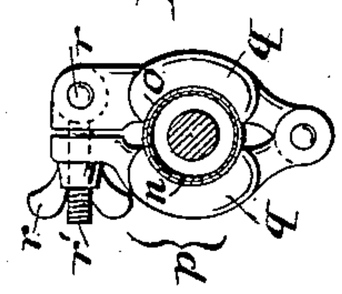
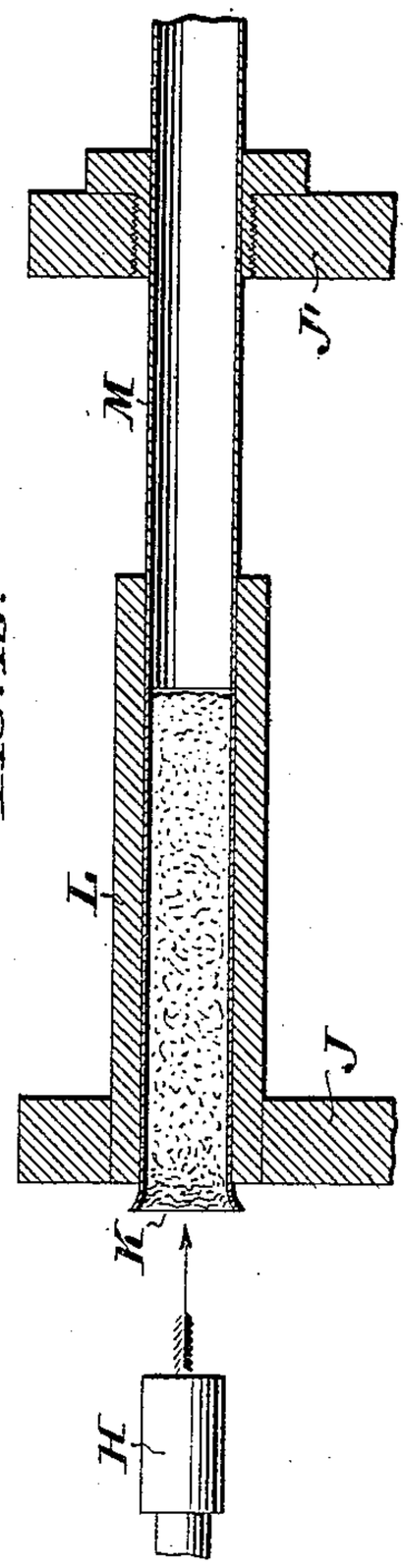


FIG. 12.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES T. THOMPSON, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR COMPACTING FEATHERS INTO TUBES.

SPECIFICATION forming part of Letters Patent No. 640,719, dated January 2, 1900.

Application filed November 3, 1898. Serial No. 695,361. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. THOMPSON, of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Apparatus for Compacting Feathers in Tubes, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to an apparatus which I use for the purpose of compacting feathers in tubes, so as to convert the tube into an elastic cushion suitable for use as or in connection with bicycle or other elastic vehicle-tires. For this purpose the tube to be packed may be either a rubber tube, such as I have shown and described in Letters Patent No. 556,247, granted to me under date of August 19, 1896, or it may be a tube of any suitable fabric, such as canvas, which, in turn, may, if desired, be used within a surrounding rubber tube, such as is used for bicycles. My invention, however, may be used for the compacting of feathers or other similar articles within cushion-tubes of any sort. In order to produce such a cushion-tube, it is necessary to compact the feathers or other similar contents within them with considerable force and also with perfect evenness, so that the contents may be a homogeneous and equally resilient mass. This my invention accomplishes.

I will describe my invention as used for the purpose of compacting feathers into a canvas tube, it being understood that tubes of other material may be used and that the contents of the tube may be some other similar substance.

In the accompanying drawings, Figures 1 and 3 represent, respectively, a plan view and a longitudinal elevation of a simple form of machine embodying my invention. Fig. 2 is an enlarged detail view, in vertical longitudinal section, of the parts to the right in Figs. 1 and 2. Figs. 4 and 5 are respectively side and end elevations of a machine slightly varying in type from the last machine, the right-hand end of the machine only being shown, there being no changes in the other parts. Fig. 6 is a longitudinal vertical section of the actuating mechanism of a compound machine embodying my invention. Fig. 7 is an elevation of the operating mechanism of the same machine. Figs. 8, 9, and 10 are cross-sections of Fig. 7 at the points respectively indicated therein by lines 8 8, 9 9, 10 10. Fig. 11 is an enlarged view of the clamp used to affix the tube which is to be packed upon the machines which have been illustrated. Fig. 12 is an enlarged sectional view of the cartridge and surrounding parts employed in the machine, showing the head of the plunger about to enter the cartridge.

I will now describe the simpler hand-actuated embodiment of my invention shown in Figs. 1 to 3.

a a' are standards bolted to a base a^2, which support between them two parallel rods b, constituting a longitudinal slideway. A cross-head c runs in this slideway.

d d' are a second pair of standards bolted to the base a^2, between which is carried at one side a longitudinal supporting-piece e, in which is journaled a shaft f', carrying a bevel-wheel f. This bevel-wheel is actuated by a crank and handle, as shown, or in any other convenient way. A bevel-pinion g, which engages the bevel-wheel f, is journaled in the standard d. It is provided with a female thread which receives within itself the long screw-threaded plunger h. This plunger is guided at its rear end by the cross-head c, while in front of the bevel-pinion g it passes through and is guided by a sleeve i, which bushes a hole in the standard d. The thread on the plunger stops some distance from the free end, so that it presents a smooth surface at that end.

In front of the parts which have been described and farther to the right in Figs. 1 and 2 is a third pair of standards j j', which are seen more clearly in the enlarged view, Fig. 3.

Concentric with the axis of the plunger h a circular hole is provided in the standard j, in which is mounted the tube k^2, provided at one end with the flange k', by which it is rigidly attached to the standard j. The mouth of the tube k^2 is flared in order to more readily permit the introduction of the cartridge k. The other end of the tube k^2, which is also open, rests within a seat l, attached to the standard j'. The cartridge k consists of a tube of proper length open at both ends.

The interior diameter of the tube k^2 is such as to permit of the free manual introduction and retraction of the cartridge k, the inside diameter of which is such as to permit of the free motion of the plunger h therethrough.

The interior of the seat l is bored out beyond the end of the tube k^2, so as to register with the head of the plunger h, and is prolonged in front of the standard j' in the form of a long metal tube m, upon which is mounted a sliding split sleeve n. The end of the canvas tube o which is to be filled is slipped over the end of the metal tube m and of the split sleeve n and is retained in place upon the latter by the clamp p. The details of this clamp are seen in Fig. 11. It consists of two halves q q, hinged together at s, having their interior surfaces bored to a circle of such diameter as to clamp the canvas tube to the sleeve n. The two halves q q are united and pressed together with any desired tension by means of the thumb-nut r working upon the screw r', which is pivoted to one of the sides q, as at r^2. The other side q is slotted to permit the passage of the screw r' therethrough.

In Figs. 1, 2, and 3 the tube o, as well as the metal tube m, is broken off, but their forms will be understood from Fig. 7, where similar tubes O are shown covering the projecting ends of metal tubes M. The ends of the tubes O are closed, and the portions extending beyond the metal tubes are shown as already filled.

The operation of the device is as follows: The tube o has its open extremity pulled over the tube m and sliding sleeve n, upon which it is firmly clamped by the clamp p. The cartridge k is filled and placed in its seat. By revolving the bevel-wheel f the pinion g, with the female thread, revolves, and the plunger h, which is thereby driven forward through the cartridge k and tube m, driving the contents of the cartridge down to the extreme end of the tube o. The plunger h is then withdrawn by reversing the direction of the motion of the bevel-gear, and a new cartridge similarly charged is inserted in place of the empty cartridge which has been withdrawn and the forward stroke of the plunger repeated. As the contents of the successive cartridges are packed at the end of the tube o the strain occasioned by the traverse of the plunger to its extreme limit of forward motion causes the tube o to pull on the split sleeve n, which then slips forward the proper amount on the tube m, so that as the tube o is charged it gradually slips off the tube m.

It is evident that the tightness of the packing of the tube o will be dependent upon the friction (adjustable in amount) which the clamp p induces between the split sleeve n and the tube m.

Under certain circumstances I have found that it is necessary that the attendant should vary the tightness with which the tube o is clamped upon the metal tube m as the operation of packing proceeds in order to produce homogeneous compression throughout, for when the tube o is drawn over the metal tube for its entire length, as is the case at the beginning of the operation, there is added to the friction of the clamp the very considerable resistance of the friction between these two tubes for their entire length. As the operation proceeds this element of resistance to the impact of the plunger decreases as the one tube slides off the other, so that unless the pressure of the clamp is varied the front end of the tube o is more tightly packed than the rest of the tube. To avoid the necessity of regulating this by hand, I may employ the apparatus shown in Figs. 4 and 5, in which the similarly-lettered parts represent parts corresponding substantially to Figs. 1 and 2. In this form the sleeve n' is the same as the sleeve n, except that it is not split so as to be capable of exerting pressure upon the tube m. Instead it is made considerably stouter, so as to be capable of resisting to some extent the pressure imposed upon it by the clamp instead of communicating it to the interior tube. This sleeve n' carries upon its left-hand end a transverse bar v. To the two ends of this bar are attached cords w, which, passing around the pulleys x x', as shown, wind around drums x^2, fast upon a transverse shaft x^3, which I have shown mounted beneath the machine. A third drum y upon this shaft x^3 has wound around it in the reverse direction a cord y, which passes down through the central aperture of a series of loading-plates z z' z^2 z^3, a still larger plate z^4 being fast to the end of the cord. The loading-plates are graduated in diameter, the largest being at the top, and they rest at intervals from each other within a frame having successive shoulders, as seen in Fig. 4, so that the upward movement of the bottom weight z^4 collects the loading-plates in succession. It will therefore be seen that at the commencement of the operation of filling a tube the only resistance to the thrust of the plunger, in addition to the friction between the tubes, is that of the weight z^4, which by its downward pull on the cord y' tends to wind the cord w around the drum x^2 against the thrust of the plunger. As the filling of the tube proceeds the weight z^4 is gradually raised, lifting successively the loading-plates z^3, z^2, z', and z, the additional load being so calculated as to counterbalance the decrease in friction between the tubes, resulting in the even compacting of the feathers throughout the operation.

I will now describe a more complex embodiment of my invention as it is shown in Figs. 6 to 12, inclusive. The shaft A carries a set of fixed and idle pulleys, also a spur-wheel F, which drives a pinion G, rigidly mounted upon the screw-threaded shaft D. The threaded portion of this shaft revolves in a female thread provided in the cross-head C, which is guided by the rods B B. An enlarged front view of this cross-head is seen in Fig. 8, showing in cross-section the central

threaded shaft D, the four guide-rods B, and the four plungers H, which are attached to this cross-head and project in front of it.

In Fig. 9 will be seen a front view of the upright support which carries the front ends of the rods B and the journal of the shaft D. Through this support pass the plungers H, being guided thereby.

Immediately in front of the parts just described are the upright standards J J'. The standard J (see Fig. 10) has four circular holes, each one concentric with the axis of one of the four plungers. Each aperture is fitted with a sleeve L, (see Fig. 12,) which forms the seat of a metal cartridge K, the mouth of which is flared in order to more readily receive the head of the plunger H, which is slightly smaller in diameter than the inside diameter of the cartridge K, which is open at both ends. From the other end of the sleeve L a long metal tube M, registering with the cartridge, projects forwardly, supported additionally by the standard J'. For each of the four plungers there are four corresponding metal tubes and cartridge-seats.

Held over the projecting ends of the four metal tubes by the clamps P are the tubes O, which are to be packed, the arrangement being similar to that previously described, except that the tubes O are here clamped directly upon the metal tubes without the interposition of any split sleeve.

In order to effect the reciprocation of the plungers, any automatic reversing device may be provided. I have shown fixed and idle pulleys in Fig. 6 to produce this effect, by which the shaft D is caused to alternately revolve in different directions, giving to the cross-head C a definite reciprocating stroke.

The operation of the device just described is similar in all respects to that first described, except that four tubes (which may be of the same or different diameters) are packed at once.

Having thus described my invention, I claim—

1. In an apparatus for compacting tubes with feathers, the combination of a reciprocating plunger of uniform stroke; a series of cartridges open at both ends and corresponding in internal diameter with the head of the plunger; a metal tube many times the length of one of the cartridges and similarly corresponding in diameter with the head of the plunger; means whereby said metal tube is held within the path of the reciprocation of the plunger; means whereby the cartridges may be successively placed and temporarily held in front of and in registration with the end of the metal tube which receives the plunger; and means whereby the open end of a flexible tube, the other end of which is closed, is permitted to slide resistingly off the metal tube as it receives the contents of the successive cartridges under the impact of the strokes of the plunger, substantially as set forth.

2. In an apparatus for compacting tubes with feathers, the combination of a reciprocating plunger of uniform stroke; a series of cartridges open at both ends and corresponding in internal diameter with the head of the plunger; a metal tube many times the length of one of the cartridges, and similarly corresponding in diameter with the head of the plunger; means whereby said metal tube is held within the path of the reciprocation of the plunger; means whereby the cartridges may be successively placed and temporarily held in front of and in registration with the end of the metal tube which receives the plunger; a clamp whereby the open end of a flexible tube is clamped around the outside of the metal tube; and means for regulating at will the pressure of said clamp, substantially as set forth.

3. In an apparatus for compacting tubes with feathers, the combination of a reciprocating plunger of uniform stroke; a series of cartridges open at both ends and corresponding in internal diameter with the head of the plunger; a metal tube many times the length of one of the cartridges, and similarly corresponding in diameter with the head of the plunger; means whereby said metal tube is held within the path of the reciprocation of the plunger; means whereby the cartridges may be successively placed and temporarily held in front of and in registration with the end of the metal tube which receives the plunger; a sleeve running on said metal tube; means for affixing the open end of a flexible tube to said sleeve; and means, such as a weight and cord, whereby the advance of the sleeve over the metal tube is resisted, substantially as set forth.

4. In an apparatus for compacting tubes with feathers, the combination of a reciprocating plunger of uniform stroke; a series of cartridges open at both ends and corresponding in internal diameter with the head of the plunger; a metal tube many times the length of one of the cartridges, and similarly corresponding in diameter with the head of the plunger; means whereby said metal tube is held within the path of the reciprocation of the plunger; means whereby the cartridges may be successively placed and temporarily held in front of and in registration with the end of the metal tube which receives the plunger; a sleeve running on said metal tube; means for affixing the open end of a flexible tube to said sleeve; a cord or cords affixed to said sleeve and winding at the other end around a drum; and a reversed cord on the same drum, the free end of which carries a weight, substantially as set forth.

5. In an apparatus for compacting tubes with feathers, the combination of a reciprocating plunger of uniform stroke; a series of cartridges open at both ends and corresponding in internal diameter with the head of the plunger; a metal tube many times the length of one of the cartridges, and similarly corre-

sponding in diameter with the head of the plunger; means whereby said metal tube is held within the path of the reciprocation of the plunger; means whereby the cartridges may be successively placed and temporarily held in front of and in registration with the end of the metal tube which receives the plunger; a sleeve running on said metal tube; means for affixing the open end of a flexible tube to said sleeve; a cord or cords affixed to said sleeve and winding at the other end around a drum; a reversed cord on the same drum, the free end of which carries a weight; and a series of loading-plates through which the reversed cord passes which rest at spaced intervals and are successively taken up by the upward motion of the weight as the sleeve recedes, substantially as set forth.

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Witnesses:

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