

(No Model.)

3 Sheets—Sheet 1.

J. A. GROEBLI.

FABRIC PERFORATING MECHANISM FOR EMBROIDERING MACHINES.

No. 556,143.

Patented Mar. 10, 1896.

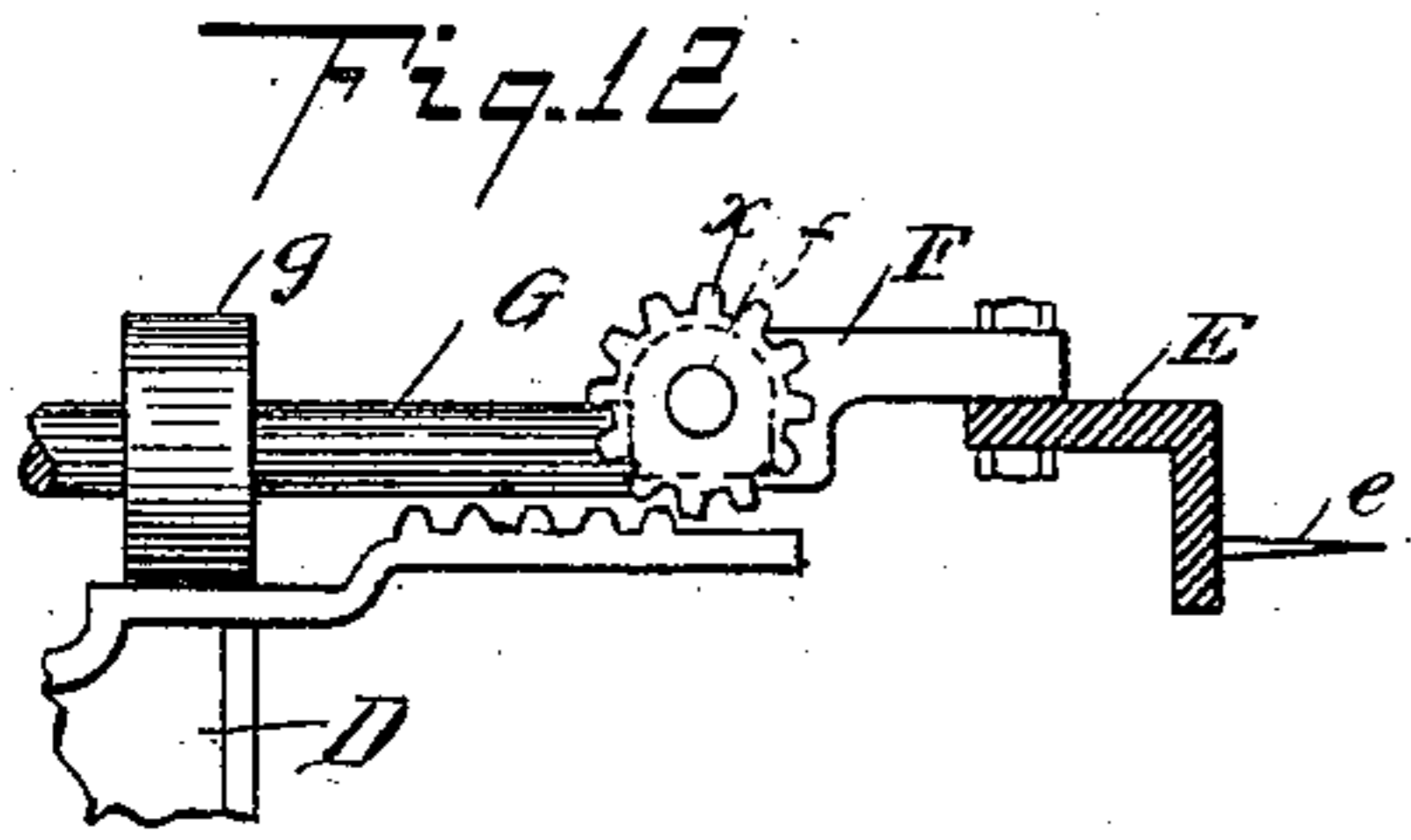
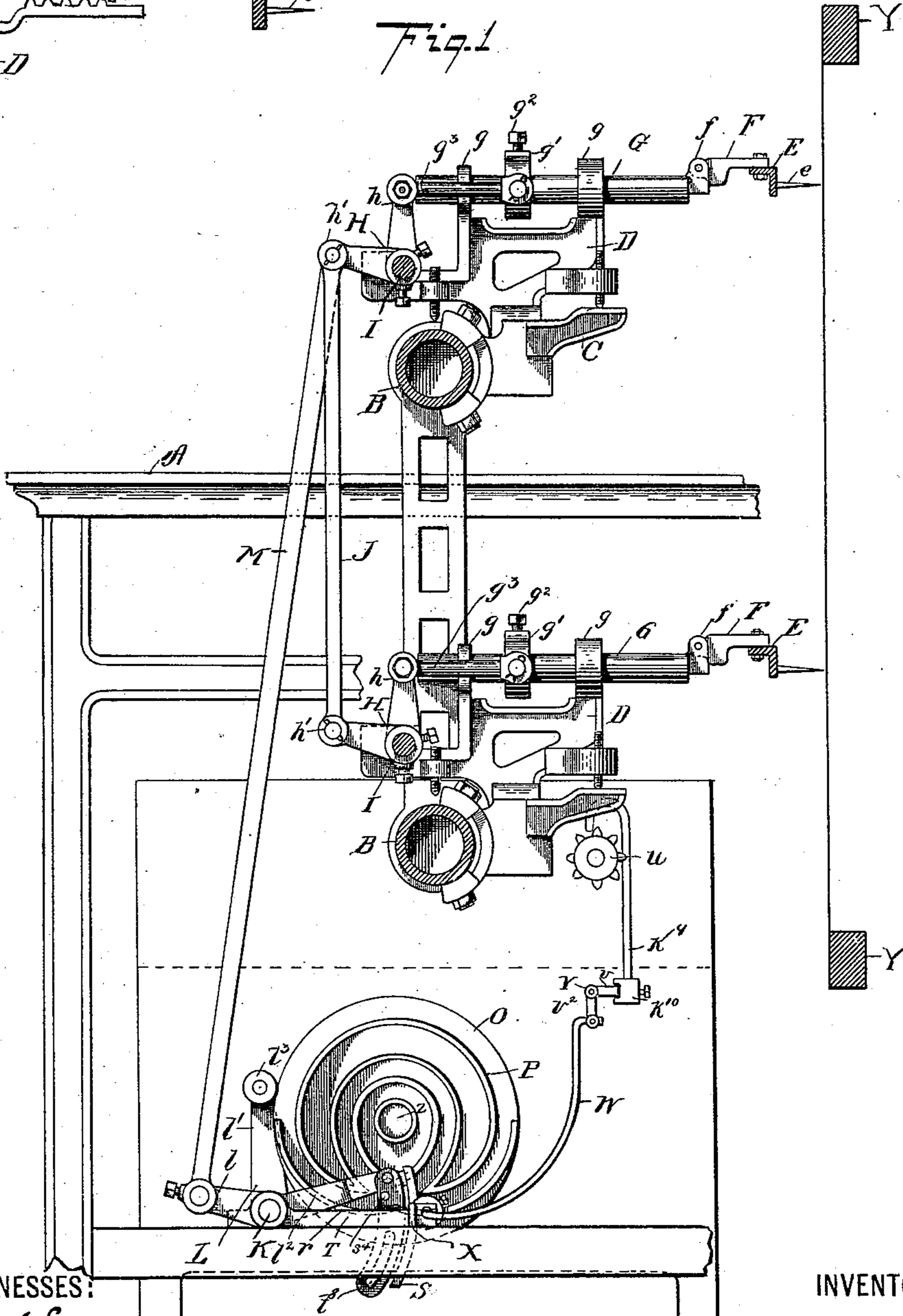


Fig. 1



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3 Sheets—Sheet 2.

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Fig. 2

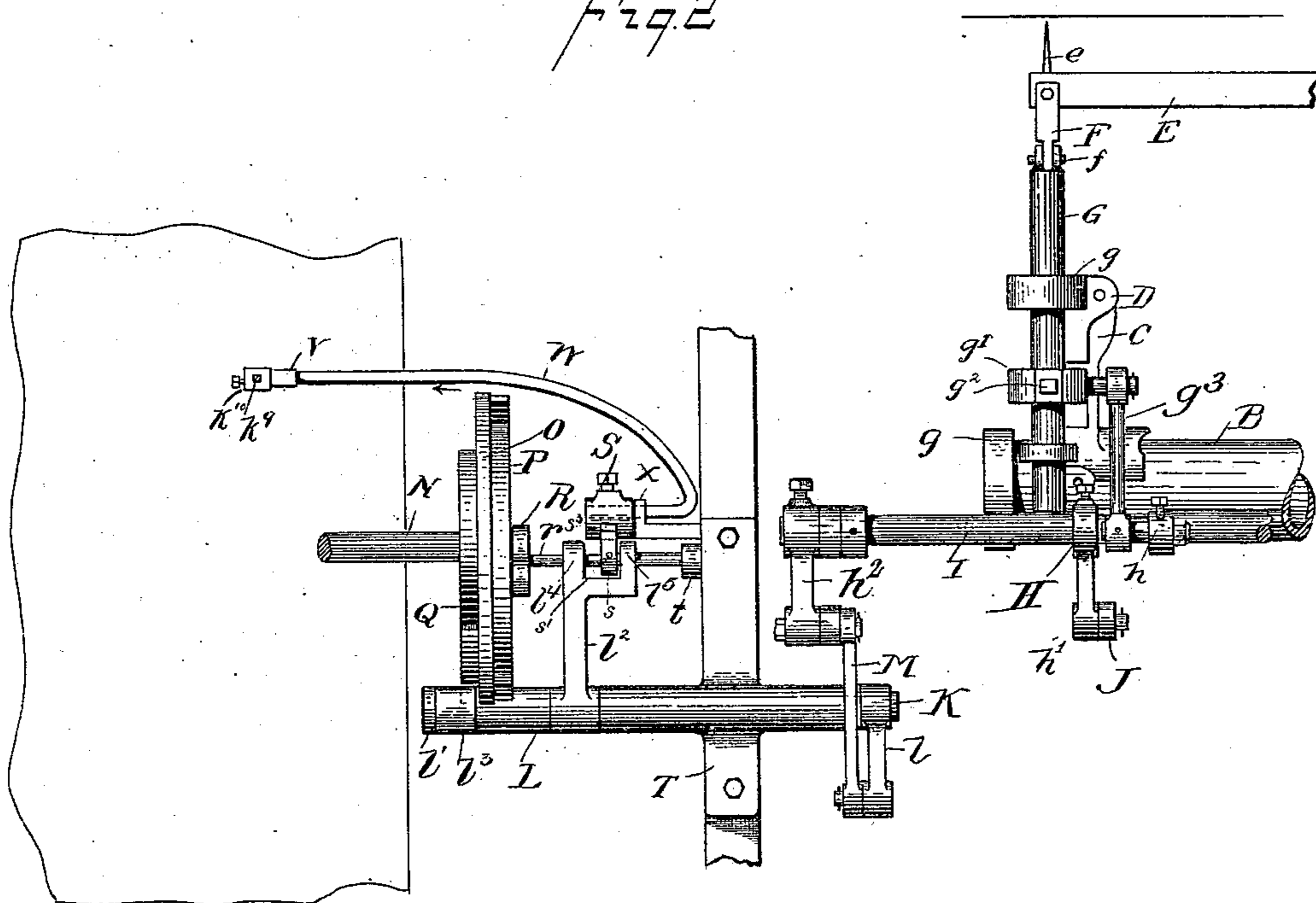
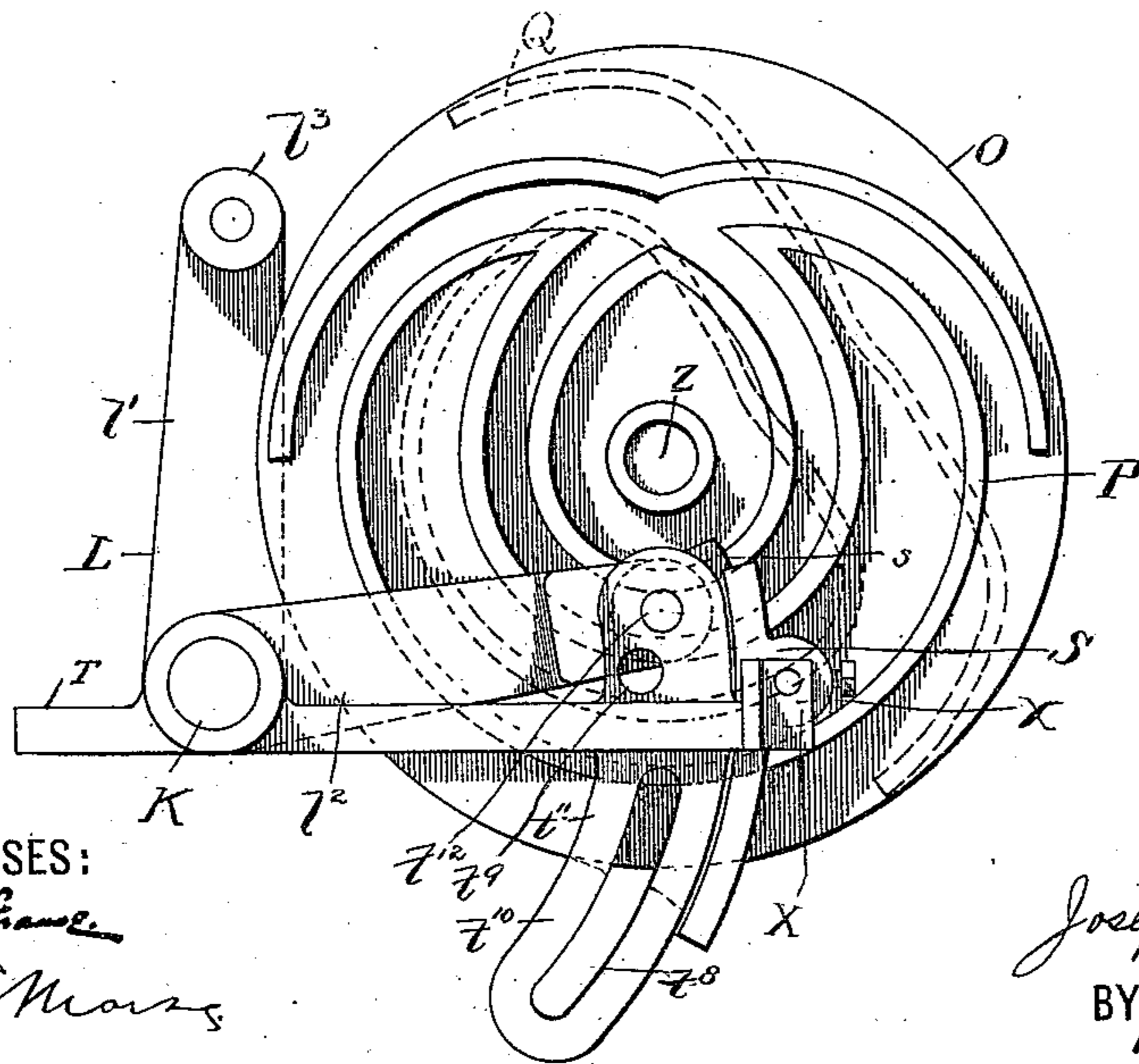


Fig. 3



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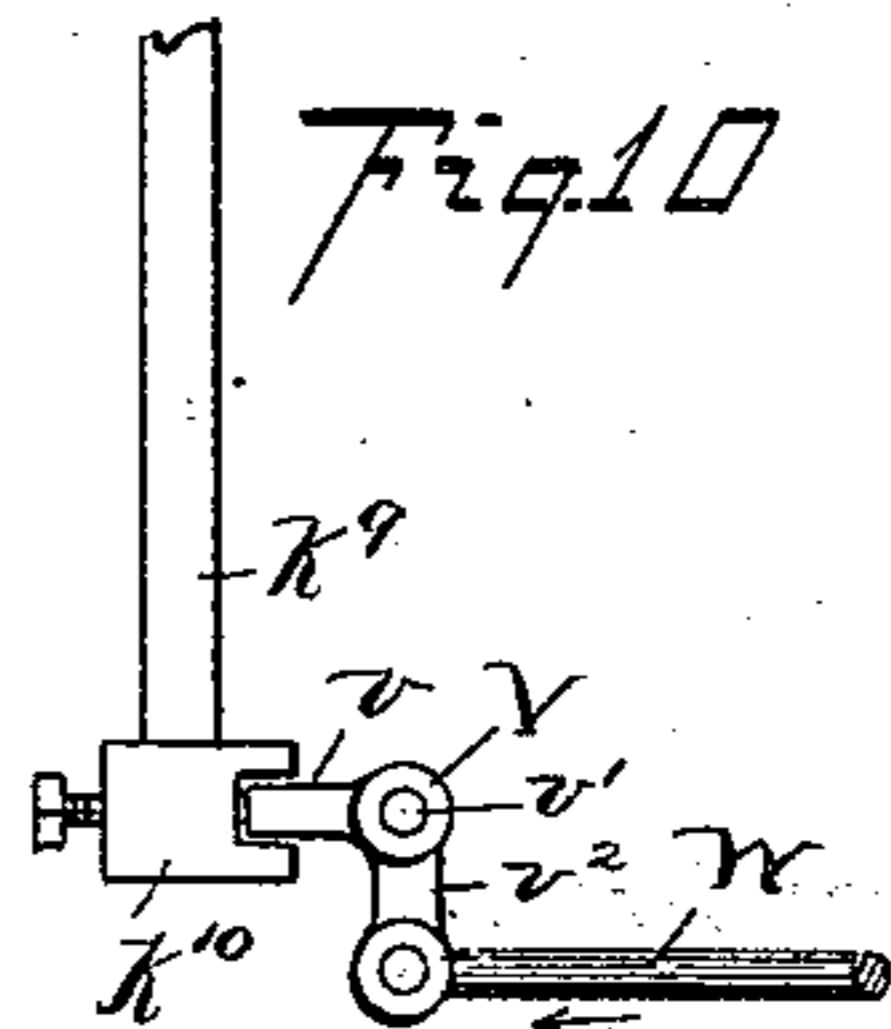
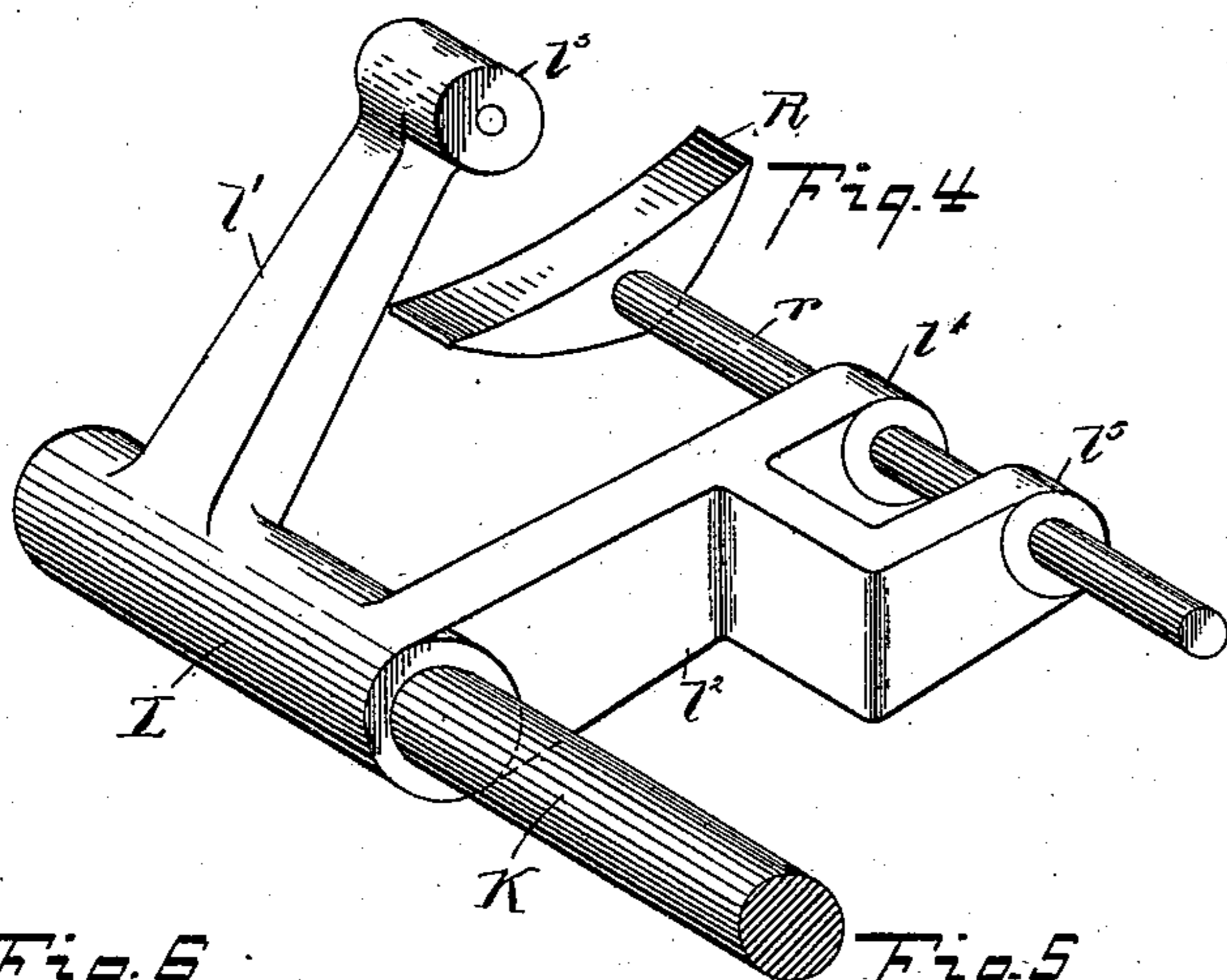


Fig. 6

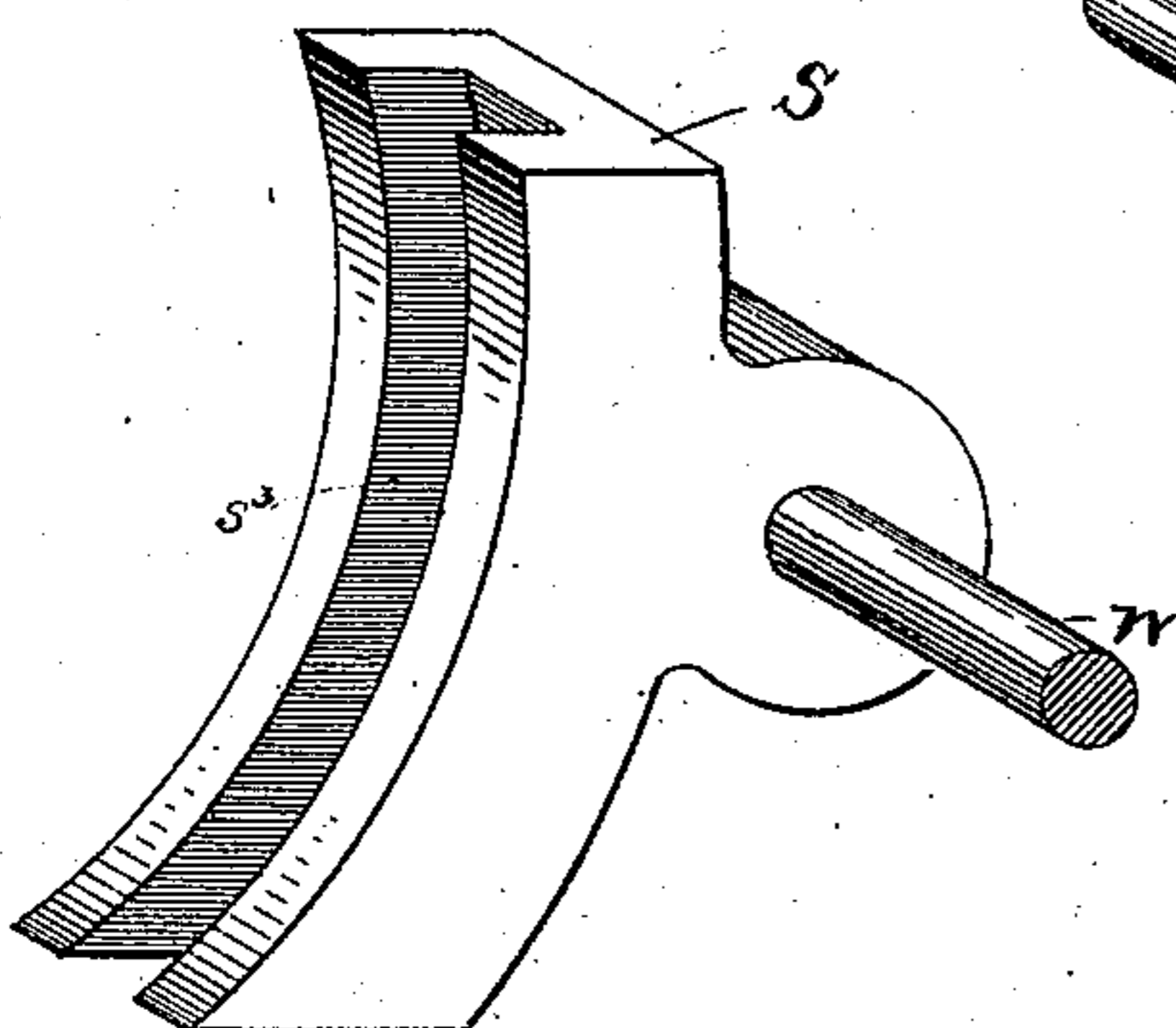


Fig. 5

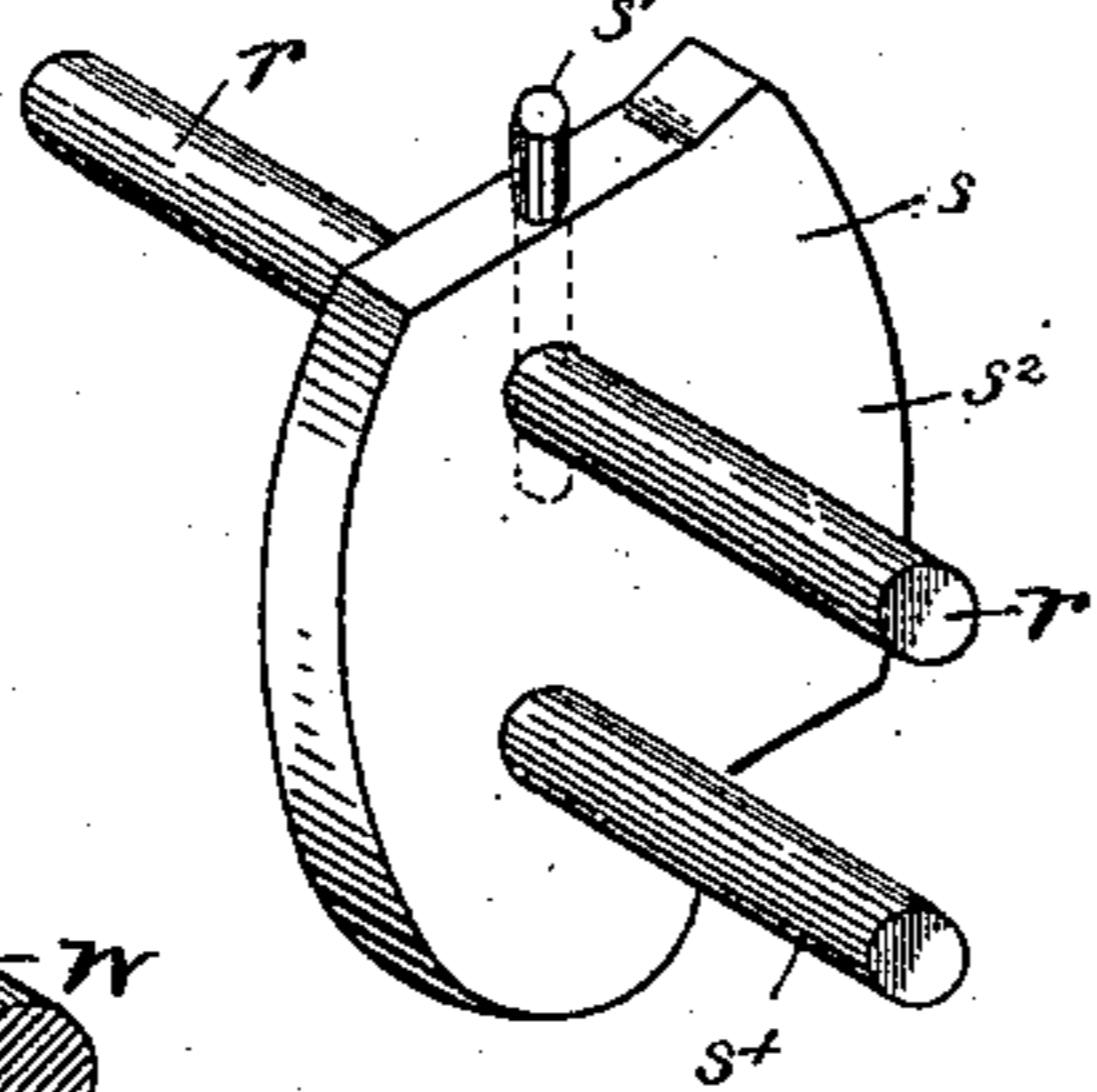


Fig. 11

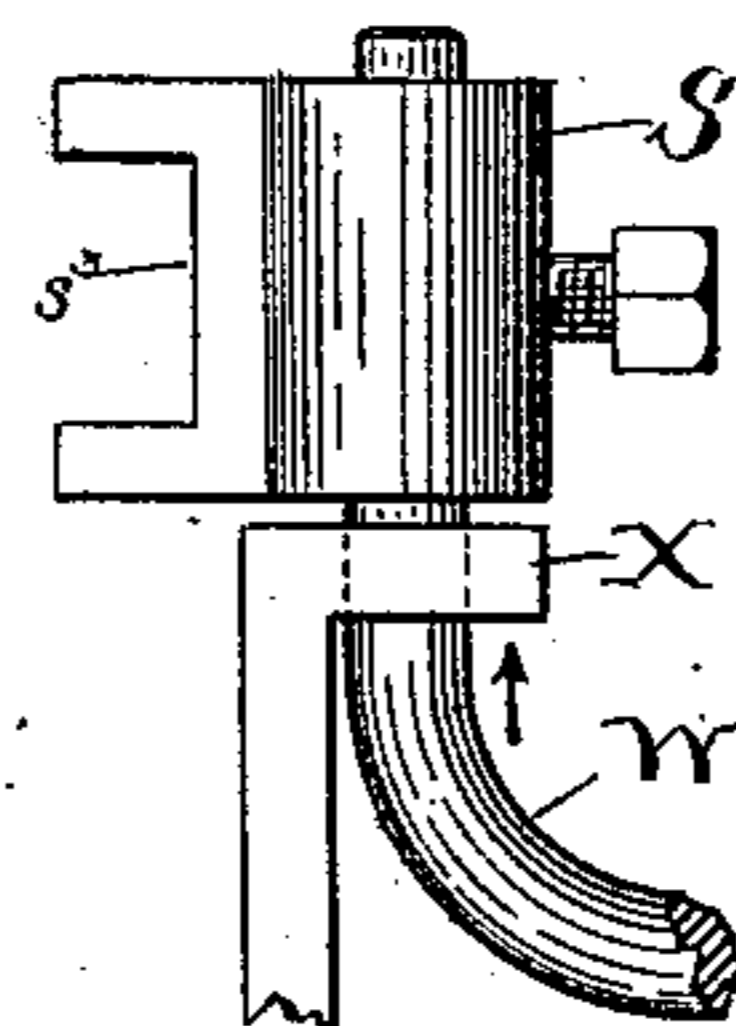


Fig. 7

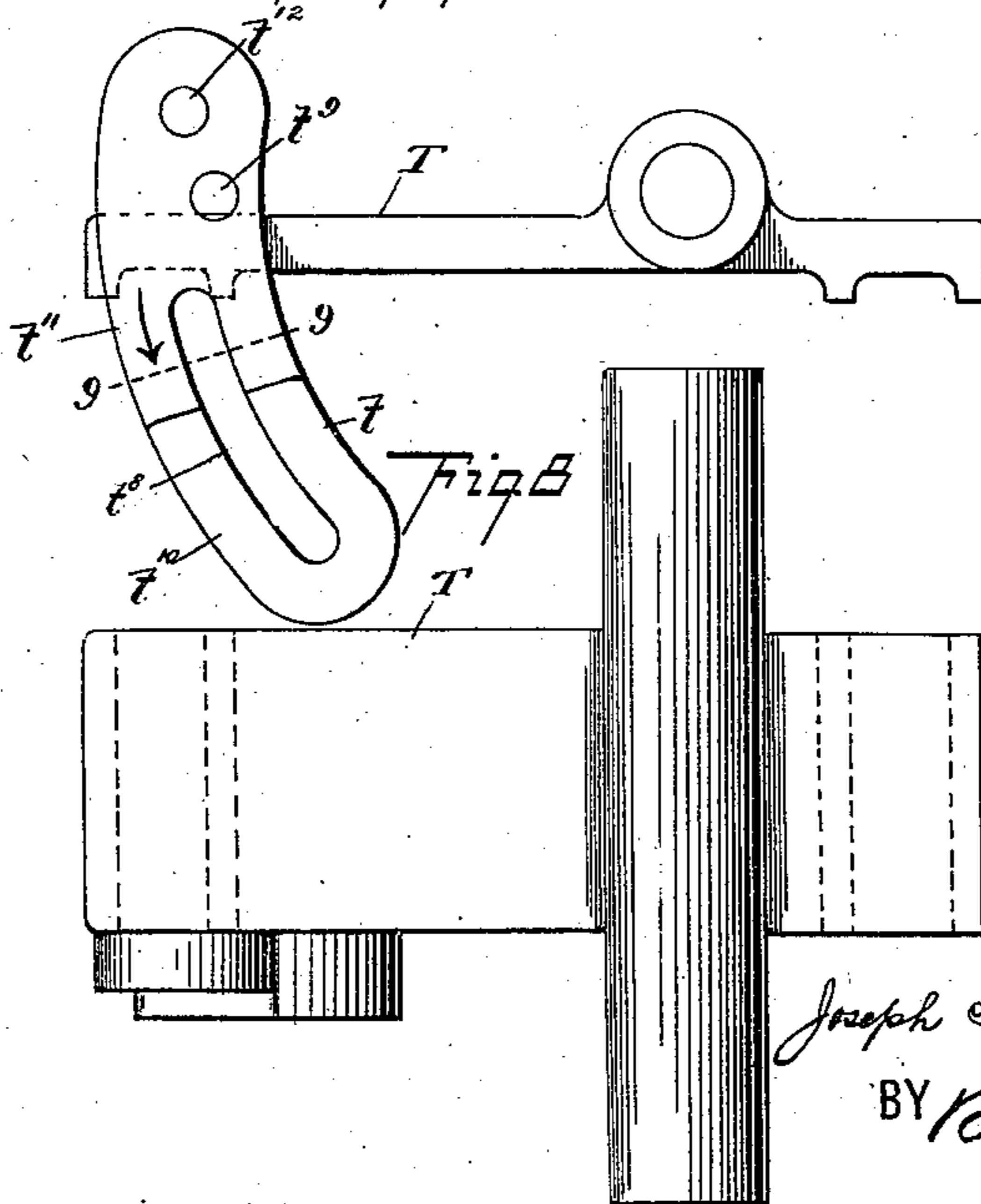
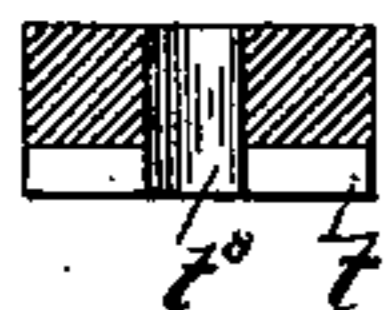


Fig. 8



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FABRIC-PERFORATING MECHANISM FOR EMBROIDERING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 556,143, dated March 10, 1896.

Application filed February 16, 1895. Serial No. 538,621. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH ARNOLD GROEBLI, a resident of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Fabric-Perforating Mechanism for Embroidering-Machines, of which the following is a specification.

My invention relates to piercing mechanism and has for its object to produce a mechanism for piercing or perforating fabrics stretched upon the tambour-frame of an embroidering-machine.

My invention consists in suitable mechanism operating with the aid of a jacquard to pierce or perforate a fabric stretched upon the fabric-frame of an embroidering-machine.

My invention will be understood by reference to the accompanying drawings, in which—

Figure 1 is a sectional end elevation of the fabric-frame of an embroidering-machine and piercing or perforating mechanism therefor embodying my invention. Fig. 2 is a plan view thereof. Fig. 3 is a detail side view of the operating-cams and mechanism actuated therefrom. Fig. 4 is a detail perspective view of parts hereinafter designated as the "rocking-arm" and "crescent" and of the parts immediately connected thereto. Fig. 5 is a broken-away detail perspective view of a guiding-piece hereinafter referred to. Fig. 6 represents a slide or guide in which the guiding-piece moves. Fig. 7 is a side view of a bracket supporting some of the operating parts. Fig. 8 is a plan view thereof. Fig. 9 is a section on line 9 9 of Fig. 8. Fig. 10 is a side view of the mechanism which connects the piercing mechanism with the jacquard. Fig. 11 is a plan view of part of the mechanism for moving the crescent into its cam, as will be hereinafter described, the same being a plan view of the guide shown in Fig. 6; and Fig. 12 is a modification showing a method of automatically swinging the perforating-bar on its pivot.

It will be understood that my invention has special reference to mechanism for piercing or perforating fabric stretched upon the movable tambour-frame of an embroidering-machine. This punching or perforating has

heretofore been accomplished by hand, and it is the special object of this invention to pierce or perforate this fabric by power with the aid of a pattern, such as a Jacquard device.

In the drawings forming part hereof, A is the frame of the machine, consisting in part of tubes B, which carry brackets C D, upon which the moving parts of the machine are supported and guided.

E is the perforating-bar of the machine, carrying one or more bore-points or perforators *e*, which may be of any suitable form. This perforating-bar E may be carried upon a suitable bracket F, which may be hinged or otherwise secured at *f* to a reciprocating rod or rods G, which work in guides *g g* carried by the bracket D.

Mounted upon the reciprocating rod G is a collar *g'*, which is held fast upon the rod by a set-screw *g*². This collar *g'* is connected by a link *g*³ with one arm *h* of a bell-crank lever H. The bell-crank lever H is attached to a suitable rock-shaft I. It will be observed that I have here shown, Fig. 1, this perforating mechanism as duplicated and the arms *h'* of the bell-crank lever H as connected by a pitman J.

It will of course be understood that I do not mean to limit myself to any particular number of piercing or perforating mechanisms or their connections.

Mounted upon some fixed part of the machine is a rock-shaft K, which carries a lever *l*, (see Figs. 1 and 2,) which is connected to the arm *h*² projecting from the rock-shaft I by a connecting-rod or pitman M.

Referring now particularly to Fig. 2, N is a power-driven shaft upon which is carried a cam-disk O provided with a cam P upon one face and a cam Q upon the other face thereof. Carried by the arm *l'* of the lever L, mounted on the rock-shaft K, is a roller *l*³, which co-operates with the cam Q, the other arm, *l*², of the lever L carrying a crescent R, (see Figs. 2 and 4,) which co-operates with the cam P. The arm *l*² of the lever L (see Figs. 2 and 4) is bifurcated and carries a pin *r*, which passes loosely through the two bifurcated ends thereof *l*⁴ *l*⁵. This pin is movable longitudinally in the bifurcated ends of the arm *l*², and carries fixed on one end thereof the crescent

R. Mounted upon the pin r between the ends l^4 l^5 of the arm l^2 is a guiding-piece s , which is rigidly secured to the pin r by a pin s' . One edge s^2 of this guiding-piece moves in a slot s^3 in the guide S . This guiding-piece is also provided with a pin s^4 , which is adapted to move with the pin r in a slot t^8 in a guide t carried by the bracket T or to enter the hole t^9 in the same bracket. This bracket T is mounted upon the frame of the machine. (See Figs. 1, 2, 7 and 8.)

Referring now particularly to Figs. 1, 2, 10 and 11, k^9 is a Jacquard pin or a moving piece connected with a Jacquard pin, which piece is suitably lifted by means of a Jacquard device u . Carried by the moving piece or Jacquard pin k^9 is a stirrup k^{10} . Within this stirrup k^{10} is engaged an arm v of a bell-crank lever V , which is pivoted at v' in some fixed position and has connected to its other arm, v^2 , an actuating-rod W , shown in the present instance as curved. This actuating-rod W (see Figs. 1, 2, 10 and 11) is connected at its other end to the guide S in which the guiding-piece s works. This rod W passes through a suitable guide-bracket X carried upon the machine (see Figs. 1, 2, 3 and 11) and serves to support the guide S .

Before proceeding to describe the detailed operation of my machine I will state by way of premise that the machine is designed especially to pierce or perforate fabric stretched upon the tambour-frame of an embroidering-machine with the aid of a Jacquard card. This fabric is most conveniently operated upon by being stretched upon a tambour-frame, as Y , which frame is in proximity to the piercing or perforating bar E . The frame may be moved by any suitable means and the motion of the perforating-bar so timed by its Jacquard device as to pierce the fabric at the desired place or places. This piercing may be variously effected from the Jacquard device, but in the particular machine under consideration the operation is as follows:

The moving piece k^9 is lifted by means of the Jacquard device, thereby rocking the bell-crank lever V on its pivot and pulling upon the rod W , moving the same laterally in the direction of the arrow in Fig. 2. The rod W carries with it in its movement the guide S . The guide S carries with it in its movement the guiding-piece s and rod r , which, moving longitudinally in the arms l^4 l^5 , enters the crescent R into the cam P . The parts are so located that this entrance takes place at the highest point of the cam—that is to say, the point nearest the center Z of the cam. By referring to Fig. 3 this initial position of the crescent may be established, as the pin r is in this figure so positioned as to enter the crescent into the cam at the proper place. It being remembered now that the shaft N is in rotation, the first effect of this entrance of the crescent R into the cam will be to move the crescent away from the center of the cam, thereby swinging the lever L upon its rock-

shaft K , bringing the roller l^3 into its cam Q and moving the slide G so as to position the boring-points e —that is to say, bringing these points into proximity to the fabric. As the shaft N continues to revolve, the roller l^3 co-operating with its cam Q will rock the lever L back and forth upon its rock-shaft K , thus reciprocating the pitman-rod M and thereby reciprocating the perforating-bar. These reciprocations may be of any desired number and will be of quite limited extent, as the cam Q has only a very small throw. In fact the extent of the reciprocation will be only sufficient to carry the perforating-bar from the position into which it was advanced by the crescent operating in the cam R and just far enough forward to push the bore-points e through the fabric to perforate the same. The movement of the parts in positioning the perforating devices is so timed that as soon as the cam Q has made one revolution the moving piece k^9 will ride out of the perforation or operating part of the Jacquard device and will be depressed, thereby moving the slide S back to its initial position, carrying with it the guiding-piece s , withdrawing the crescent R from its cam and entering the pins r and s^4 into the slot t^8 in the guiding-piece t of the guiding-bracket T fixed upon the machine where the guiding-piece will rock with the rocking of the arm l' , which continues to rock, the roller l^3 not having yet been disengaged from its cam Q . The next step is to disengage the roller l^3 from its cam. This is effected as follows:

When the desired number of perforations have been made in the particular places in the fabric, the moving piece k^9 is raised by the Jacquard device, (the moment of which raising is timed by the said Jacquard device,) and the raising of the moving piece k^9 operates to move the crescent R in position to be entered into its cam and to withdraw one of the pins r and s^4 from the slot t^8 , which served to guide them as the arm L rocked, so as to prevent the crescent R from turning on its pin, in order that when it is desired to re-enter the crescent into its cam it will be properly positioned for such re-entering. The pin thus withdrawn from the slot t^8 is the pin r , the remaining pin s^4 being prevented from passing out of the slot by the thick portion t^{10} of the guide. The crescent R having, it being remembered, passed out of the cam at its lowest point—that is, the point farthest from the center—it must in this case re-enter the cam at the same distance from the center of the cam as it went out and be moved toward the center of the cam, but at the point opposite to the point where it left the cam. The crescent is moved toward its cam by the jacquard acting through the medium of the actuating-rod W , and the pin s^4 will traverse the portion of the slot t' in the thick part of the guide t and pass out over the thin portion t^{11} of the guide t and at the point where the crescent enters its cam. This movement is

for the purpose of positioning the crescent to be caught by its cam as the cam revolves. As the cam revolves it will catch its crescent. When the crescent has entered its cam and is moved thereby to its initial position, Fig. 3, near the center of the cam, it has the effect of rocking the lever L and lifting the roller l^3 clear of its cam Q. These motions will be completed by the time the moving piece k^9 is ready to be moved out of or disengaged from the projection or perforation in the Jacquard device, and as the moving piece k^9 is so disengaged it will be depressed, thereby moving the guide S, carrying with it the guiding-piece s and moving the crescent R out of the cam P and entering the two pins r and s^4 into the two holes t^{12} and t^9 in the guide t to prevent any accidental motion of the rock-shaft or the crescent. The punching mechanism is now disengaged from its actuating device, (cams P and Q,) and the machine is in its original position.

Whenever it is desired to perforate a fabric, the perforation is accomplished in the manner just described—that is to say, the beginning of the perforating operation is determined by a Jacquard hole or projection, which operates to pull upon the rod k^9 to thereby engage the crescent R with its cam P, and as the cam proceeds to turn it will now rock the lever L, so as to move the perforating-bar up into proximity to the fabric. This movement of the bar is known as “positioning” the perforating device—that is, bringing it into such position so that the short reciprocations of the bar will be effective to perforate the fabric. As the cam P turns, it will, as aforesaid, rock the lever L, position the perforating device, and at the same time bring the roller l^3 into operative relation with its cam Q, so that as soon as the perforating-bar is positioned the roller engaging with its cam will impart a series of short reciprocations to the bar to perforate the fabric. As soon, however, as the perforating-bar has been positioned the Jacquard perforation or projection has been moved away from the rod k^9 , so that the crescent R is pulled out of its cam; but it must not be understood that the reciprocating motion of the perforating-bar ceases when the crescent R has been moved out of its cam, because the roller l^3 being still engaged with its cam the reciprocation will continue until the crescent R is re-entered into its cam, when it will rock the lever L in a reverse direction and will move the perforating-bar away from the fabric, and by this same movement of the lever L will withdraw the roller l^3 from operative relation with its cam and put a stop to the reciprocating movement of the perforating-bar. This re-engaging of the crescent R is effected by the jacquard, which acts to move it into the cam, allows it to remain in the cam until the lever L has been rocked, as aforesaid, and then withdraws it from the cam.

The removal of the perforating-bar from proximity with the fabric may be variously accomplished. For instance, I may provide the bracket or brackets F with a gear-wheel x or its equivalent (see Fig. 12) and mount a fixed rack y in operative relation thereto, so that as the bar G is moved during return of the crescent to its normal position the gear upon the bracket will co-operate with the fixed rack and will swing the perforating-bar back upon its pivot f out of proximity with the fabric. It will also be obvious that the perforating-bar will be swung into position positioned by the first or positioning movement of the crescent when it first enters its cam.

Now, while I have in specific terms set forth a particular machine and its mode of operation, describing certain parts as fixed or hung upon certain other parts and stating the parts to be in certain specified relations, I will have it understood that I do not mean thereby to limit myself to the machine and its elements thus set up, as the construction and arrangement of the parts and their interactions may be greatly varied by those who may desire to enjoy the fruits of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with the fabric-frame of an embroidering-machine, of a power-driven fabric-perforating device for perforating the fabric stretched upon the frame and pattern mechanism for setting the said perforating device into operation, substantially as described.

2. The combination with the fabric-frame of an embroidering-machine, of a power-driven shaft, a fabric-perforating device for perforating the fabric stretched upon the frame, intervening mechanism for the perforating device and connecting mechanism operating independently of the shaft for connecting the intervening mechanism with the shaft at predetermined times, substantially as described.

3. The combination with the fabric-frame of an embroidering-machine, of a fabric-perforating device for perforating the fabric stretched upon the frame, and actuating mechanism for the fabric-perforating device controlled by a pattern device, substantially as described.

4. The combination with the fabric-frame of an embroidering-machine, of a power-driven shaft, a fabric-perforating device for perforating the fabric stretched upon the frame, intervening mechanism for the perforating device, and a pattern mechanism for connecting the intervening mechanism with the shaft at predetermined times, substantially as described.

5. The combination with the fabric-frame of an embroidering-machine, of a power-driven shaft, a fabric-perforating device for perforating the fabric stretched upon the frame, intervening mechanism for the perfo-

rating device, connecting mechanism for connecting the intervening mechanism with the shaft, and pattern mechanism for controlling the connecting mechanism, substantially as described.

6. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device, for perforating the fabric stretched upon the frame, intervening mechanism for the perforating device, and pattern mechanism for controlling the intervening mechanism, substantially as described.

7. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame, a cam-shaft for actuating the said perforating device, and pattern mechanism for effecting the connections between the cam-shaft and the perforating device, substantially as described.

8. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame, a power-driven cam-shaft, actuating mechanism intervening between the cam-shaft and the perforating device, and means for engaging the actuating mechanism with the cam-shaft, the said engaging means being independent of the cam-shaft, substantially as described.

9. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame, intervening mechanism therefor, a power-driven cam-shaft arranged to actuate the intervening mechanism but normally disconnected therefrom, and means for engaging and disengaging the cam-shaft and oscillating mechanism, substantially as described.

10. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame, a reciprocating rod G, a bell-crank lever H connected to the reciprocating rod, a cam-shaft and Jacquard mechanism intervening between the bell-crank lever H and the cam-shaft, whereby the bell-crank lever is rocked by the cam-shaft, substantially as described.

11. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame, a reciprocating rod G, a bell-crank lever H connected to the reciprocating rod, a cam-shaft, a lever engaging with the cam-shaft, and a pitman M connecting the bell-crank lever and the lever engaging with the cam-shaft, whereby the bell-crank lever H will be rocked upon movement of the cam, substantially as described.

12. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame, a power-driven cam, a lever adapted to engage with the cam and con-

nected to the perforating mechanism so as to actuate the same, and connecting mechanism independent of the cam-shaft for engaging the cam with its co-operating lever, substantially as described.

13. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame, a power-driven cam-shaft, a lever adapted to engage with the cam and connected to the perforating device so as to actuate the same, and connecting mechanism actuated from a Jacquard card for engaging the cam with its lever, substantially as described.

14. The combination of the fabric-frame of an embroidering-machine, a perforating device for perforating the fabric stretched upon the frame, a power-driven cam-shaft, a bell-crank lever for actuating the perforating mechanism, and mechanism for engaging and disengaging an arm of the bell-crank lever with the cam, substantially as described.

15. The combination of a fabric-perforating device, a rock-shaft K for effecting the movement of the punching mechanism, an arm l' on the rock-shaft, a cam-shaft in proximity to the arm carrying a plurality of cams, an arm l^2 on the rock-shaft, and a movable piece as R carried by the arm l^2 , means for engaging and disengaging the piece R and one of the cams whereby when the piece R is engaged with the cam-shaft, the arm l' will be brought into position for engagement with the other cam, substantially as described.

16. The combination of a fabric-perforating device, a rock-shaft K for effecting the movement of the perforating mechanism, an arm l' on the rock-shaft, a cam-shaft provided with a plurality of cams in proximity to the arm, an arm l^2 on the rock-shaft, and a movable piece as R carried by the arm l^2 , means for engaging and disengaging the piece R and one of the cams, whereby when the piece R is engaged with the cam, the arm l' will be brought into position for engagement with the other cam, and means for preventing the piece R from rotating when it is disengaged from the cam, substantially as described.

17. The combination of a fabric-perforating device, a rock-shaft K for effecting the movement of the perforating mechanism, an arm l' on the rock-shaft, a cam-shaft in proximity to the arm provided with a plurality of cams, an arm l^2 on the rock-shaft, and a movable piece as R carried by the arm l^2 , means for engaging and disengaging the piece R and one of the cams, whereby when the piece R is engaged with its cam, the arm l' will be brought into position for engagement with the other cam, a guiding-piece s to which the piece R is connected, a guide S in which the guiding-piece s works, and a connection between the guide S and the jacquard for moving the guide S laterally to effect the engagement of the

piece R with the cam, substantially as described.

18. The combination of the fabric-frame of an embroidering-machine, a power-driven fabric-perforating device for perforating the fabric stretched upon the frame with mechanism substantially as described for positioning and actuating it, and pattern mechanism for controlling its operation at predetermined times.

19. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating device for perforating the fabric stretched upon the frame and mechanism substantially as described for connecting it to and disconnecting it from its driving mechanism and for locking it when disconnected, so as to retain it in proper position in which it may be reconnected.

20. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating mechanism for perforating the fabric stretched upon the frame, a power-driven shaft for driving the perforating mechanism, and mechanism substantially as described for positioning the fabric-perforating mechanism,

and mechanism independent of the shaft for setting the positioning mechanism in action.

21. The combination of the fabric-frame of an embroidering-machine, a fabric-perforating mechanism for perforating the fabric stretched upon the frame, a power-driven shaft for driving the perforating mechanism, and mechanism substantially as described for positioning the fabric-perforating mechanism, and a pattern mechanism for setting the positioning mechanism in action.

22. The fabric-frame of an embroidering-machine combined with a power-driven shaft and a fabric-perforating device and mechanism substantially as described for setting the perforating device in operation at predetermined times, and mechanism for locking the perforating device when not in operation, so as to retain the perforating device in proper position in which the said perforating device may be reconnected.

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Witnesses:

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