

(No Model.)

L. REYNOLDS.
STARCHING MACHINE.

No. 545,134.

Patented Aug. 27, 1895.

Fig. 1.

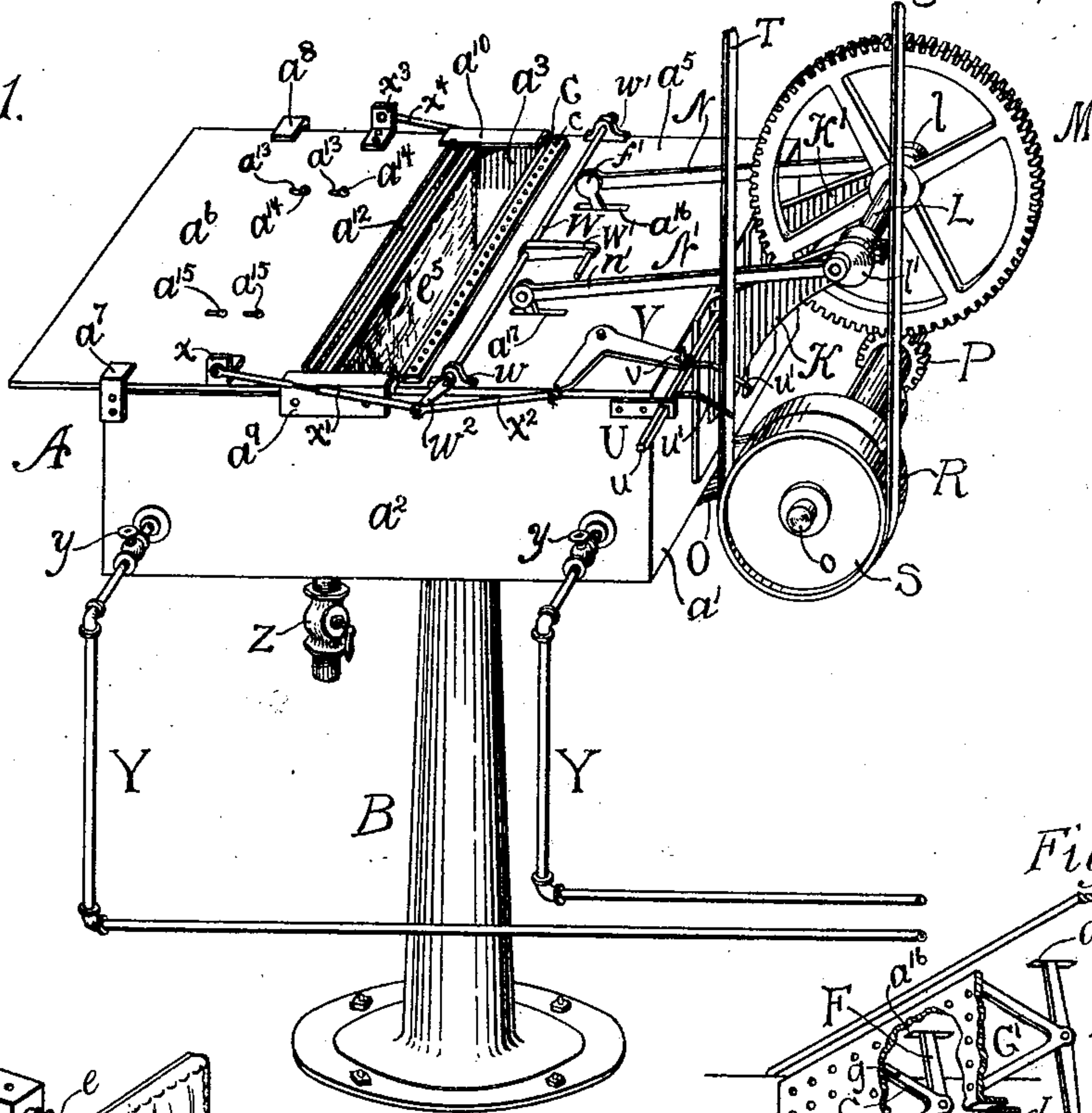


Fig. 3.

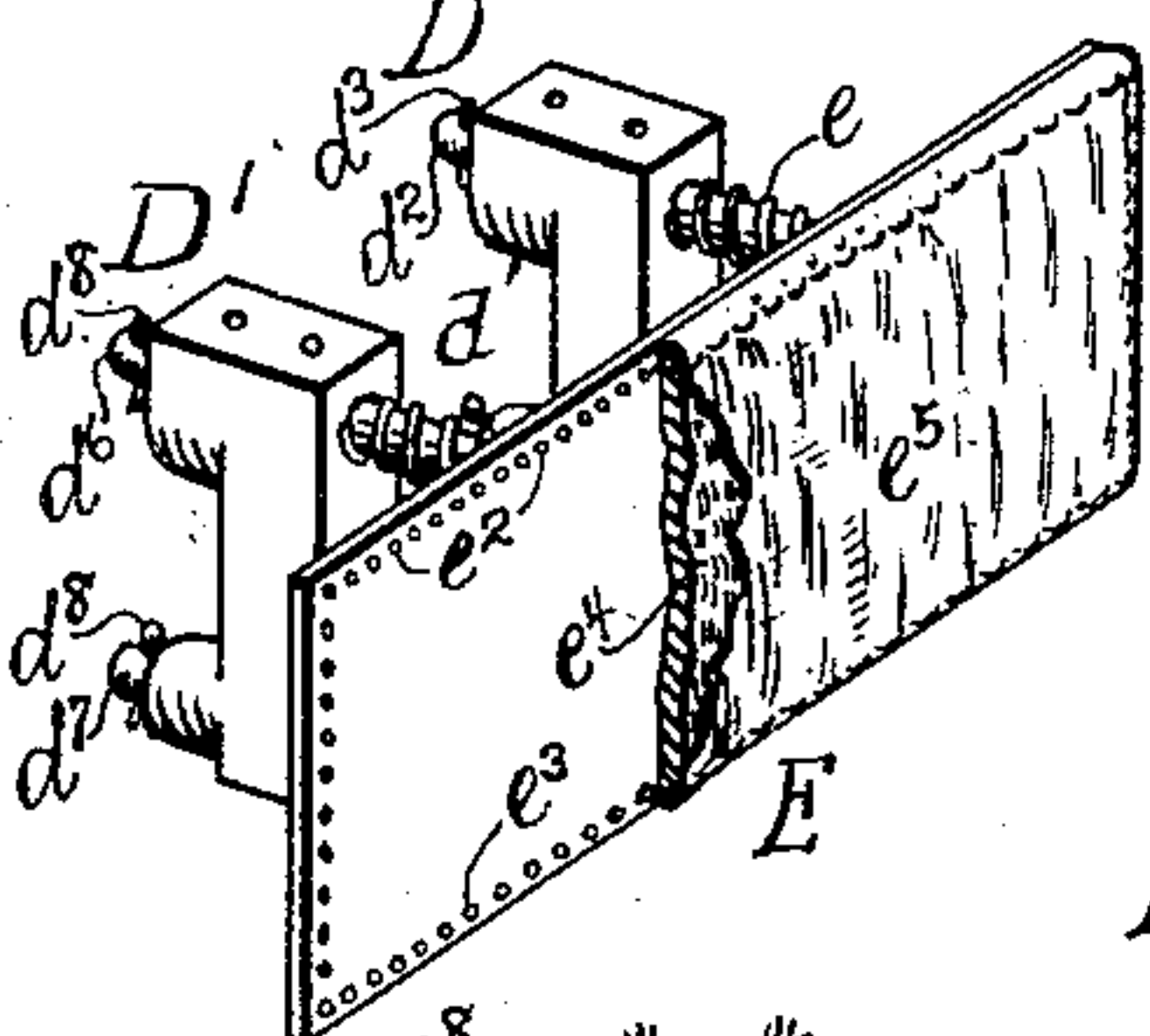


Fig. 4.

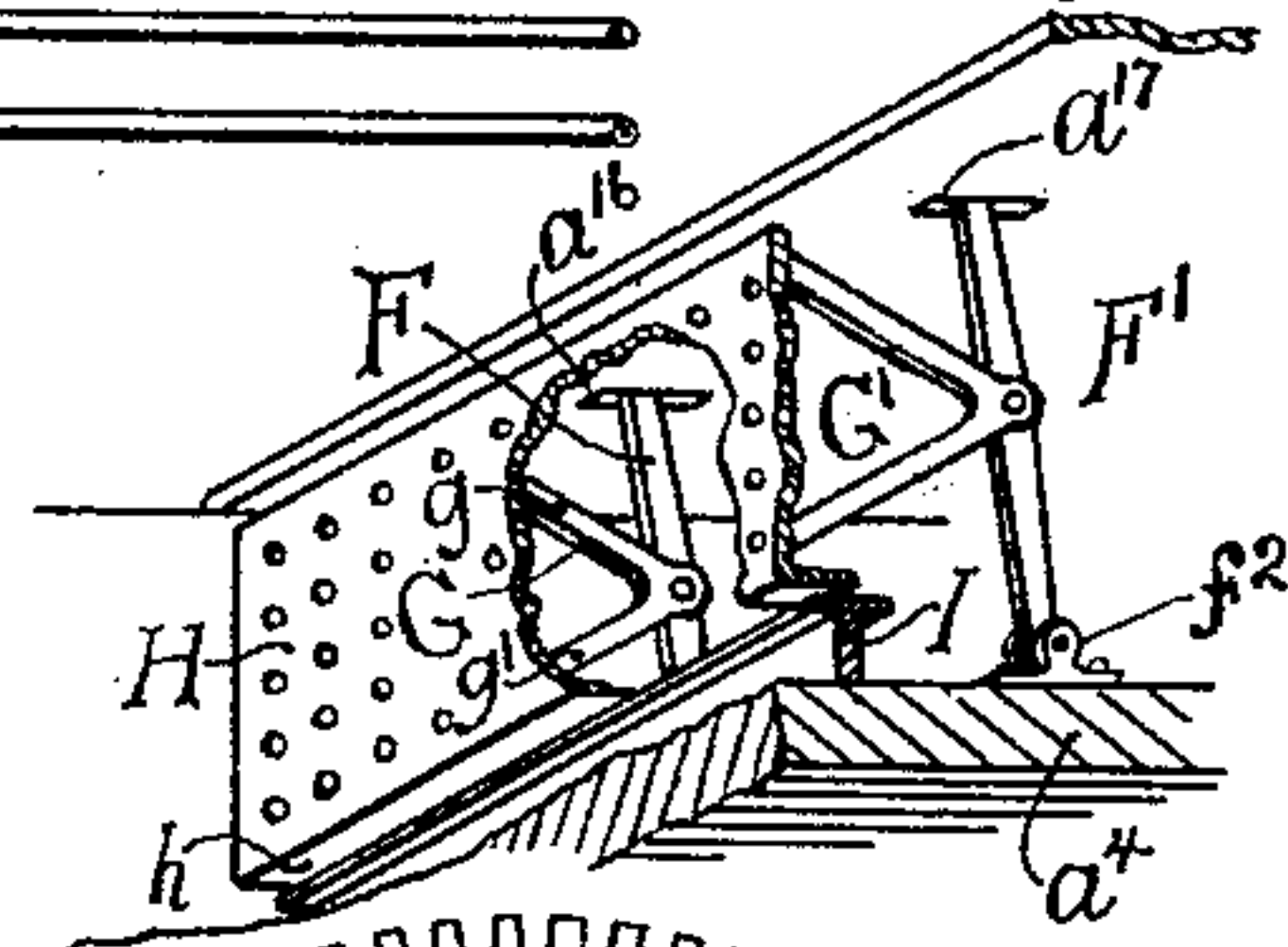
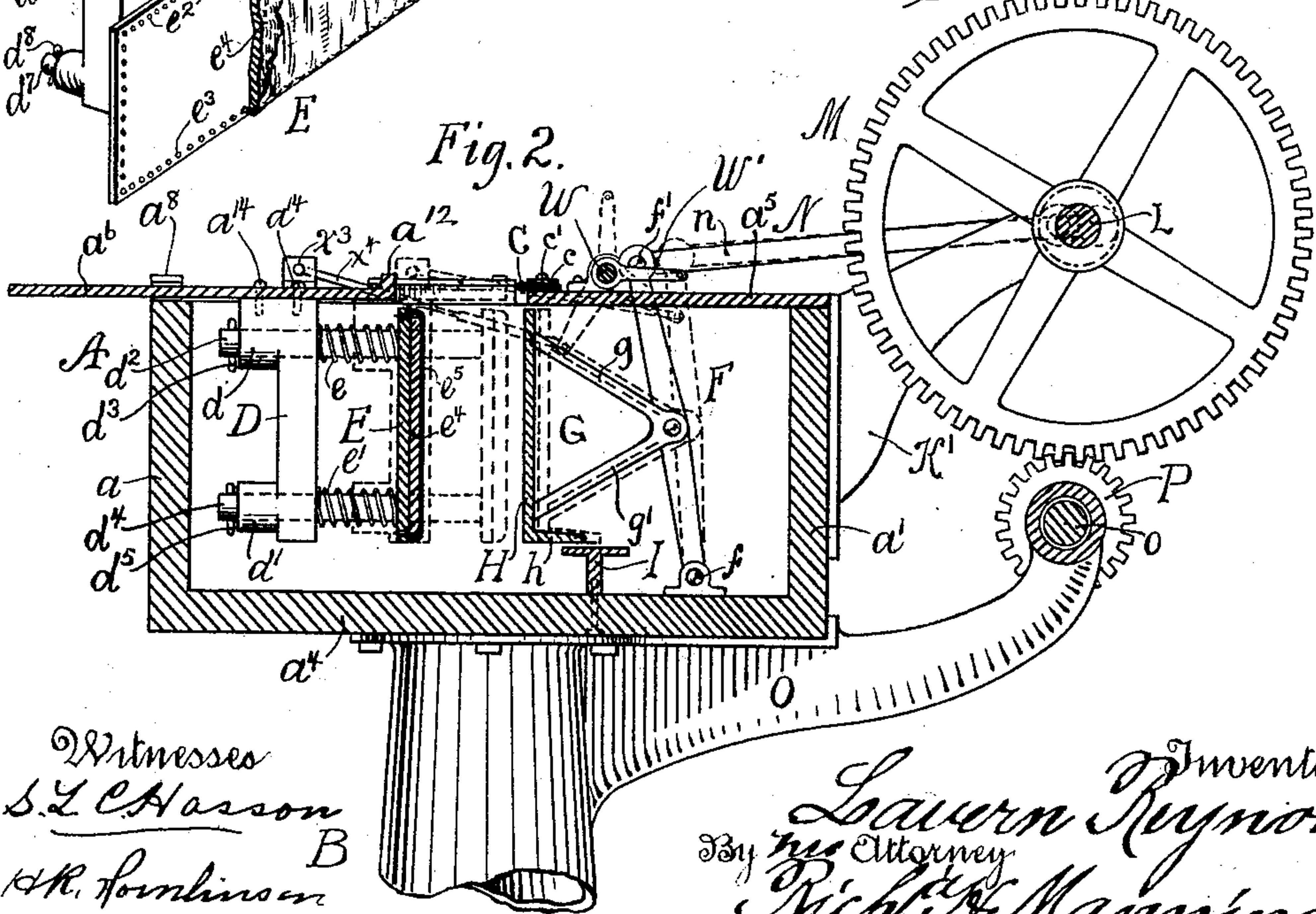


Fig. 2.



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STARCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 545,134, dated August 27, 1895.

Application filed April 11, 1894. Serial No. 507,192. (No model.)

To all whom it may concern:

Be it known that I, LAVERN REYNOLDS, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Starching-Machines for Laundries, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention has for its objects, first, to enable the starch to be applied to and forced into the fabric without abrasion; second, to facilitate the penetration of the starch through one or more thicknesses of fabric and enable the deposit of the starch to be obtained in increased quantities.

My invention consists in the novel construction and combination of parts, such as will first be fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a view of the improved starching apparatus in perspective shown mounted upon its pedestal, and also showing the steam-pipes connected with the receptacle and the devices communicating power to the compressing-plate. Fig. 2 is a vertical sectional view of the starching-machine with the lower portion of the pedestal broken away. Fig. 3 is a detail view in perspective of the yielding starch-recharging plate. Fig. 4 is a detail view of the perforated compressing-plate.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents the receptacle for holding the starch and starching apparatus, which consists of a box nearly square in form and of a proper depth.

a and a' represent the front and rear ends, respectively, of the box, and a^2 a^3 its sides.

a^4 is the bottom of the box.

The box A is mounted upon a pedestal B, which extends upwardly the required height, and to which the bottom of the box is bolted in the usual manner. The cover at the top of the box consists of the separate plates a^5 a^6 .

The plate a^5 extends from the upper edge of the side a^2 to the upper edge of the side a^3 and from the upper edge of the end a' to a point

on the upper edge of the sides a^2 a^3 about one-half the distance from the front to the rear end of said box. Upon the upper side of the plate a^5 and extending from one side of the box to the other, and also over the inner edge of the said plate near the center of the box, is a narrow strip of rubber C, over which is placed a narrow plate c , which is perforated at suitable points in the direction of its length, and through which and the strip C are inserted the screws c' , which screws are made to enter in a suitable manner the plate a^5 . The plate a^6 , which forms the other portion of the cover of the box, extends from the inner edge of the plate a^5 to the upper edge of the end a of the box, and also from the upper edge of one side to the upper edge of the other side of the box, in the same manner as the portion a^5 , and is made to slide to and from the portion a^5 in the manner hereinafter described. To the side a^2 of the box A, near the end a , is attached one end of guide-plate a^7 , the other end of which plate extends at right angles over the upper side of the plate a^6 . Upon the other side a^3 of the box is a guide-plate a^8 , which extends over the upper side of the plate a^6 in the same manner as the plate a^7 . To the side a^2 of the box near the inner edge of the plate a^5 is attached a guide-plate a^9 , which extends longitudinally of the box a considerable distance or about the distance in which the portion a^6 of the cover is permitted to retract in opening, and the upper portion is bent at right angles over the upper side of the sliding portion a^6 of the cover.

Upon the side a^3 of the box is a guide-plate a^{10} , which is arranged in a similar position and corresponds in length to the guide-plate a^9 . Extending in an upward direction a short distance above the upper surface of the plate a^6 , between the guide-plates a^9 a^{10} , and attached rigidly to said plate a^6 , is a strip a^{12} , the inner side of which is flush with the inner edge of the said plate a^6 . To the under side portion of the sliding plate a^6 , at a point one-third the distance from the inner edge in the direction of the outer edge of said plate, and also nearly the same distance described from the inner portion of the side a^3 in the direction of the side a^2 , is connected adjustably the upper end of a brace-bar D, the lower end of which bar extends in a downward di-

rection to within a short distance of the bottom a^4 of the box. Upon the upper portion of the bar D, toward the inner side of the end a and close against the under side of the plate a^6 , is a lug d . Upon the lower end of said bar D, and extending also from the said bar toward the inner portion of the side a of the box, is a lug d' . Directly above the upper end of the bar D and its lug d and in the plate a^6 are the slots $a^{13} a^{13}$, which are in a single line. In the upper end of the bar D and its lug d are threaded perforations, and said bar D is held firmly in position by the screws $a^{14} a^{14}$ in said slots $a^{13} a^{13}$.

To the under side portion of the plate a^6 , at a point precisely the same distance from the inner portion of the side a^2 that the bar D is from the side a^3 , is attached adjustably a bar D' , which is provided with lugs upon the side toward the end a and extends the same distance in the direction of the bottom a^4 as the bar D. In the top plate a^6 are slots $a^{15} a^{15}$, in which are adjusting-screws connected with the upper end of the brace-bar D' in the same manner as the screws a^{14} are connected with the bar D. The upper end portion of bar D, a short distance beneath the plate a^6 , is perforated, which perforation extends through the lug d in the direction of the end a of the box, and in which perforation is inserted loosely one end of a bolt d^2 . Through said end of the bolt d^2 , which extends a short distance beyond the lug d , is inserted in a transverse direction a pin d^3 . The lower end of the bar D is also perforated in the same manner and direction as the upper end, and through said perforation is inserted one end of a bolt d^4 , through the said end of which bolt is inserted in a transverse direction a pin d^5 .

Through the bar D' are made perforations at the same points and in the same direction as in the bar D, and through said perforations are inserted bolts $d^6 d^7$, which are retained by the pins d^8 in precisely the same manner as the bolts $d^2 d^4$. The other ends of the respective bolts $d^2 d^4 d^6 d^7$ extend toward the central portion of the box to a position equal to that described by the inner edge of the plate a^6 and to a line drawn vertically from said edge. To said ends of said bolts is attached rigidly a rectangular flat plate E, which extends from the inner portion of the side a^2 to the inner portion of the side a^3 in one direction and from the under side portion of the plate a^6 in a downward direction the same distance as described by the lower ends of the bars D D' . Said plate is arranged to move without frictional contact with the inner sides of the box in its operation. Around the bolt d^2 and between the said bar D and the plate E is placed a spiral spring e , and around the bolt d^4 , between the said bar D and plate E, is placed a spiral spring e' , both of which springs are of sufficient tension to keep the plate projected forward and receive the compression hereinafter described.

Upon the respective bolts $d^6 d^7$ are also spiral springs which are precisely the same and arranged in position in the same manner as the springs upon the bolts $d^2 d^4$. Through the upper portion of the plate E, near the edge, are perforations e^2 , which are close together and extend the length of said plate. Near the lower edge of said plate are similar perforations e^3 , and the sides of the plate E are also perforated. A thick cloth e^4 , preferably woolen, extends the length and width of plate E and is connected thereto by sewing through the cloth and through the perforations e^2 described in the upper edge, thence along both sides of said plate, and also at the lower edge of plate E by sewing through the cloth and perforations e^3 in the same manner as described at the upper edge and sides. Over the thick woolen cloth e^4 is extended a piece of cloth e^5 , preferably light cotton or cheese cloth and thinner in texture than the cloth e^4 . The cloth e^5 is connected with the upper and lower edges and sides of the plate E in the same manner as described in connecting the cloth e^4 , both of said pieces of cloth forming a pad or cushion, which prevents all strain upon the garment and receives the starch, as hereinafter described.

In box A and attached rigidly to the bottom a^4 of the box at a point a short distance from the inner portion of the end a' , and also a corresponding distance from the side a^3 of said box, is a lug f . In the fixed portion a^5 of the cover of the box is a longitudinal slot a^{16} . To the lug f is pivotally attached the lower end of a vibrating bar F, the upper end of which bar extends upwardly through the slot a^{16} and a short distance above the upper side of the portion a^5 of the top of box A. In the direction of the side a^2 of the box and at a point the same distance from the inner portion of said side and end a' of said box as the lug f is from the side a^3 and end a' is attached a lug f^2 . In the portion a^5 of the top is a slot a^{17} , which is parallel with the slot a^{16} .

To the lug f^2 is attached the lower end of a vibrating bar F' , which extends upwardly through the slot a^{17} . To the bar F, a short distance above a point upon the said bar equidistant from its pivotal point on the lug f to the top of the box, is pivoted a V-shaped brace G, the separate arms $g g'$ of which brace extend from the pivotal point on bar F at an angle to each other and in the direction of plate E. To the brace-bar F' is pivoted a V-shaped brace-bar G' , which is precisely the same as the brace-bar G and extends in the same direction. To the outer ends of the brace-bars G G' is rigidly attached a flat perforated plate H, which extends from the inner portion of the side a^2 to the inner portion of the side a^3 . The upper edge of the plate H extends nearly to the under side of the portion a^5 of the cover, and the lower edge extends in a downward direction the same distance as described by the plate E. Upon the lower edge of plate H is a flange h , which

extends at right angles to said plate and in the direction of the bars $F F'$. Attached fixedly to the inner side portion of the bottom a^4 , beneath the flange h on the plate H , is a T-shaped bearing or table I , which extends from the inner portion of the side a^2 to the inner portion of the side a^3 , and upon which the flange h of the plate H slides when the plate H is operated. To the outer side portion of the end a' of the box A , within lines drawn through the said box upon the slots a^{16} a^{17} and parallel therewith, are attached fixedly the brackets $K K'$. The bracket K extends outwardly and in an upward direction above the plane of the top plate a^5 a short distance, and the bracket K' extends upwardly at precisely the same height.

In the outer ends of the brackets $K K'$ is journaled a shaft L , and upon said shaft between said brackets is mounted a gear-wheel M . To the end of the shaft L , which extends a short distance beyond the outer side portion of the bracket K' , is attached a disk l , and to the side of disk l , near the outer edge, is pivoted one end of a bar N , the other end of which bar is pivoted at f' to the end of the vibrating bar F . Upon the other end of shaft L , which extends a short distance beyond the outer side portion of the bracket K , is attached a disk l' . To the disk l' is pivotally attached one end of a bar N' at the same point as the bar N is attached to the disk l . The other end of the bar N' is pivotally attached to the end of the vibrating bar F' .

To the pedestal B , directly beneath the box A , is rigidly secured one end of a bracket O , the other end of which bracket extends in an outward direction to a point vertically in line with the shaft L , carrying gear-wheel M , at which point the said outer end is extended in an upward direction a short distance. In the outer end of the bracket O is journaled in a horizontal position a shaft o , one end of which shaft extends to a point beneath the gear M and is provided with a pinion P , which meshes with the said wheel M . The other end of shaft o extends to a position nearly in the plane of the side a^2 of the box, and upon said end is fixed a pulley R . Upon shaft o is also placed a loose pulley S , which is close in position to the pulley R . Upon the loose pulley S is a power-driven belt T , which is connected with a suitable power-transmitting pulley above the machine. (Not shown in the drawings.)

Secured to the box A , near the portion a^5 of the cover and opposite the belt T , is a bolt-keeper U , in which is supported one end of a horizontally-sliding bolt u , the other end of said bolt being supported in a bolt-keeper similar to the keeper U , attached to the end of the box near bracket K . Upon bolt u are the outwardly-extended belt-shifting arms u' u'' , which pass beyond the sides of the belt T . Upon the portion a^5 of the top of the box is pivoted a bell-crank lever V , one end of

which extends to a point over the bolt u , and is connected with said bolt by means of a pin v . A short distance from the strip c on the portion a^5 of the top of the box and near the side a^2 is a shaft-bearing w , and upon the other portion of the cover near the side a^3 is a shaft-bearing w' . In the bearings w w' is journaled a shaft W . Upon the end of shaft W , which extends a short distance beyond the outer portion of the side a^2 , is a crank w^2 . Upon the sliding portion a^6 of the cover, near its edge which is adjacent to the side a^2 , is attached a lug x , to which is pivoted one end of a rod or bar x' , the other end of which rod is pivotally attached to the crank w^2 . To the end of the bell-crank lever V , extending over the side a^2 , is pivotally attached one end of a rod or bar x^2 , the other end of which bar is pivotally connected with the crank w^2 . Upon the other end of the shaft W , which extends past the side a^3 , is provided a crank, (see Fig. 2,) and upon the plate a^6 is a lug x^3 , to which is pivotally attached one end of a bar or rod x^4 , the other end of which rod is pivotally attached to the crank on said end of said bar W in the same manner as described by the rod or bar x' .

To the shaft W , between the operating-bars $N N'$, is attached a lever W' , which in the position shown rests upon the portion a^5 of the top of the box or receptacle A . $Y Y$ are steam-pipes which connect with the interior of the receptacle through the side a^2 , near the respective ends of the box, and steam is admitted by means of the stop-cocks y upon each separate pipe. To the bottom a^4 of the receptacle is attached a discharge-pipe Z .

In the operation of my improved machine the box or receptacle A is supplied with hot liquid starch so as to fill the box to the line of the upper edge of the pad on plate E , and the steam admitted through the pipes $Y Y$, whereby the starch is kept in a uniform heated condition. The articles to be starched are placed within the feed-opening between the separate parts of the cover of the box and arranged against the pad upon the plate E , which is submerged in and saturated with the liquid starch. The lever W' on shaft W is then raised to a vertical position, and the sliding portion a^6 of the cover is drawn toward the inner edge of the fixed part a^5 , the strip a^{12} on the sliding portion of the cover fitting closely against the rubber strip C on said portion a^5 of the cover, between which parts the clothes are held while being starched and the hot starch is prevented from escaping. In the same movement of the lever W' the bell-crank lever V throws the belt T from the loose pulley S to the fixed pulley R , and a reciprocating movement is immediately imparted to the bars $F F'$, and the plate H is forced forward within the starch and upon or against the articles lying against or upon the yielding pad.

In the forward movement of the plate H

the full compression of the plate is obtained against the intermediate articles, and at the same time the springs of the pad yield, thus forcing the starch into the fabric without friction upon the surface. At the same time the plate H, being perforated, allows the water to be discharged through the perforations, and thereby leaves the full strength of the starch itself within the article to be starched.

In the backward movement of plate H suction is caused upon the pad upon plate E and upon the fabric or articles subjected to the starch, and the hot starch is drawn through the fabric and a considerable amount is retained between the folds of the material, thereby preventing blistering and insuring an evenly and perfectly starched garment.

In the starching of linen bosoms of shirts the starch is forced through the thickness of the linen, and for the purpose of increasing the quantity of starch in the bosom the process is repeated as long as necessary to afford the result. In each reciprocatory movement of the plate H the pad is recharged with the starch, which in turn imparts the starch to the fabric, and the compression causes the starch to form a layer and remain in the interstices of the goods, expelling the water and leaving the solid part of the starch. As soon as sufficient starch has been applied to the articles the lever W' is forced in a downward direction upon the top plate α^5 , which action throws the belt T upon its loose pulley and causes the sliding portion α^6 to move back and open, so that the goods may be removed from the receptacle A. The operation is then repeated. It will be observed that the action of the lever W' causes a combined movement of the belt-shifting device and the cover of the receptacle.

Having fully described my invention, what

I now claim as new, and desire to secure by Letters Patent, is—

1. A starching machine consisting of a receptacle for holding a suitable supply of liquid starch, and a cover to said receptacle having separate fixed and sliding parts, a yielding pad connected with the sliding part of said cover, and extending within said receptacle, a compressing plate opposite said pad and means for communicating a reciprocating movement to said plate for the purpose described.

2. A starching machine consisting of a receptacle for holding a suitable supply of liquid starch and a cover to said receptacle having separate fixed and sliding parts, a pad connected with the sliding part of said cover extending within said receptacle, and a movable compression plate opposite said pad and mechanism connected with said sliding plate and said compression plate for operating said parts simultaneously as and for the purpose described.

3. A starching machine consisting of a receptacle for holding a suitable supply of liquid starch and a cover to said receptacle having separate fixed and sliding parts, a yielding plate having a pad thereon connected with said sliding plate and extending within the receptacle, a movable plate opposite said pad, pivoted vibrating bars having pivoted brace bars connected with said movable plate, a bearing for said movable plate within said receptacle and means for communicating a reciprocating movement to said vibrating bars for the purpose described.

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