

(No Model.)

5 Sheets—Sheet 1.

P. F. CORRIGAN.  
STARCHING MACHINE.

No. 583,788.

Patented June 1, 1897.

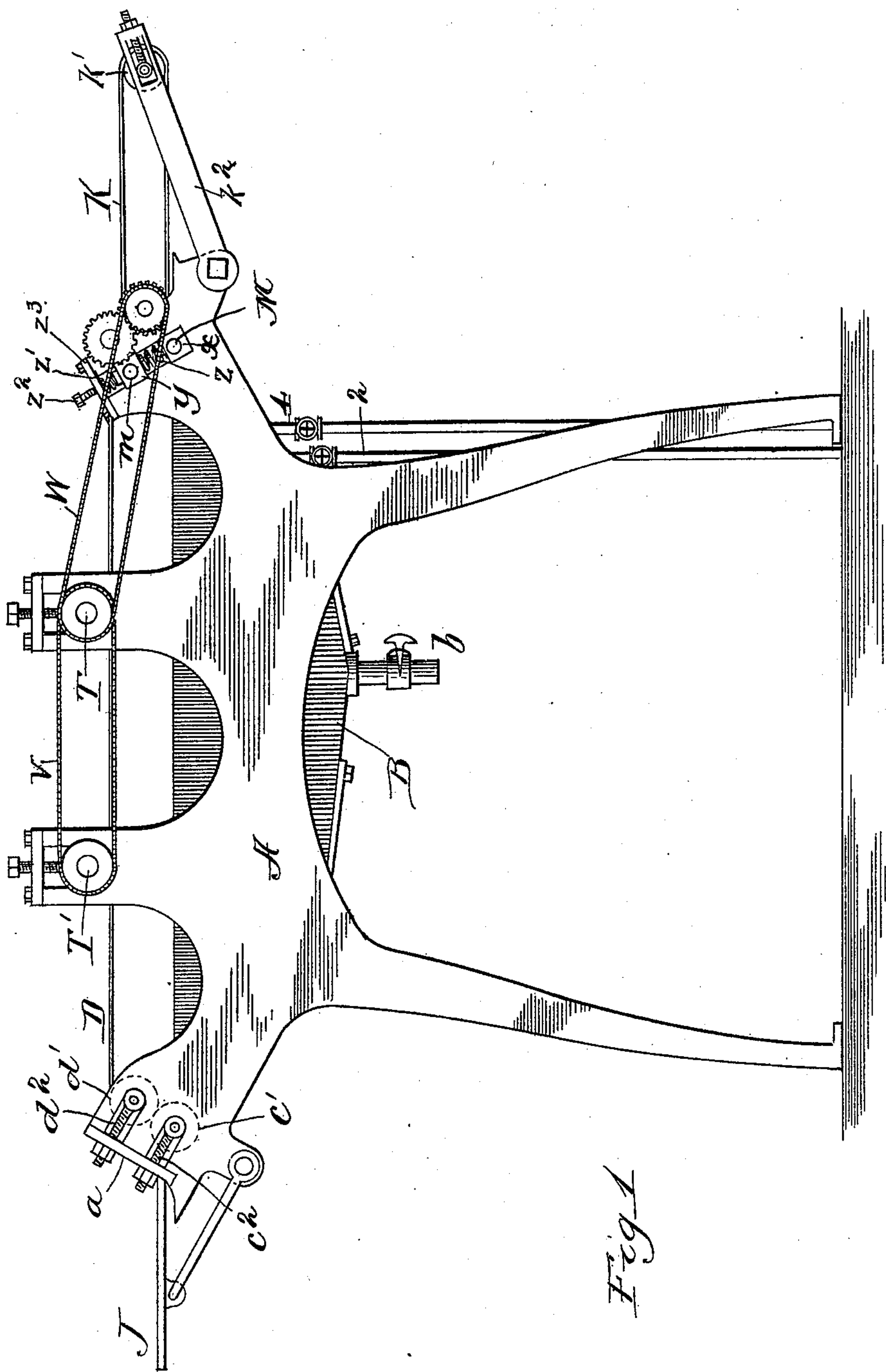


Fig. 1

Witnesses  
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By Louis K. Gibson  
Attorney





(No Model.)

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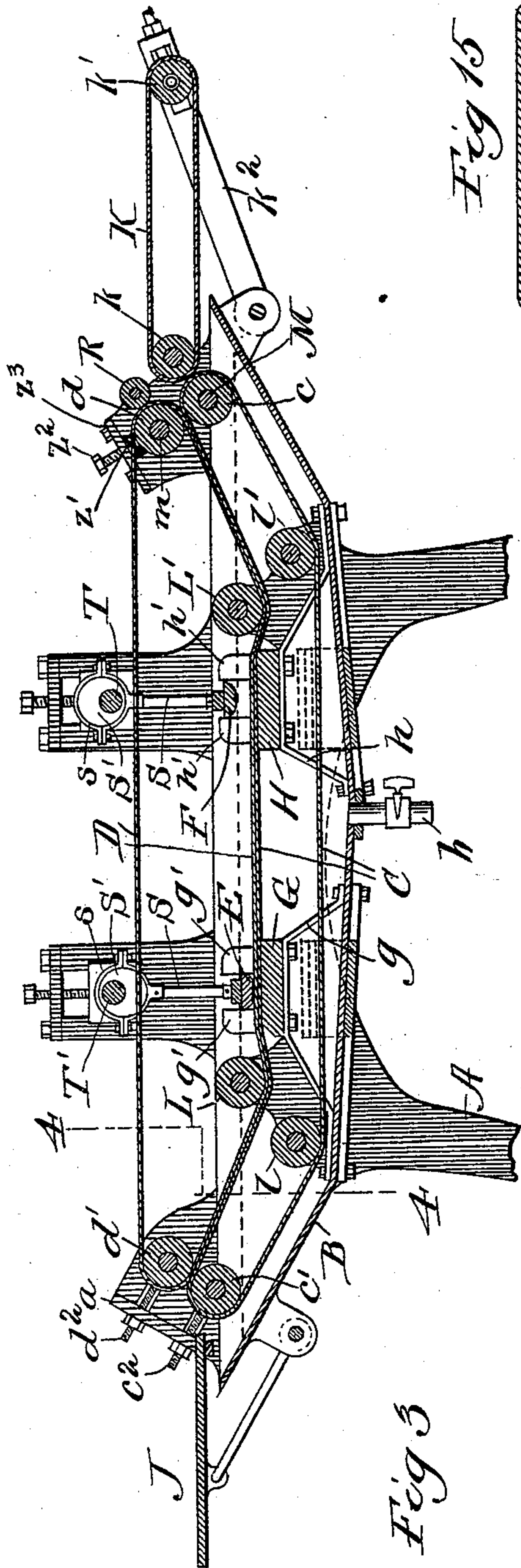


Fig 3



Fig 15

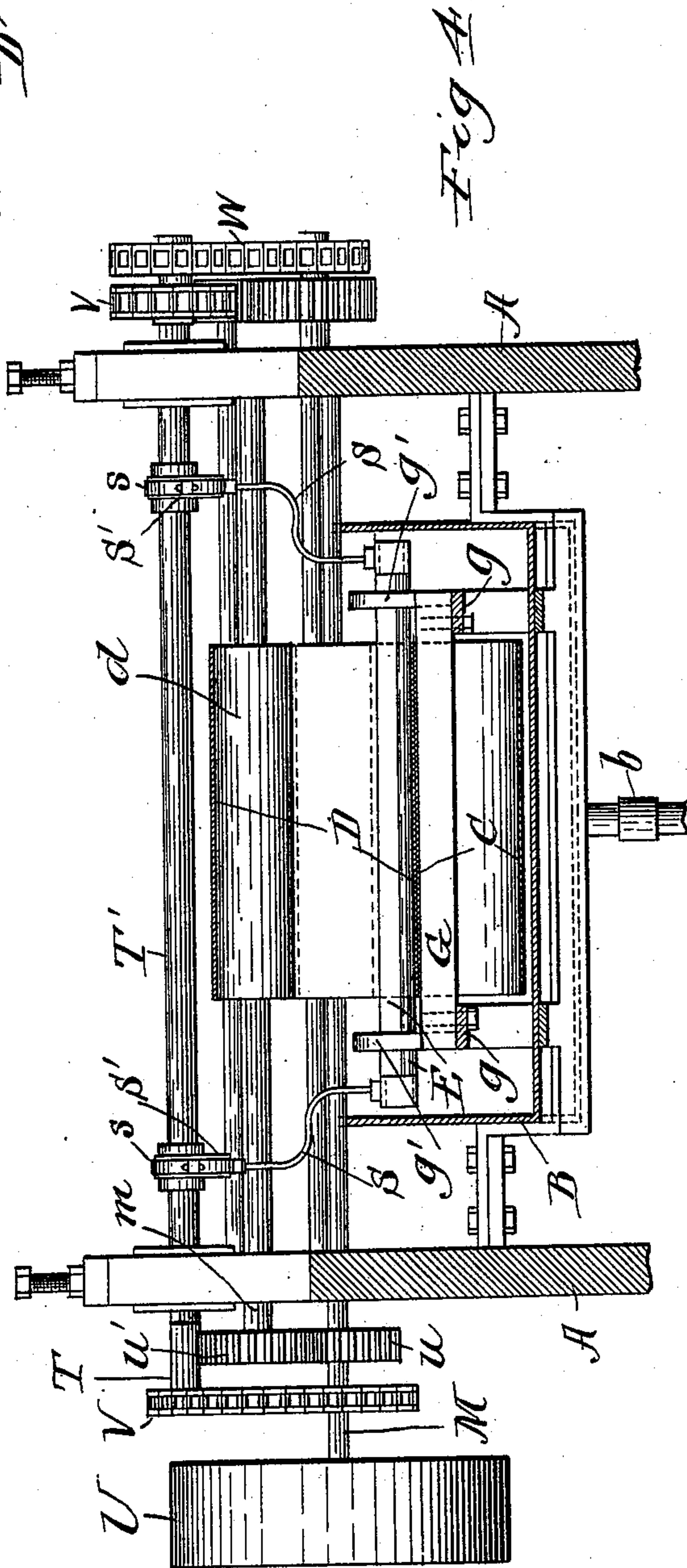


Fig 4

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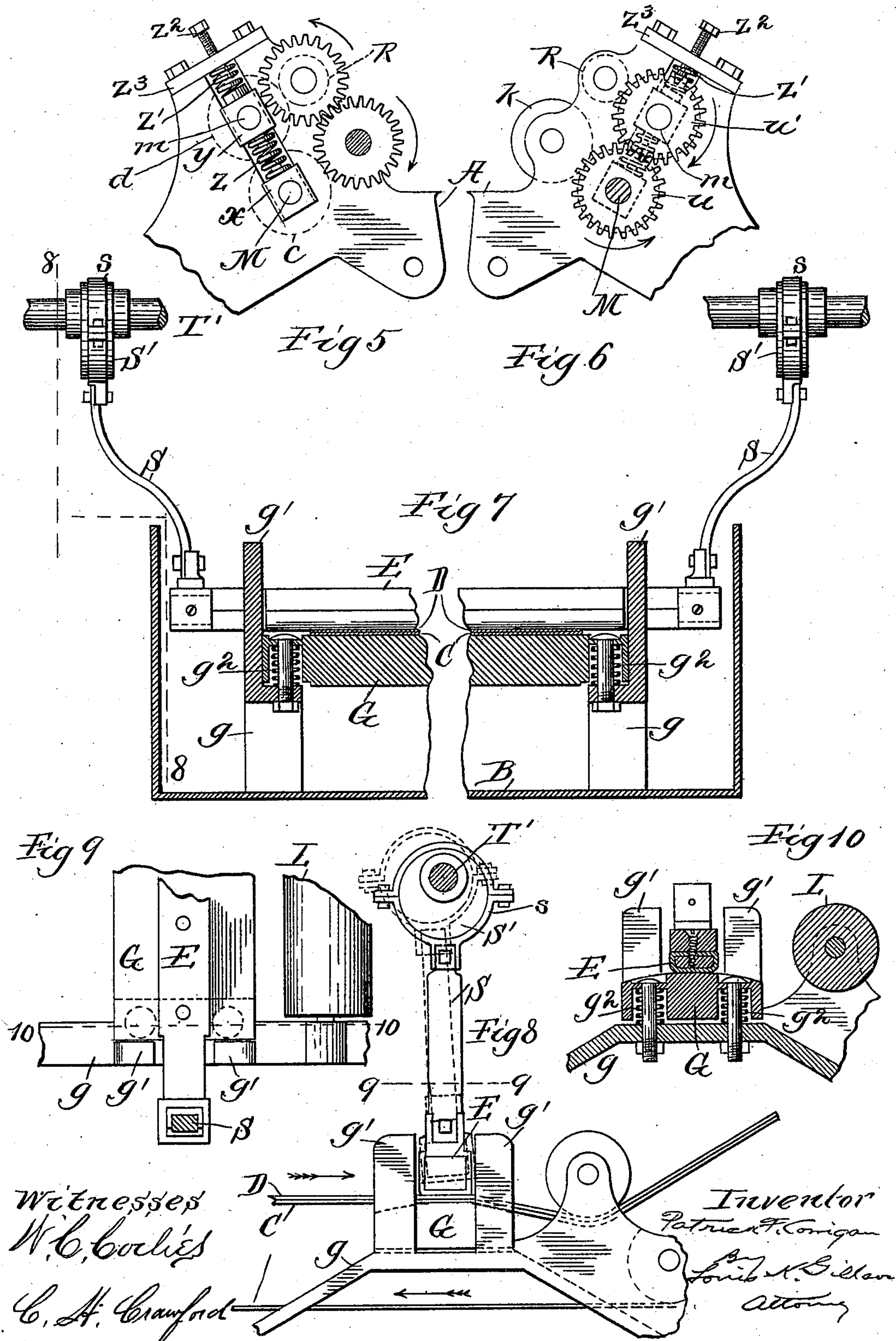
(No Model.)

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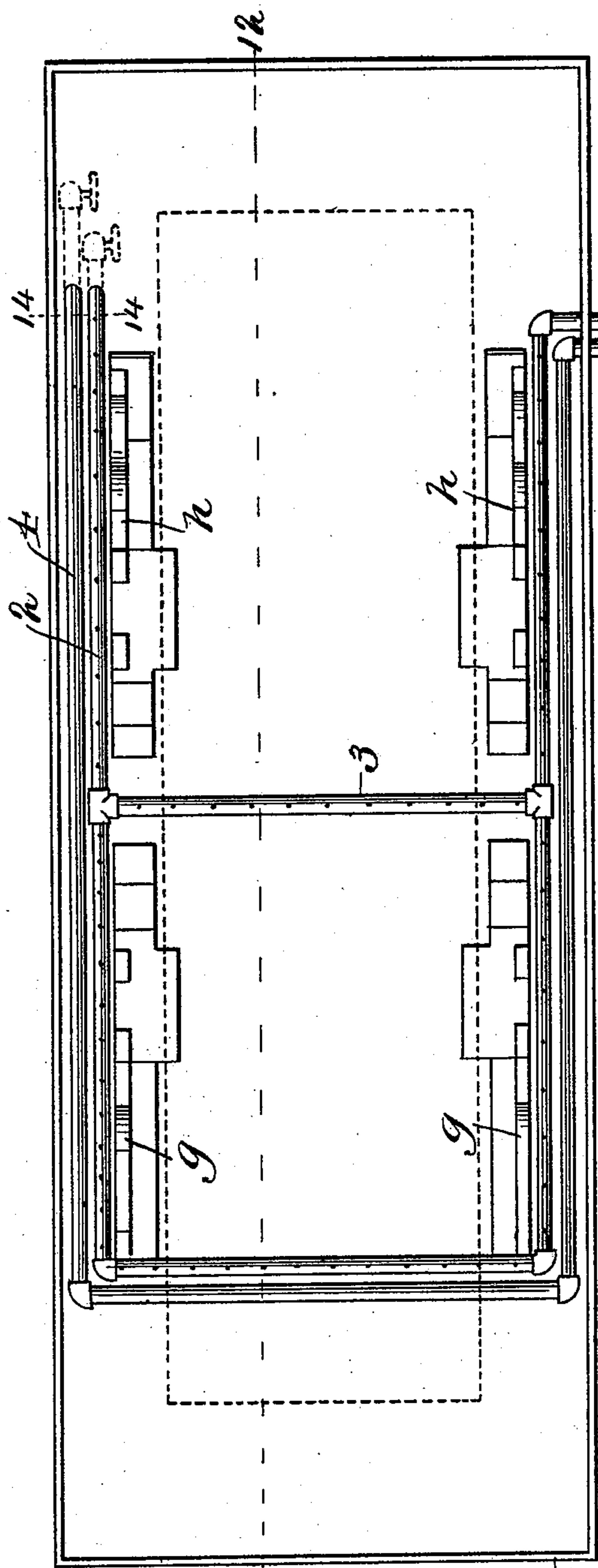
(No Model.)

5 Sheets—Sheet 5.

P. F. CORRIGAN.  
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Patented June 1, 1897.



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Fig. 11

B

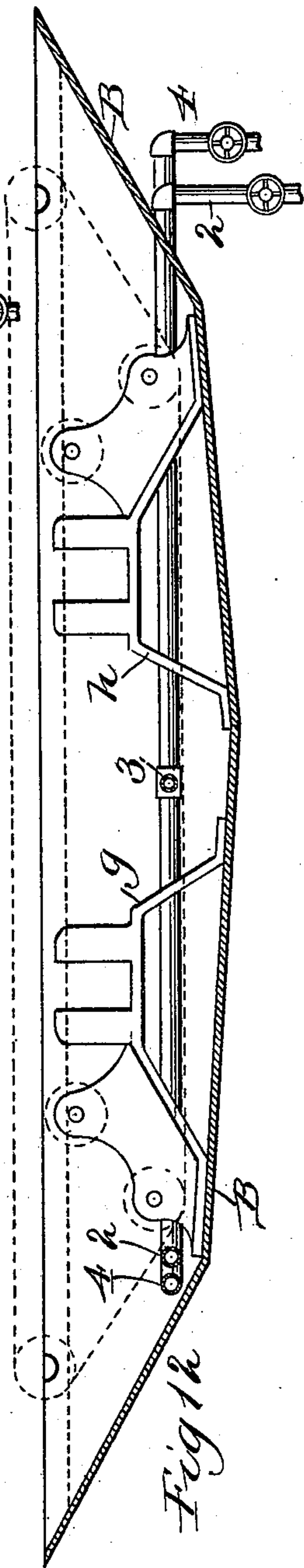


Fig. 12

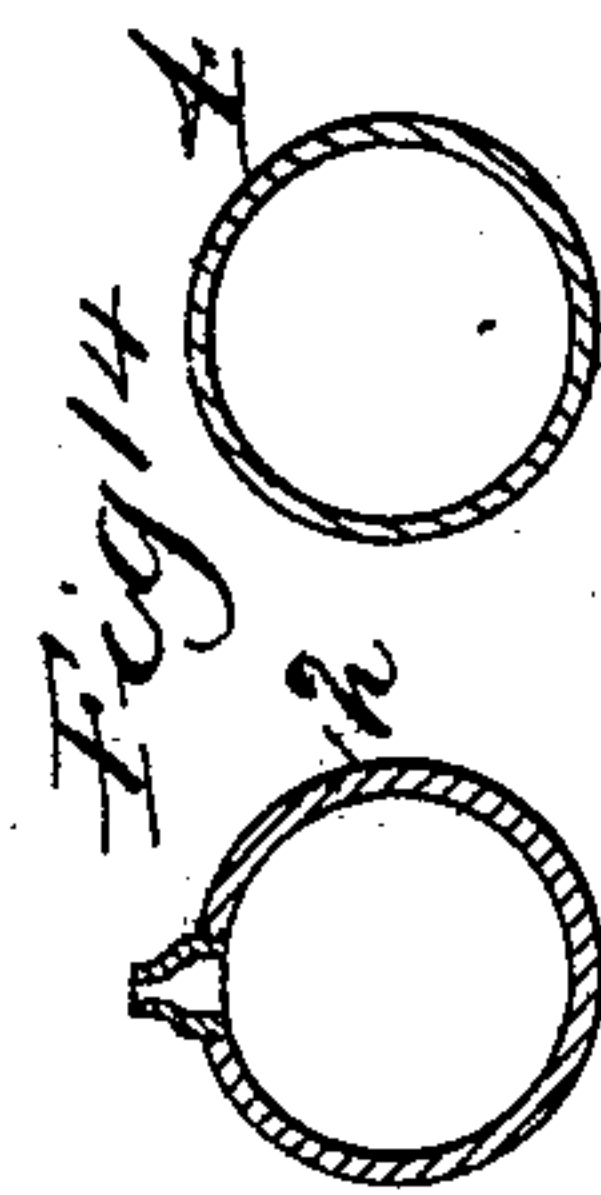
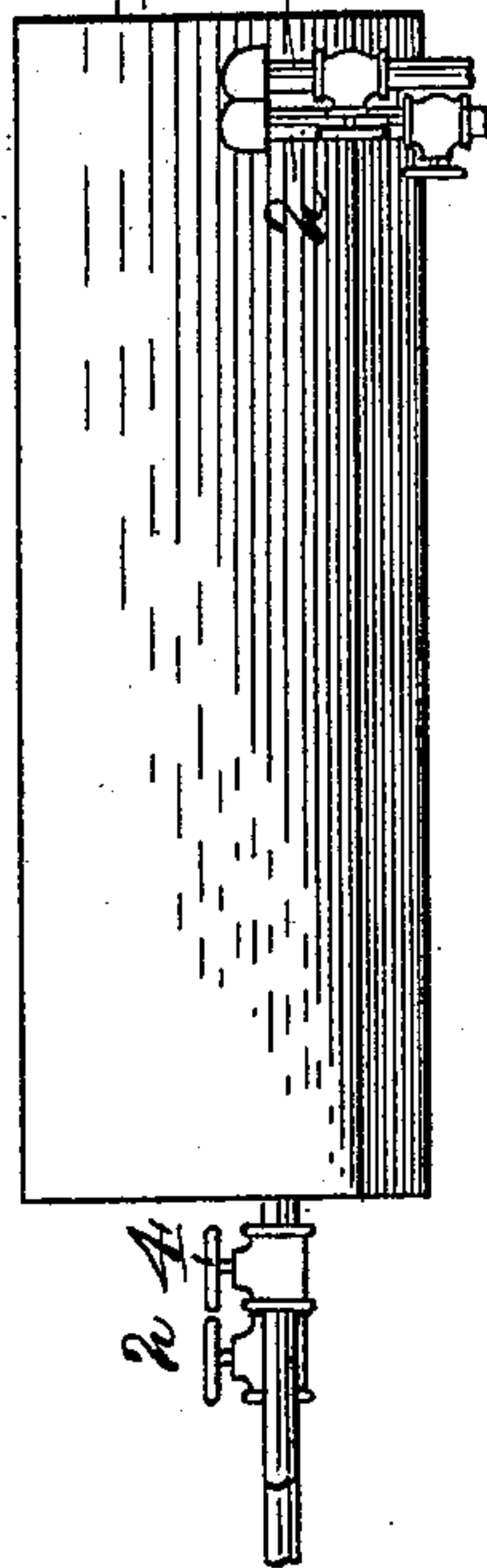


Fig. 13

Fig. 14



Inventor  
Patrick F. Corrigan  
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# UNITED STATES PATENT OFFICE.

PATRICK F. CORRIGAN, OF CHICAGO, ILLINOIS.

## STARCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 583,788, dated June 1, 1897.

Application filed December 17, 1895. Serial No. 572,475. (No model.)

*To all whom it may concern:*

Be it known that I, PATRICK F. CORRIGAN, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Starching-Machines, as fully hereinafter set forth and described, and which are illustrated in the accompanying drawings, which form a part of this specification.

The invention relates particularly to machines for starching collars and cuffs. Its object is to provide for the thorough starching of the goods by mechanical means without danger of destroying them, and also to provide for the delivery of the goods from the machine free from wrinkles.

The invention consists in the various parts and arrangement of parts, as hereinafter fully set forth and claimed.

In the accompanying drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal vertical section on the line 3 3 of Fig. 2. Fig. 4 is a transverse vertical section on the line 4 4 of Fig. 3. Figs. 5 to 10 are details, Fig. 5 being taken on the line 5 5, and Fig. 6 on the line 6 6, of Fig. 2, Fig. 7 being a transverse vertical section of the tank through one of the blocks, the beater being shown in elevation, Fig. 8 being an end elevation of one of the beaters and its accessories, Fig. 9 being taken on the line 9 9 of Fig. 8, and Fig. 10 being a transverse vertical section through one of the beaters and its cooperating block, these details being drawn upon a larger scale than the other figures. Fig. 11 is a plan view of the machine with its moving parts removed. Fig. 12 is a longitudinal vertical section of the same on the line 12 12 of Fig. 11. Fig. 13 is an end elevation of the starch-tank, and Fig. 14 is a detail sectional view on the line 14 14 of Fig. 11. Fig. 15 is a transverse section of one of the conveying-aprons.

The body or frame of the machine A is substantially oblong-rectangular in form and is supported by four legs and is provided with upwardly-extending arms or brackets serving as journal-bearings for various rollers, hereinafter described. The starch-pan B is oblong-rectangular and is suitably mounted upon the frame A. A pair of endless aprons C D are

so mounted as to pass through the pan B and move in opposite directions, the one below the other, their adjacent turns being face to face and in contact and passing under beaters E F and over blocks G H, with which the beaters cooperate. The goods are fed to the machine from a table J at one of its ends and are carried between the adjacent turns of the aprons C D and are delivered therefrom to a delivering endless apron K, to which motion is communicated for conveying the goods to any suitable receiving-table or other receptacle. The apron C is carried by rollers *c c'*, located at opposite ends of the starch-pan, and the apron D is carried by similar rollers *d d'*, located immediately above the rollers *c c'*, respectively. These four rollers are mounted upon shafts journaled in upwardly-projecting brackets forming a part of the frame A, as hereinbefore stated. A pair of idle-rollers *L L'* are journaled in brackets *g h*, projecting upwardly from the bottom of the pan B, and serve to depress the adjacent turns of the aprons C D, so as to carry them through the starch. A similar pair of idle-rollers *l l'* are similarly journaled near opposite ends of the starch-pan and still farther depress the lower turn of the apron C, so as to avoid its contact with the upper turn thereof.

The beaters E F may be of any desired number. I regard two as being sufficient to satisfactorily accomplish the results desired. These beaters are each carried by a pair of rods S S, one at each end, which are attached to eccentric-straps *s s*, which ride upon eccentrics *S'*, mounted upon shafts *T T'*. The eccentrics on each shaft are spaced apart farther than the width of the starch-pan to avoid the dropping of oil therefrom into the starch, and the connecting-rods S S are suitably bent, as shown, so as to connect the straps with the beaters, which are necessarily of less length than the width of the pan. The beaters reciprocate vertically, each between a pair of guide-arms *g' g'* and *h' h'*, projecting upwardly from the brackets *g h*, the beaters, however, fitting loosely between these guide-arms. The connection between the eccentric-straps *s s* and the beaters E F being rigid it will be seen that a rocking as well as a reciprocating motion is communicated to them by means of the eccentrics, as clearly indi-



cated by the use of dotted lines in Fig. 8. The initial contact of the beater with the aprons is therefore along one of its edges, and its final contact is by its opposite edge, the face of the beater having been forcibly pressed upon the aprons during the contact. The blocks G H which coöperate with the beaters are supported by spiral springs  $g^2 g^2$ , resting upon the brackets  $g h$ , so that they yield to the impact of the beaters. The delivery-apron K is carried by rollers  $k k'$ , the former of which is journaled in upwardly-extending arms of the frame A, and the latter of which is journaled in a pair of arms  $k^2$ , extending from the end of the frame. The roller  $k$  is so located that the apron K impinges against the apron C as it turns over the carrying-roller  $c$ , and the rollers  $k c$  are driven in the same direction, so that their adjacent faces move oppositely. By this means the goods, after passing between the rollers  $c d$ , are stripped from the apron C by the reverse action of the apron K and are carried by the latter to the receptacle which may be provided for them. The proximity of the roller  $k$  to the apron C is so close that were the apron K not employed the roller itself would strip the goods from the apron C. A stripping-roller R is so located as to coöperate with the roller  $d$  by impinging against the apron D as it turns over this roller. This stripping-roller is also driven in the same direction as the roller  $d$ , with which it coöperates, so that its contacting face moves oppositely from the apron and strips any article from the apron D which may tend to adhere to it, throwing it down and against the apron K, which receives it and conveys it to its destination. The roller R is driven from the roller  $k$ , intermeshing gears being carried by those rollers.

Power is communicated to the machine by means of a belt-pulley U, mounted upon the shaft M, which carries the roller  $c$ , and from this shaft power is transmitted to the shaft  $m$ , carrying the roller  $d$ , by means of a pair of gear-wheels  $u u'$ . The shaft T is rotated by means of a sprocket-chain V, driven from the shaft M, and power is transmitted from it to the shaft T' by means of a sprocket-chain  $v$ . The roller  $k$  is driven by means of a sprocket-chain W, leading from the shaft T. By a suitable proportioning of the sprocket-wheels the roller  $k$  is given a greater peripheral speed than the roller  $c$ , thereby giving the apron K a faster movement than the apron C. As the goods are delivered from the apron C they are caught by the apron K and adhere to it with sufficient tenacity to draw them taut before their rearward ends become disengaged from the starching-apron, thereby eliminating any wrinkles which may have formed and delivering the goods from the machine in a perfectly smooth condition.

For the purpose of securing a proper tension of the starching-aprons C D the shafts upon which their carrying-rollers  $c' d'$  are

mounted are journaled in adjustable bearings. This is accomplished by journaling the shafts carrying the rollers  $c' d'$  in the heads of the eyebolts  $c^2 d^2$ , whose stems project through a plate  $a$ , secured to an upwardly-extending bracket of the frame A and carry suitable nuts, which turn up against this plate. The shafts M  $m$  are so mounted as to allow them to be separated slightly by the passage of any large article, the shafts being journaled in blocks  $x y$ , adapted to slide in a slot formed in upwardly-extending brackets of the frame A, a spiral spring  $z$  being interposed between these blocks and a pressure-spring  $z'$  being placed above the block  $y$  and forced against it by means of a set-screw  $z^2$ , carried by a plate  $z^3$ , fixed across the slot within which the blocks are mounted.

The starch is heated in the ordinary manner by the use of steam-pipes. I prefer to use for this purpose a pipe 4, entering the pan near one of its corners and passing along three of its sides, but without perforations, so that it delivers no steam into the starch, and by means of a pipe 2, lying along the side of pipe 4 and having numerous perforations, as shown, so that jets of steam may be discharged into the starch for the purpose not only of heating but also of softening it. If desired, the joints of the pipe 2, upon opposite sides of the pan B, may be united midway of their length by means of a cross-pipe 3. These pipes are of course provided with suitable valves, so that the use of the steam may be regulated at pleasure. The brackets  $g h$  are sufficiently removed from the sides of the pan to give ample space for the steam-pipes outside of them, and by this arrangement the pipes in no way interfere with the working parts of the machine.

While the idle-rollers L L' are shown as so located that they hold the starching-aprons C D firmly against the blocks G H, this is not at all necessary. The length of the pan is such that abrupt angles may be avoided in conveying the goods into and out of the starch, thereby causing the machine to be much more easily operated than were the contrary the case, and also preventing the wrinkling of the articles operated upon. A suitable drain-pipe  $b$  opens through the bottom of the tank B for the removal of the starch and the proper cleansing of the tank.

The beaters E F are rubber-faced, thereby presenting yielding contact-surfaces. The rocking motion imparted to them is similar to the action of the human hand in starching and serves to smooth the goods while at the same time rubbing the starch into them.

The screws  $z^2$  may be set up to apply the necessary pressure to squeeze the surplus starch out of the goods as they pass between the rollers  $c d$ , the effect being substantially the same as that secured in hand-starching by rubbing the goods with the hand after they have been starched.

I claim as my invention—



1. The combination with a tank and a block within the tank, of a beater for coöperating with the block, guideways for the beater, a shaft journaled above the pan, eccentrics mounted upon the shaft, straps running upon the eccentrics, and rigid connection between the straps and the beater.

2. The combination with a tank and a block within the tank, of a reciprocating beater above and coöperating with the block, means for communicating a rocking motion to the beater, a pair of endless conveying-aprons each having one of its turns located between the beater and the block, and means for driving the aprons in opposite directions.

3. The combination with a tank and a block within the tank, of a beater for coöperating with the block, a shaft journaled above the pan and carrying eccentrics, straps running upon the eccentrics, rigid connection between the beater and the straps, a pair of endless conveying-aprons each having one of its turns located between the block and the beater, and means for driving the aprons in opposite directions.

4. In a starching-machine the combination with a tank, a pair of endless conveying-aprons passing through the tank, rolls for carrying such aprons and means for driving these aprons in opposite directions, of an endless delivery-apron, rolls for carrying such apron, one of said rolls being so located that the delivery-apron will intercept articles adhering to one of the conveying-aprons, and means for driving the delivery-apron in the same direction with the conveying-apron with which it coöperates.

5. The combination with a tank, an endless

conveying-apron passing through the tank and rollers for carrying the apron, of an endless delivery-apron, rollers for carrying the delivery-apron, one of such rollers being parallel with and adjacent to the carrying-roller for the conveying-apron toward which its carrying turn travels, and means for driving the rollers of the two aprons in the same direction but at differentiated speed, whereby the delivery-apron is caused to travel more rapidly than the conveying-apron.

6. The combination with a starching-machine comprising a tank, endless conveying-aprons traveling through the tank and means for driving the aprons, of an endless delivery-apron whose upper turn leads from the discharge of the conveying-aprons, and means for driving the delivery-apron more rapidly than the conveying-aprons.

7. In a starching-machine, the combination with a tank and a supporting-frame, the spring-supported blocks G, H, within the tank, the beaters E, F, shafts T, T', eccentrics mounted upon the shafts, straps running on the eccentrics, rigid connection between the straps and the beaters, the conveying-aprons C, D, the stripping-rollers R, k, the delivery-apron K, and means for driving the shafts T, T', the aprons C, D, the rollers R, k, and the apron K, the apron K being driven at a higher speed than the aprons C, D.

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

PATRICK F. CORRIGAN.

Witnesses:

LOUIS K. GILLSON,  
ISABEL HELMICH.