

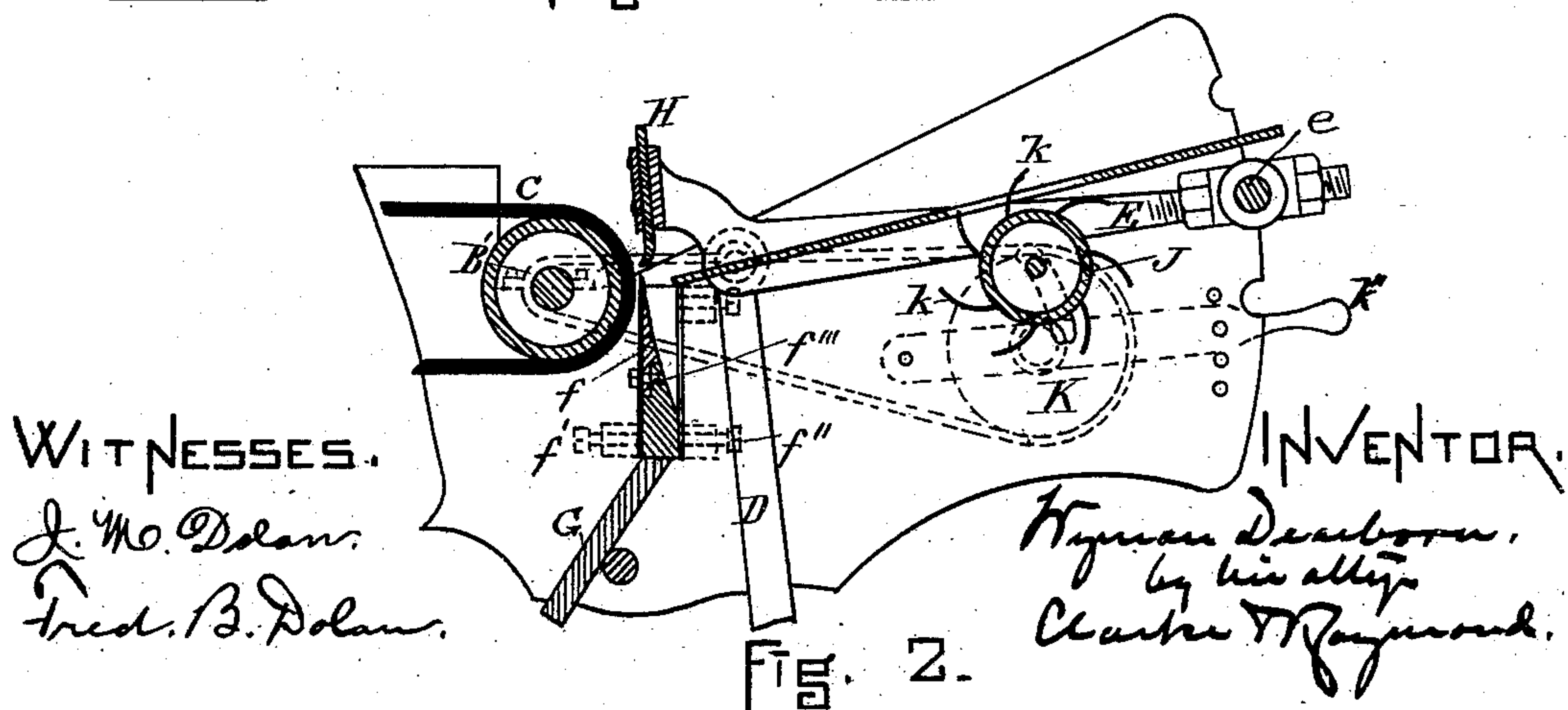
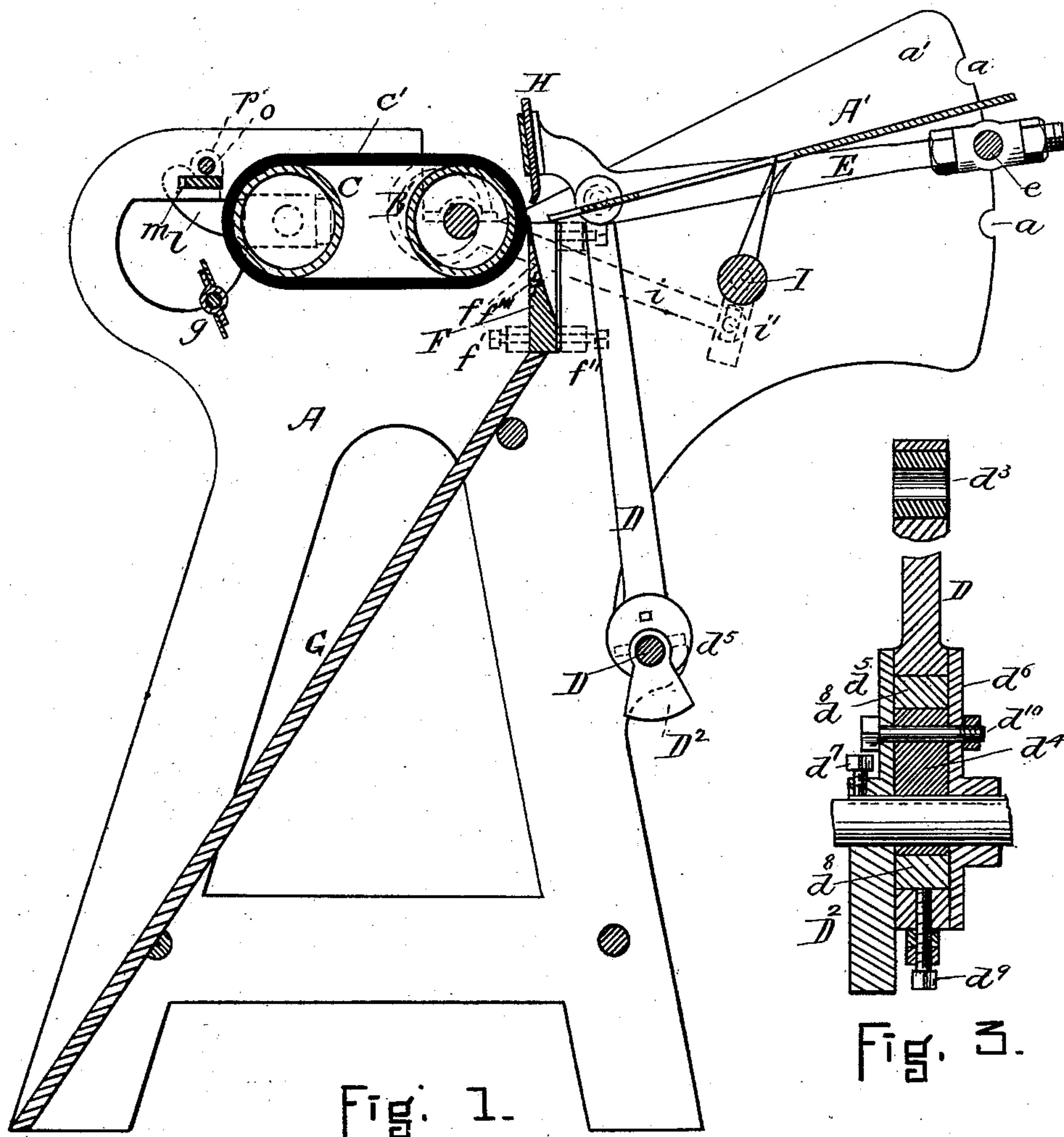
(No Model.)

4 Sheets—Sheet 1.

W. DEARBORN.
WOOL BURREING MACHINE.

No. 393,746.

Patented Dec. 4, 1888.



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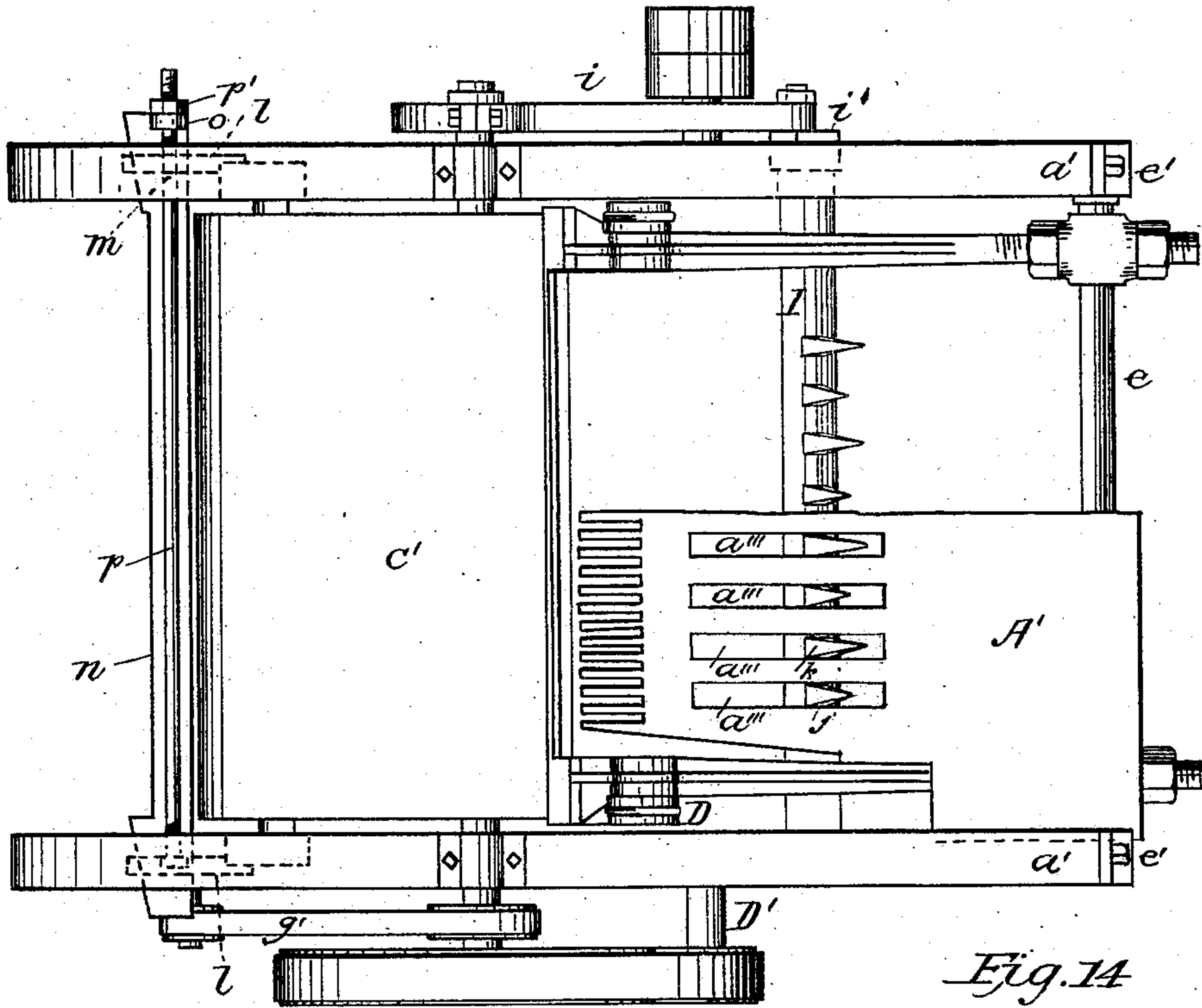


Fig. 14

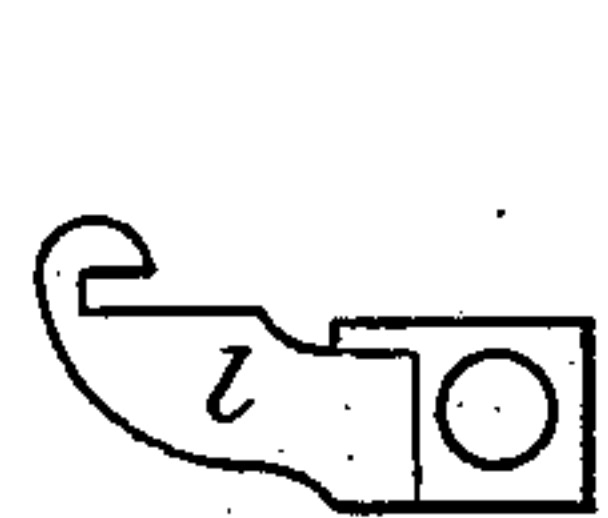


Fig. 13.

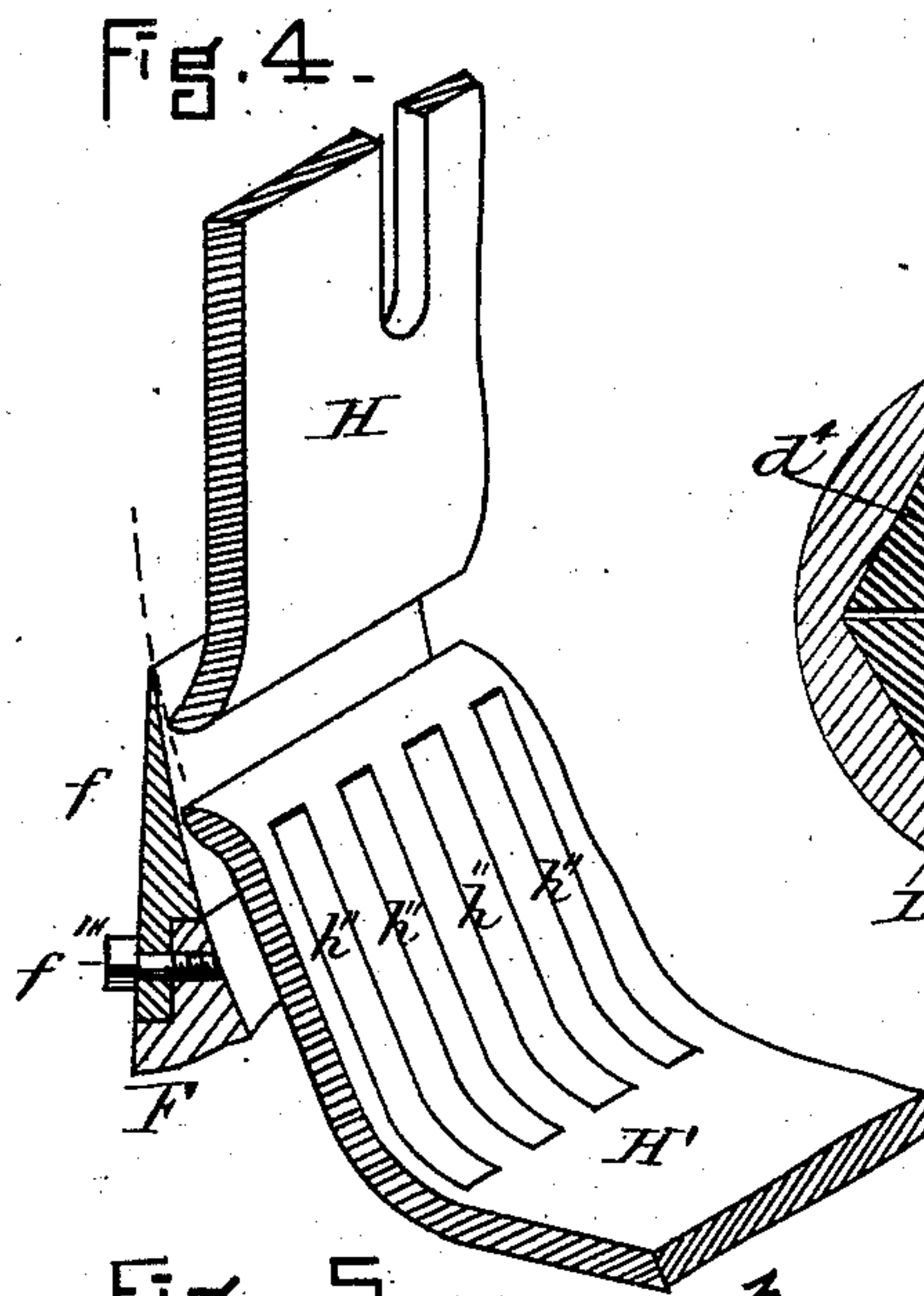
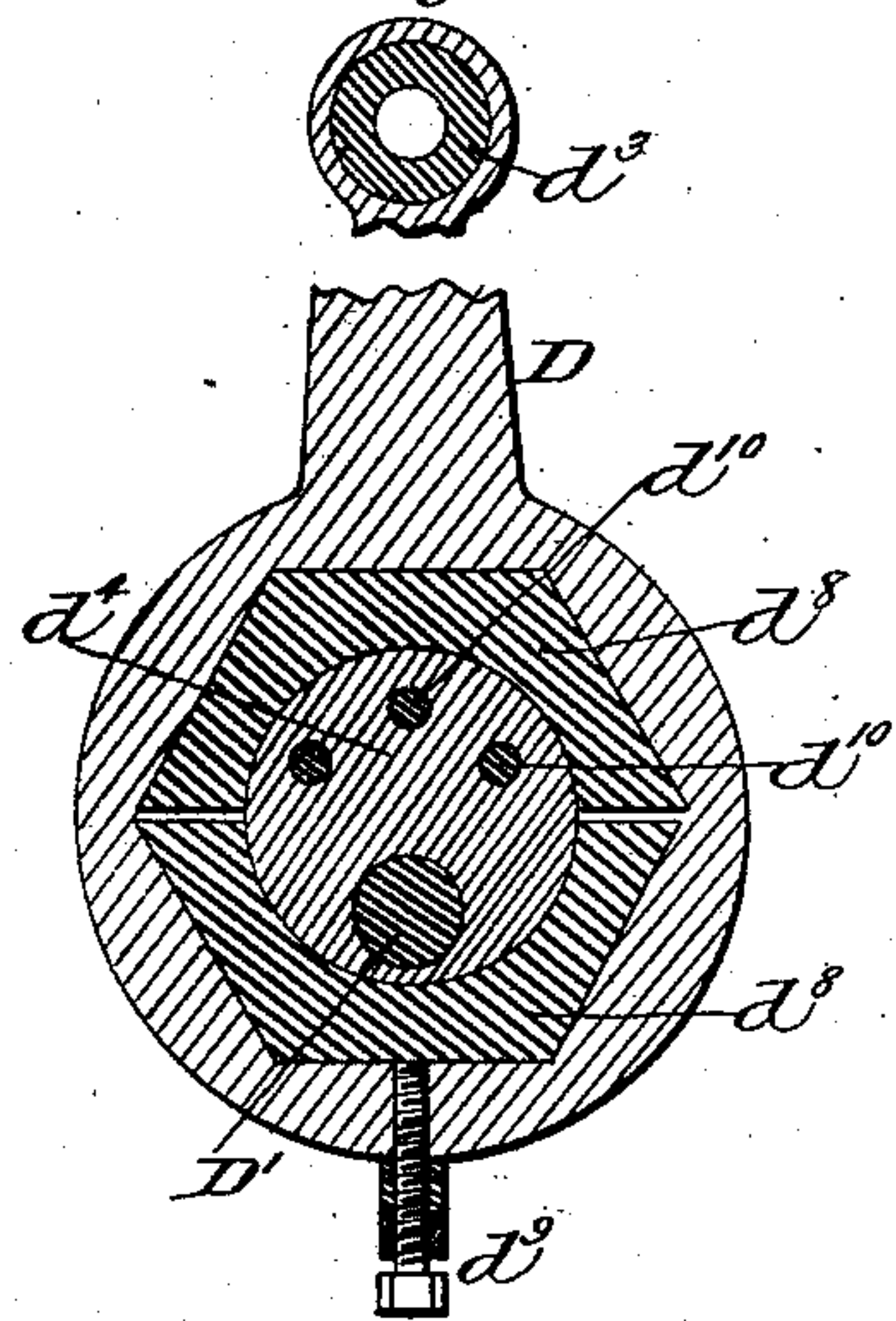


Fig. 5.



WITNESSES.

J. M. Dolan.

Fred. B. Dolan.

INVENTOR.

Wm. Dearborn,
by his attys
Carter & Raymond.

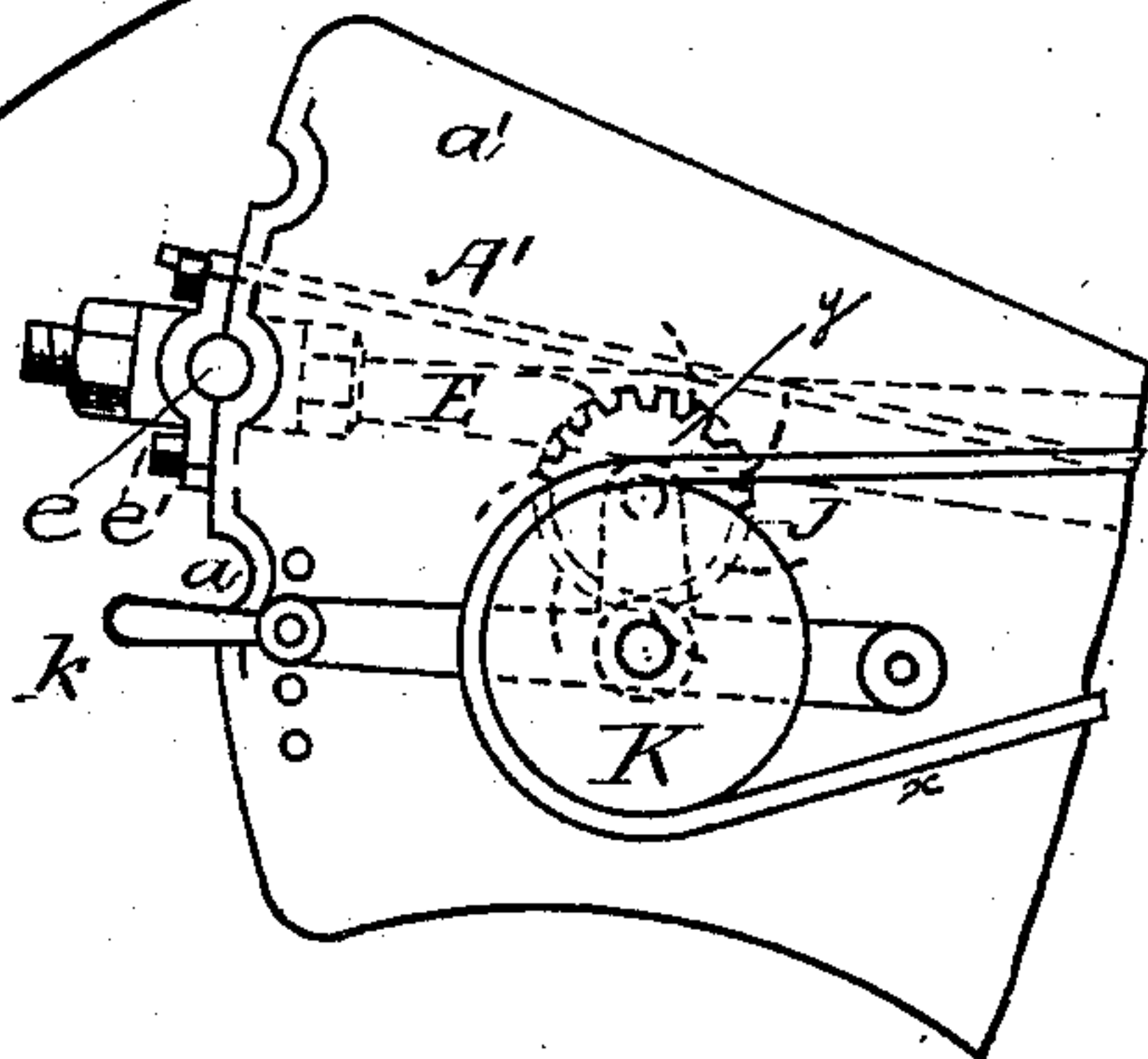
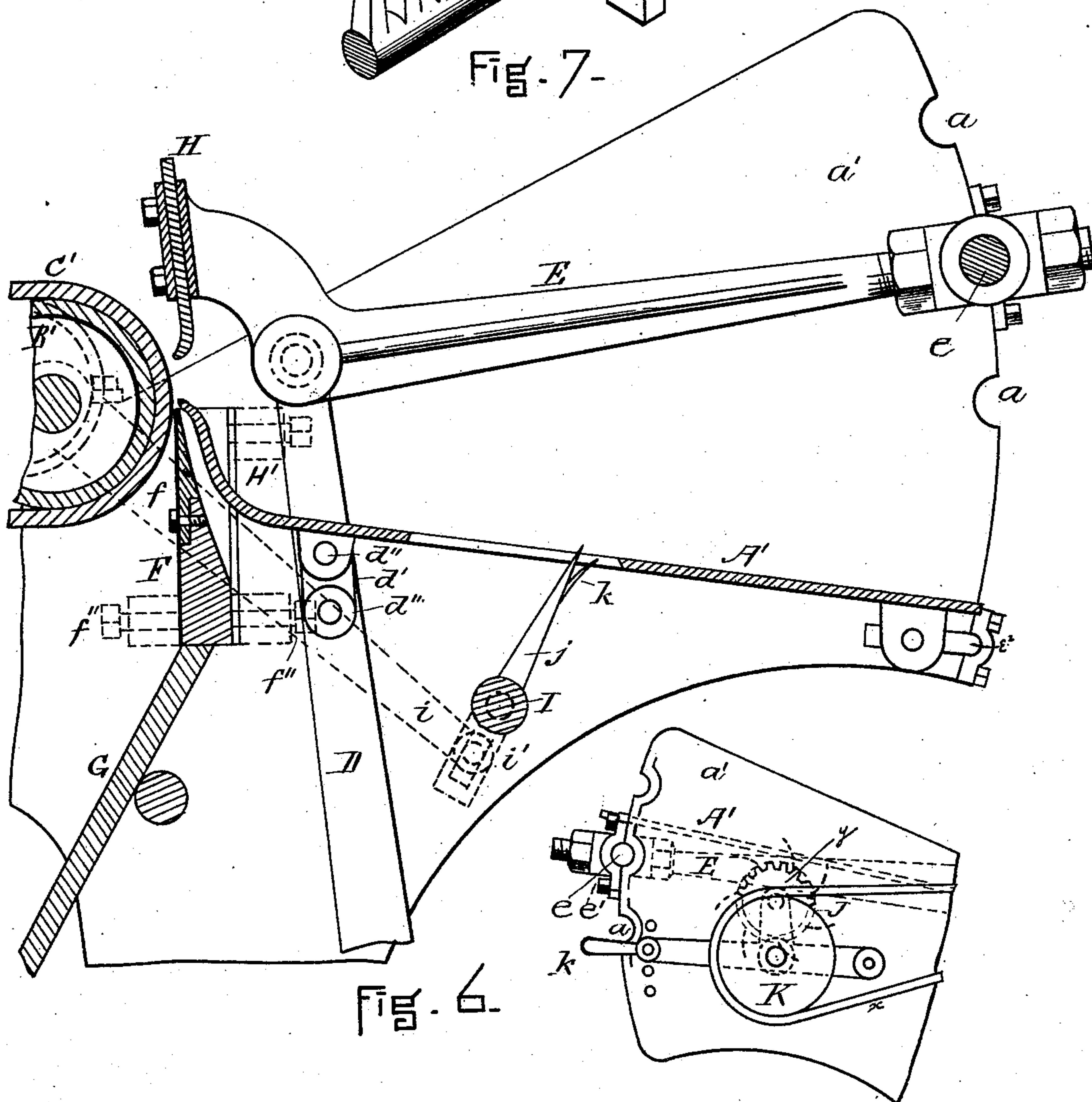
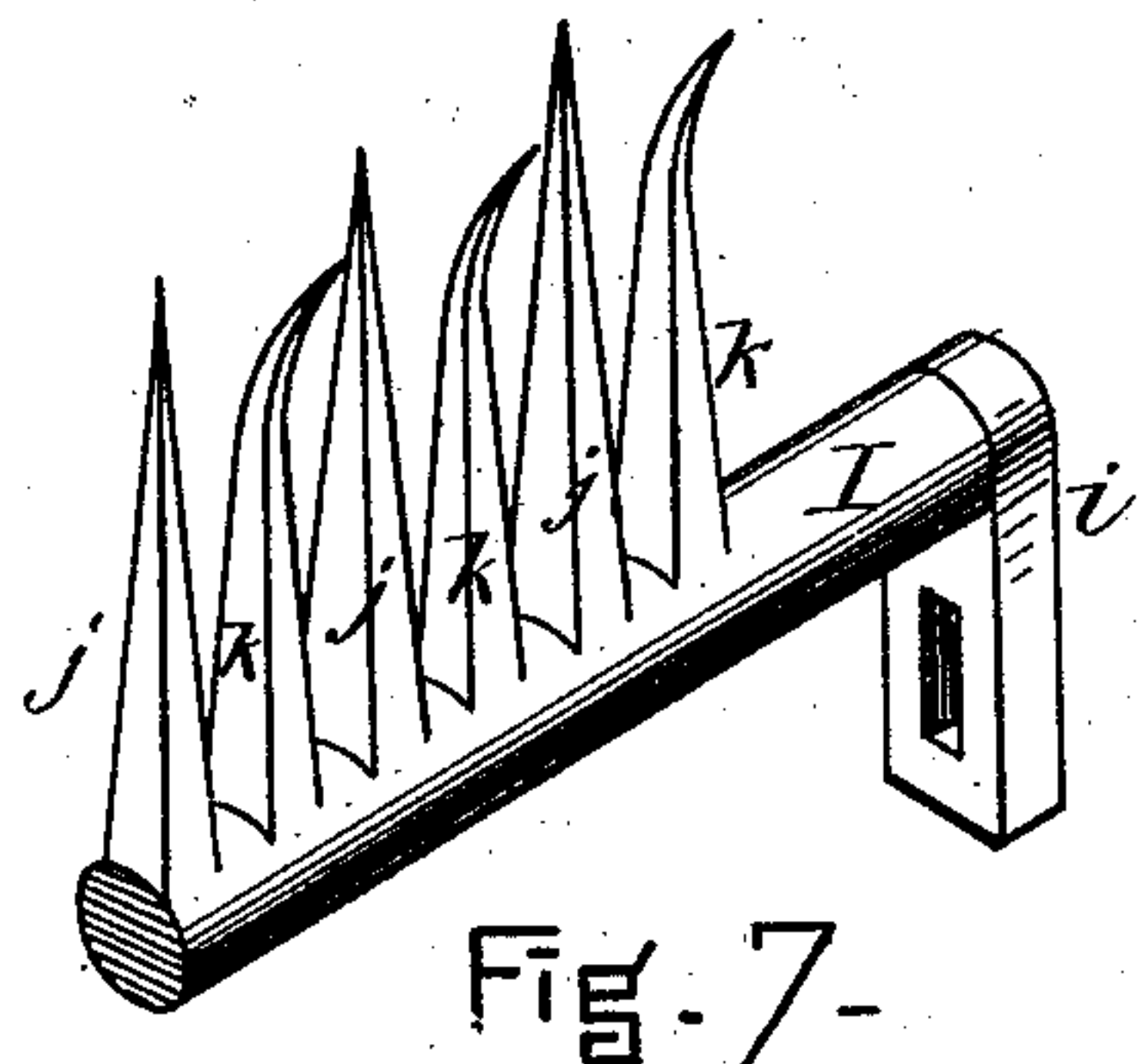
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WITNESSES.

J. M. Dolan.
Fred. B. Dolan.

Fig. 8. INVENTOR.
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Clark & Hayward.

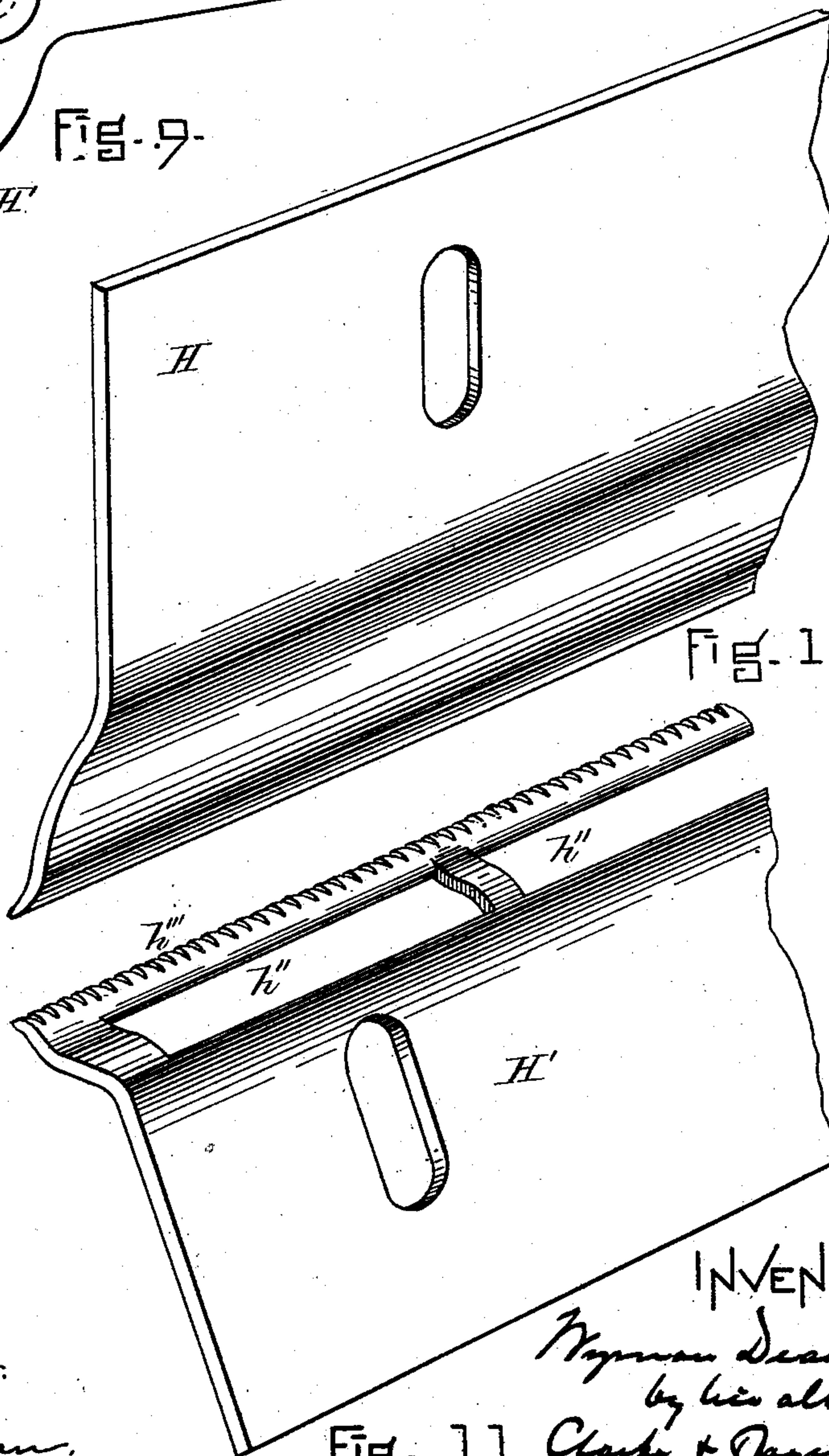
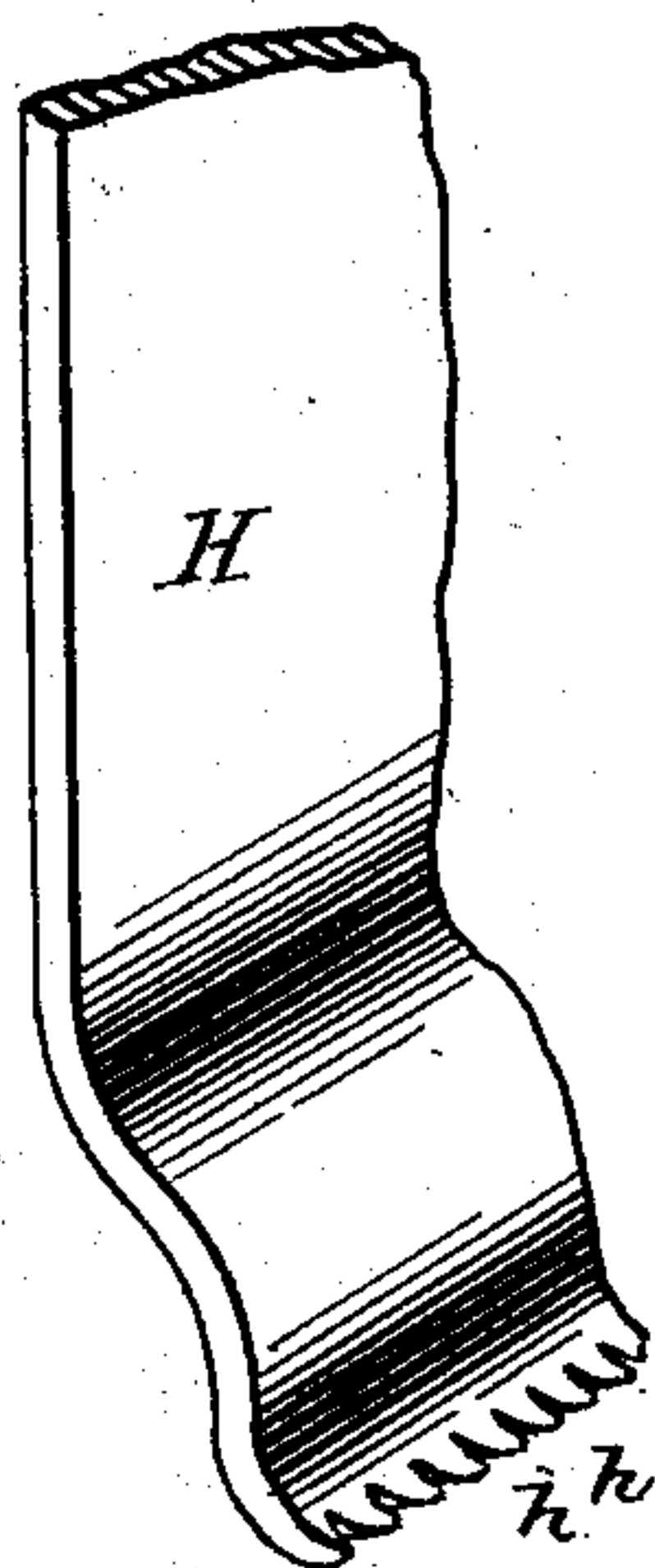
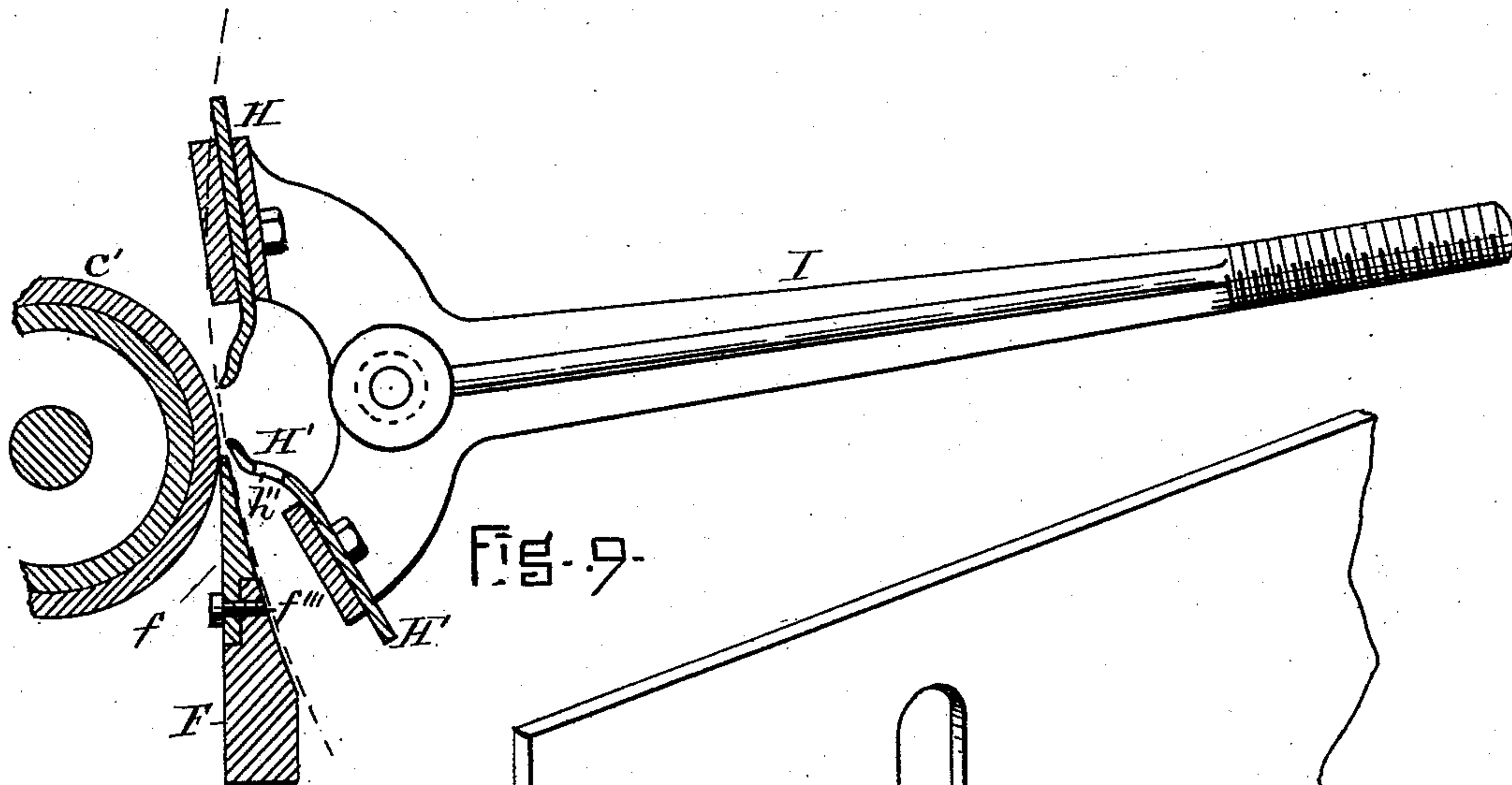
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WITNESSES.

J. M. Dolan.
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INVENTOR.

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Clark & Hayward.

UNITED STATES PATENT OFFICE.

WYMAN DEARBORN, OF BOSTON, MASSACHUSETTS.

WOOL-BURRING MACHINE.

SPECIFICATION forming part of Letters Patent No. 393,746, dated December 4, 1888.

Application filed January 27, 1887. Serial No. 225,627. (No model.)

To all whom it may concern:

Be it known that I, WYMAN DEARBORN, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Wool-Burring Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

In burring wool two methods are commercially practiced—one mechanical, in which the burring-machine is something like the saw-gin used for cotton, and one chemical, in which the burrs are dissolved by acids. The chemical method is not successful with the larger sorts of hard burrs, and is said to injure the felting quality of the wool. The mechanical method is nearly certain to break a considerable part of the fibers and thereby injure the staple. The mechanical method is applied, commercially, only to scoured wool, and it is not believed to be practical to use it upon wool “in the grease” on account of the “suint” of the wool clogging the parts.

The principle of the saw-gin is the principle that has hitherto usually been adapted to burring wool mechanically. In this the fiber containing burrs or seeds is brought up to a grating too small for the seeds or burrs to pass, and the fibers are caught by fine teeth, which project through the grating and pull the fibers away from the burrs or seeds. This principle is sometimes modified by using two sets of teeth running in opposite directions on neighboring or on the same tangents; but this is obviously only the substitution of two combs for one comb and a grating.

I am aware that a patent was granted to E. J. McCarthy, dated January 10, 1860, No. 26,775, in which there was a draw-roller, a device called a “breast-plate,” a stripper, and a pair of feed-rolls, one of which was serrated for the purpose of holding one end of the fiber, while the opposite end was held by the breast-plate and draw-roll.

I am also aware that a patent was granted to Platt and Richardson, of Oldham, England, No. 36,727, of October 21, 1862, in which there was a toothed roller, a set of fixed spikes, an endless apron of leather or other flexible ma-

terial with transverse bands, a fluted roller, and a sort of roller-gin.

I am also aware that a patent was granted to R. J. Clay April 2, 1867, No. 63,471, in which was described a gang of reciprocating tooth-shaped blades with saw-teeth at their edges, which worked through ways or passages; but this machine, as I understand it, was a reciprocating saw-gin instead of a rotating saw-gin.

I am also aware that there was a patent granted to J. K. Proctor, No. 208,493, October 1, 1878, in which was described a machine which had five sets of saws and a series of brushes and fans, but in which the saws did not work, as a rule, through gratings.

The principle involved in roller-ginning has seemed to me better adapted for burring wool than the principle of the saw-gin. In the roller-gin the fiber is caught between the presser-bar and roll of the gin, and the seed is knocked out of it by vibrating clearers, the fiber being very little broken in the operation. I therefore attempted to apply the principle of the roller-gin to the burring of wool, and I desired to remove the burrs from uncleaned wool, or, as it is technically called, “wool in the grease.” I have found that the character of the work of burring wool requires some changes and modifications in the working parts of the machine, and these changes, which seem to be essential for the performance of the work, and which I was only able to make after repeated experiments, I now propose to describe and patent. They relate to the texture of the friction-surface of the roller, to the shape of the clearer blade or blades, and particularly to the shape of the working-edges of these blades, to the presser-bar, and to certain appliances connected with the feed-table.

With the form of construction hereinafter described I have removed from unscoured wool all sorts of burrs without injury to the fiber, with hardly any waste, excepting the loss of the weight of the burrs themselves, and without suspicion on the part of anybody to whom the work was exhibited after it was finished that the wool had ever been burred.

The machine here illustrated belongs to the belt-gin type of roller-gin, and in many respects is similar to the Murray gin, patented

February 4, 1873, No. 135,485. It is obvious that the changes in the working parts herein illustrated and described are equally applicable to a gin in which the rolling frictional surface is of cylindrical form, as in the roller-gin proper, as it is to a gin in which the rolling cylindrical surface is of nearly elliptical form, as in what is technically termed the "belt-gin."

10 In the drawings, Figure 1 is a vertical section of the machine. Fig. 2 is a similar section of the head and front of the machine, showing a slight variation of some parts. Fig. 3 is a transverse section of some parts of the
15 connecting-rod D of Fig. 1. Fig. 4 is a top plan of the head of the machine. Fig. 5 is a perspective detail of the parts of the presser-bar and clearers. Fig. 6 is a section, on a larger scale than before, of the head and front of the
20 machine in another modified form. Fig. 7 is a perspective of the feed-table drag-teeth. Fig. 8 is an elevation of part of the side of the machine which is hidden in Fig. 2. Fig. 9 is an elevation of the clearers and of the
25 roll, belt, and presser-bar in section. Figs. 10, 11, and 12 are details of clearer-blades. Fig. 13 is an elevation of part of the belt-straining device. Fig. 14 is a section of the parts illustrated in Fig. 3 at right angles to
30 the section shown in Fig. 3.

A is the frame of the machine; A', the feed-table.

B' C are rolls over which runs the endless belt C'. This is made of several plies of
35 duck vulcanized together with india-rubber compound. It should have six or more plies. I have usually used a belt with about twelve plies. While for commercial purposes in ginning cotton it is essential that the duck of
40 which this multiple-ply belt is made should be comparatively coarse, in burring wool, it is as essential that the duck should be comparatively fine. I have found by experience that what is known as "twelve-ounce hose-duck"
45 gives the best results in belts for burring wool. There is, of course, a small range of weights and sizes of threads either way from this number of duck; but the practical statement of this requirement is that for burring
50 wool the belt or covering for the roll must be made of about twelve-ounce hose-duck cemented with vulcanizable material and vulcanized. For ginning cotton such a belt or roller-cover, to get the best results, is made of
55 about eighteen-ounce hose-duck. The belt must, as in the cotton-gin belts, be built up with a minimum quantity of rubber between the plies.

D is the connecting-rod, which actuates the
60 clearer H, and is itself actuated by the eccentric d^1 , which is on the driving-shaft D', as can be understood from Fig. 4. If any other form of reciprocating clearer than that shown at H, Fig. 1, is used—as, for instance, the form
65 shown in Fig. 9—the connecting-rod D will be used to actuate that as well. The upper part of this connecting-rod D has an eye

formed in it, into which is driven the wooden bushing d^3 , as shown in Figs. 3 and 14. The
70 main shaft D' has mounted upon it an eccentric, d^1 , and two cheeks, d^5 d^6 , and these cheeks are fastened to the shaft by set-screws d^7 or by a spline, which would be the equivalent of these set-screws. A large eye formed
75 at the lower end of the connecting-rod D envelopes this eccentric, and there is space enough between the interior of this eye and the exterior of the eccentric for a wooden bushing, d^8 . This wooden bushing is made
80 in two parts, which are allowed to have a small interval between them, and in case of wear these parts are forced together, so that the bushing d^8 fits closely to the exterior of the eccentric d^1 by driving in the adjusting-
85 screw d^9 , which passes through the lower part of the lower eye of the eccentric-rod D. On one of the flanges d^5 is attached a counterweight, D², to act as a counterpoise to the eccentric in the revolution of the shaft D'. In
90 order to unite these cheeks d^5 d^6 firmly with the eccentric d^1 , a bolt, d^{10} , passes through them and the eccentric from side to side and is firmly screwed up. This method of using
95 wooden frictional surfaces rubbing against iron is as important in such a machine as a cotton-gin or a wool-burrer as it is in the thrust-bearing of a screw-steamer. I have employed for the wood bushing the same material, pitch-pine, which I formerly have used
100 in the bearings of a cotton-gin.

E are the clearer-arms pivoted, at the front of the machine on the cross-bar e , which is held in notches a by the cap squares e' . These notches are in the cheeks a' on either
105 side of the feed-table A'. There are several of these notches, to enable the clearer to be worked at different angles, if desired.

F is the body of the presser-bar. It is set in notches in the frame of the machine and adjusted to and from the belt by adjusting-
110 screws f' f'' . This body F is much more solid than usual and is of iron. A steel blade, f , is notched into it and screwed to it by the screws f''' . These screws, except, perhaps, those at the ends, should be put in from the
115 belt side, as shown in Figs. 6 and 9.

The clearer H is fast to the clearer-arms E, and is straight for a considerable distance, and then curved sharply away from the front of the machine toward the roller, the bend
120 being inclined to the body of the clearer at an angle of about thirty degrees, and terminates in a slightly-rounded edge near the presser-bar. This formation of the working-edge into a blunt rounded arête instead of a cutting
125 arête is important. If the edge be smooth and not cut into teeth, it will serve very well for removing the larger varieties of burrs; but it requires to be modified for the smaller sorts of burrs, and particularly for what are called
130 "spiral" burrs.

For removing the spiral burr from wool the edge of the clearer must be notched with fine notches h , Fig. 12, which are triangular on all

their faces. They are not in the form of saw-teeth, but each is a short blunt pyramid, and they are cut only in the turned or rounded edge of the clearer and ought not to enter upon either of the faces of the body of the clearer adjacent to the edge, and must not enter upon the lower face of the lower clearer, when a lower clearer, H' , is used as in Figs. 9 and 10. In this latter case the notches h''' of the lower clearer need to be shallower and the pyramids blunter than is at times permissible in those of the upper clearer. This form of tooth can be seen on examination of Figs. 10, 11, and 12, of which Fig. 10 shows the front side of the clearer, and Fig. 12 the back side, with the notches h not going through the blade, but only notching the turned edge. They are made pretty deep on the roller-face, and the instrument which cuts them is so inclined as not to impair the continuity of the feed-table face and but slightly the edge itself on the side adjacent to the roll.

If double clearers are desired, they may be attached to the arm E , as shown in Fig. 9 at H H' , or the lower clearer may form the edge of the feed-table, as shown in Fig. 6, in which case the table A' would be pivoted at e^2 and the feed-table vibrated up and down from the connecting-rod D by the action of the pin d''' , link d' , and ear d'' , as shown in Fig. 6. If a lower clearer be used, it must be slotted, as shown at h'' , Figs. 5 and 11, for the passage of the burrs when they are knocked out of the wool. The notched edge is required for this lower clearer as well as for the upper one in case of spiral burrs, and, as previously explained, the notches h''' must not enter upon the vertical or slightly-inclined face of the body of the clearer on the side toward the roll, because, as the fiber of the wool is not dragged past this point in the clearer, the suint, which is worked out of the wool in the burring operation, will collect and cake onto this face of the clearer and clog the notches, whereas if they are made short and shallow in this lower side it does not so clog the notches.

G is the back board or separator, and g is a revolving doffer to clean the belt C' of fiber. It is run by a belt, g' , (see Fig. 4,) from the shaft of the roll B' . On this same shaft is an eccentric from which the eccentric-rod i of Figs. 1 and 4 connects with the rocker-arm i' of the shaft I of the feed-table drag-teeth.

The feed-table A' is slotted at a''' , Fig. 4, to allow of the passage of the drag-teeth. The character of these can be understood from Fig. 7. They are fixed on the shaft I , either straight, as at j , or with curved tips, as at k , and I prefer that they shall be alternately straight and curved. They are vibrated lengthwise the feed table, detaining and loosening the wool as it passes them to be burred. By this combination the fiber as it passes over the feed-table, and is pulled along by the drawing-roll, is pulled away from the drawing-roll and put into a condition of comparative tension when it is struck by the clearers, whereby the

burrs are more effectively removed. The slot in the arm i' allows more or less motion to be given them. This variation of motion is caused from the fact that the motion of the arm i is a uniform motion. If it be attached in the slot i' at the point next the shaft I , then the motion of an inch of the connecting-rod i will give a greater motion to the teeth j k at their extremities than if the arm i be attached in the slot i' at a greater distance from the center of the shaft I . This is readily done by the ordinary screw-stud, which is used in connecting connecting-rods to the power end of a slotted arm on a rock-shaft. An equivalent for this detail is shown in Fig. 2, where the toothed cylinder J , having curved teeth k , is shown for the same purpose. This toothed cylinder is run by gearing y from the wheel K , as shown in Fig. 8, and this wheel K is run by a belt, x , from the shaft of the roll B' , as shown in Fig. 2. The wheel K is on a lever, k'' , adjustable in height, as shown in Fig. 2 and in Fig. 8.

In order to adjust the clearers to the varying lengths of different fibers, slots are made in them, through which binding-screws pass, which screws are attached to the clearer-arms. This has been a usual detail in gins of my construction, and it is illustrated in the upper clearer of Fig. 5, and also in the lower clearer in Fig. 11.

To get the proper tension on belt C' , the boxes of roll C are movable to and from roll B' in slots in the frame of the machine. The method of getting even tension is, however, novel. Each box has a hooked ear, l , fast to it, as shown in dotted lines, Fig. 4, and in elevation, Fig. 13. The frame is slotted transversely at m , and a long transverse bar, n , with symmetrical wedges at each end, is thrust through these slots from side to side. The hooks of ears l hook on the wedges of the bar, and one end of the bar n is turned up into an ear, o . Through this ear o passes a rod, p , which lays hold of the machine, and a nut, p' , serves to drive the wedges forward and strain the belt C' .

In both modifications of the clearer H —viz., that illustrated in Figs. 5 and 6, in which the edge is not serrated, and that illustrated in Figs. 10 and 12, in which it is serrated—the body of the clearer is set forward of the edge, (assuming the feed-table to be the front of the machine,) and a deep recess exists above the working-edge, into which the wool may expand after the downward stroke, which expansion I believe to be essential to feeding wool, but which is not essential or desirable for cotton-ginning on account of the differing elasticity of the fibers. The projection of the working-edge in rear of the rear face of the clearer ought to be in the vicinity of a quarter of an inch; but if an eighth it will do work, and more than a quarter will do no great harm. The angle of projection of the rear face ought to be about thirty degrees; but a larger angle is admissible, and a smaller one, even less than twenty degrees, will do good

work; hence there is some range allowable to take up wear of the clearer. Formally, this has a superficial resemblance to the Osgood devices, illustrated in Letters Patent No. 61,239, January 15, 1867; No. 41,046, December 22, 1863, and No. 25,848, October 18, 1859; but the Osgood clearers of Patent No. 25,848 are serrated plates cut through from back to front. Those of Patent No. 41,046 are also serrated plates cut through from back to front, and the points of the teeth do not extend beyond the face of the vertical part of the clearer, but the rear face of the clearer has a shallow transverse groove formed in it from the points of the teeth up. In No. 61,239 the clearers are bent plates with nearly-horizontal saw-teeth edges having the points of the teeth toward the ginning-roll and presser-bar.

The double-ogee curvature of the clearers II (shown in Figs. 9, 10, and 12) is made because the clearers are set in Fig. 9 on the front side of the end block of arm E instead of on the back of said end block, as in Fig. 6—a form of construction adopted for hand-machines, while the other form of Fig. 6 is adopted for power-machines.

Only one of the two forms of clearer herein described is herein claimed, the other form of device to be employed on a different quality of wool being made the subject of another application filed by me February 20, 1888, Serial No. 264,586.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In combination with the connecting-rod D, formed at the lower end into an eye, the shaft D', eccentric d^4 , cheeks d^5 d^6 , all united together substantially as described, and the adjustable wooden bushing d^8 , and means whereby said bushing is adjusted as described, substantially as and for the purpose described.

2. The combination, with the movable boxes of rolls C, furnished with the hooked ear l , of the wedge-shaped spline provided with ear o , and the rod p , and nut p' , substantially as described.

3. The pivot-shaft e of the clearer-arms E, in combination with the said clearer-arms, with means whereby a vibrating movement is imparted to the arms E, and with the clearer II, attached to said arms E, and with means whereby the position of said pivot-shaft e may be shifted vertically and the clearer II given a different inclination of stroke, substantially as and for the purpose described.

4. In a wool-burring machine, the clearer II, formed with a curvature from front to back adjacent to the edge at about an angle of

thirty degrees with the body of the clearer, and provided with a working-edge notched with fine notches h , each of the teeth of which clearer is a short blunt pyramid, and each of which notches h is cut only in the turned edge of the clearer, substantially as described.

5. In a wool-burring machine, the combination of a roller, B', adapted to be revolved downward upon its front side, which roller is armed with a multiple-ply surface of rubber duck of about the fineness of twelve-ounce hose-duck, a chisel-edge presser-bar F f , which presents its edge adjacent to said duck covering and has its bevel arranged on the front side and its back face arranged tangentially to the roll, and a clearer, II, which has a curvature from front to back at about an angle of thirty degrees with the body of the clearer, which clearer is provided with a working-edge notched with fine notches h , whereby the edge thereof is provided with teeth, each of which teeth is a short blunt pyramid, and each of which notches h is cut only in the turned edge of the clearer, and means for rotating said roll B' and vibrating said clearer II past and adjacent to the point of nearest approach between the presser-bar and the armament of the roller, and a feed-table, A', substantially as described.

6. In an apparatus for burring wool, the combination of a drawing-roll provided with a suitable covering, a stationary presser-bar adjacent to said roll, by the aid of which drawing-roll covering and presser-bar the fiber is pulled along, a vibrating clearer which is vibrated adjacent to the point of junction of said drawing-roll and presser-bar, which vibrating clearer is actuated to forcibly strike the fiber at or near the junction between the presser-bar and drawing-roll, mechanism for actuating said drawing-roll and vibrating clearer, a feed-table whereby the material to be burred is presented to the drawing-roll, a toothed drag, the teeth of which project through said feed-table, and actuating mechanism for causing said drag to pull the fiber away from the drawing-roll as it passes forward over the feed-table, whereby the fiber is pulled in one direction by the drawing-roll between the drawing-roll and presser-bar and in the opposite direction by the drag, and in this condition of comparative tension is struck and cleaned from burrs by the vibrating clearer, all substantially as and for the purpose described.

WYMAN DEARBORN.

Witnesses:

F. F. RAYMOND, 2d,
J. M. DOLAN.