(No Model.) 3 Sheets—Sheet 1.

Q. W. & I. E. BOOTH.

APPARATUS FOR MOLDING ABRASIVE STRIPS.

No. 428,298. Patented May 20, 1890.

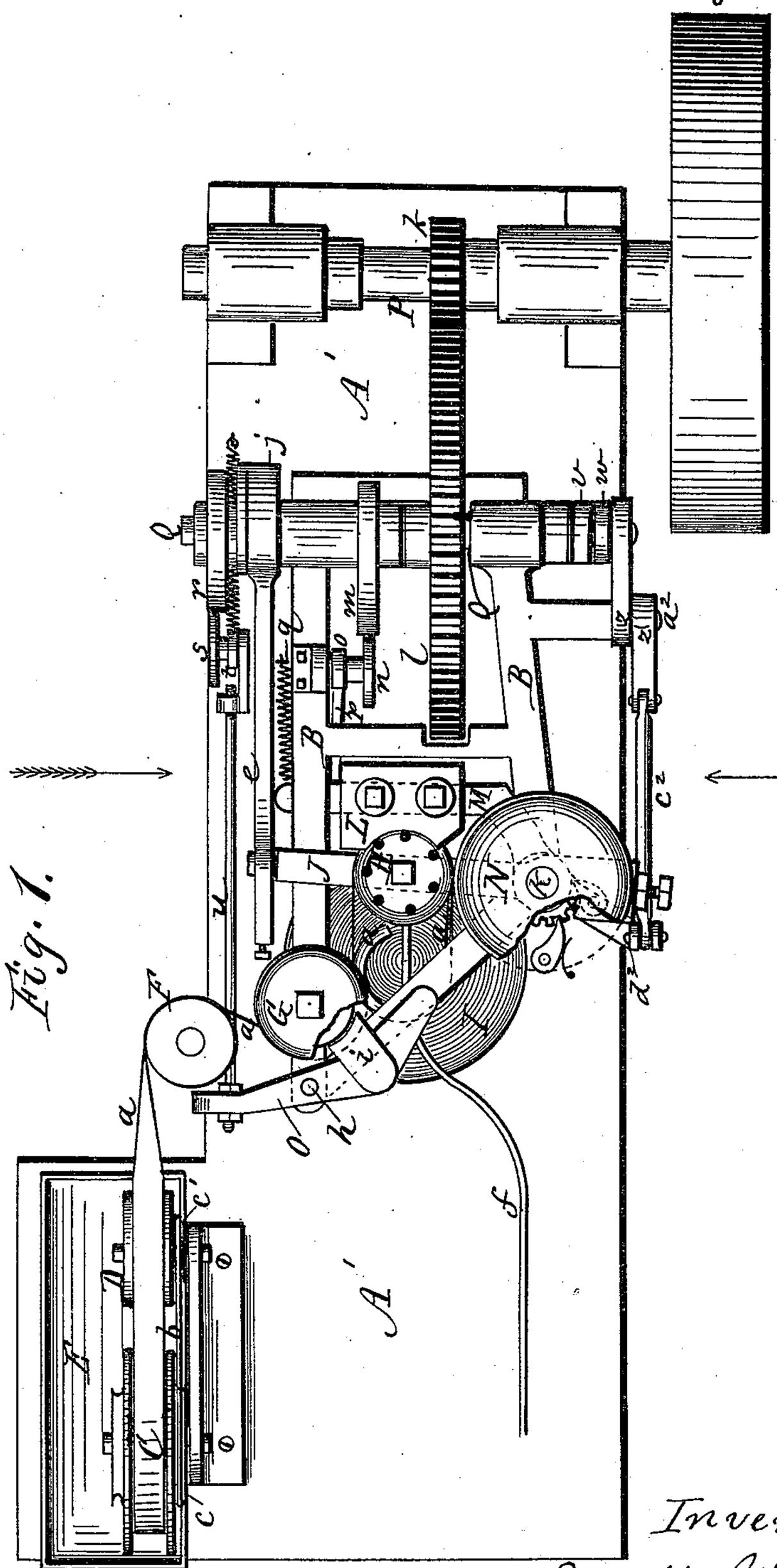

Fig. 1.

Witnesses.
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(No Model.) 3 Sheets—Sheet 2.

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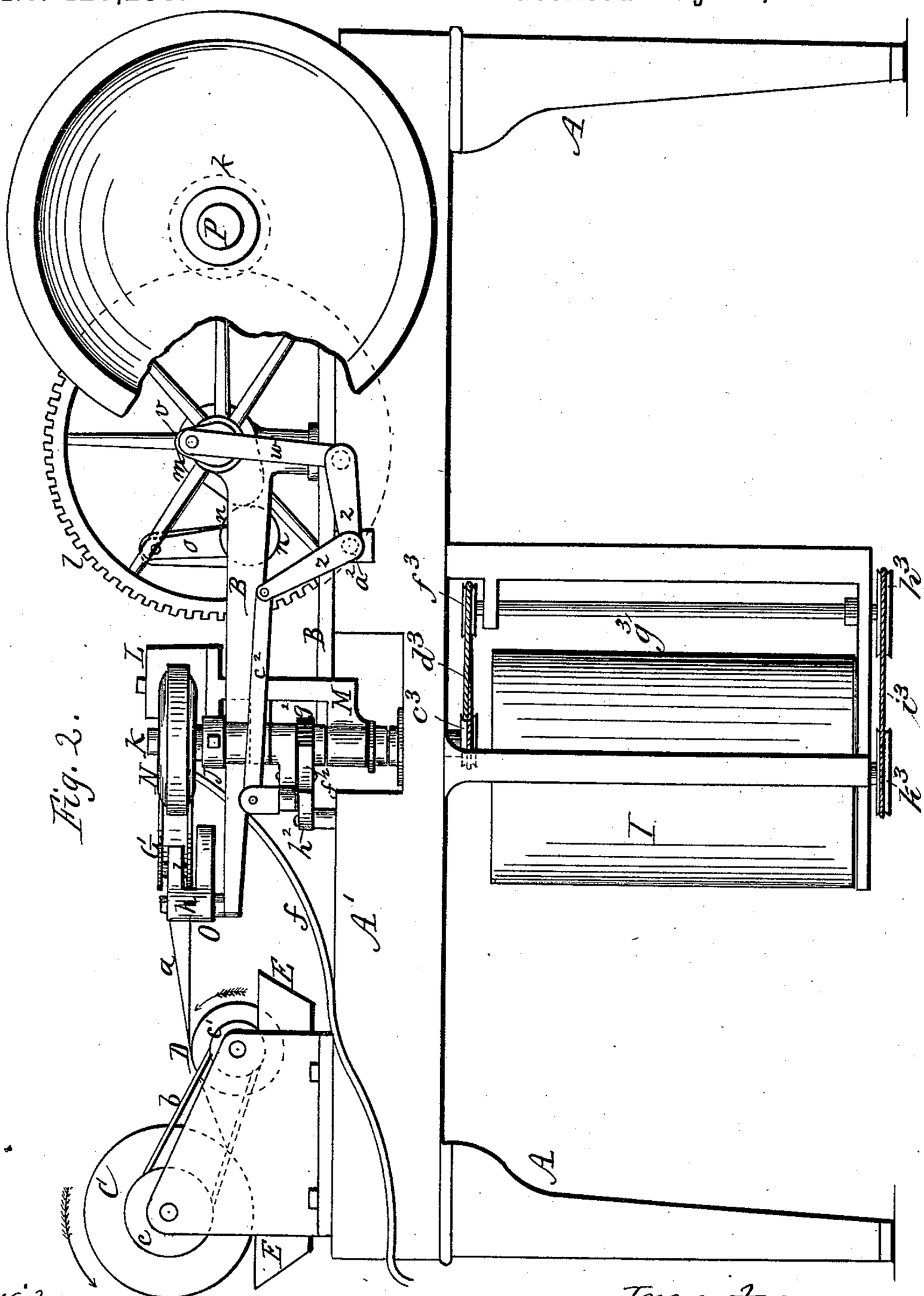

Fig. 2.

Witnesses.
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(No Model.) 3 Sheets—Sheet 3.

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Fig. 3.

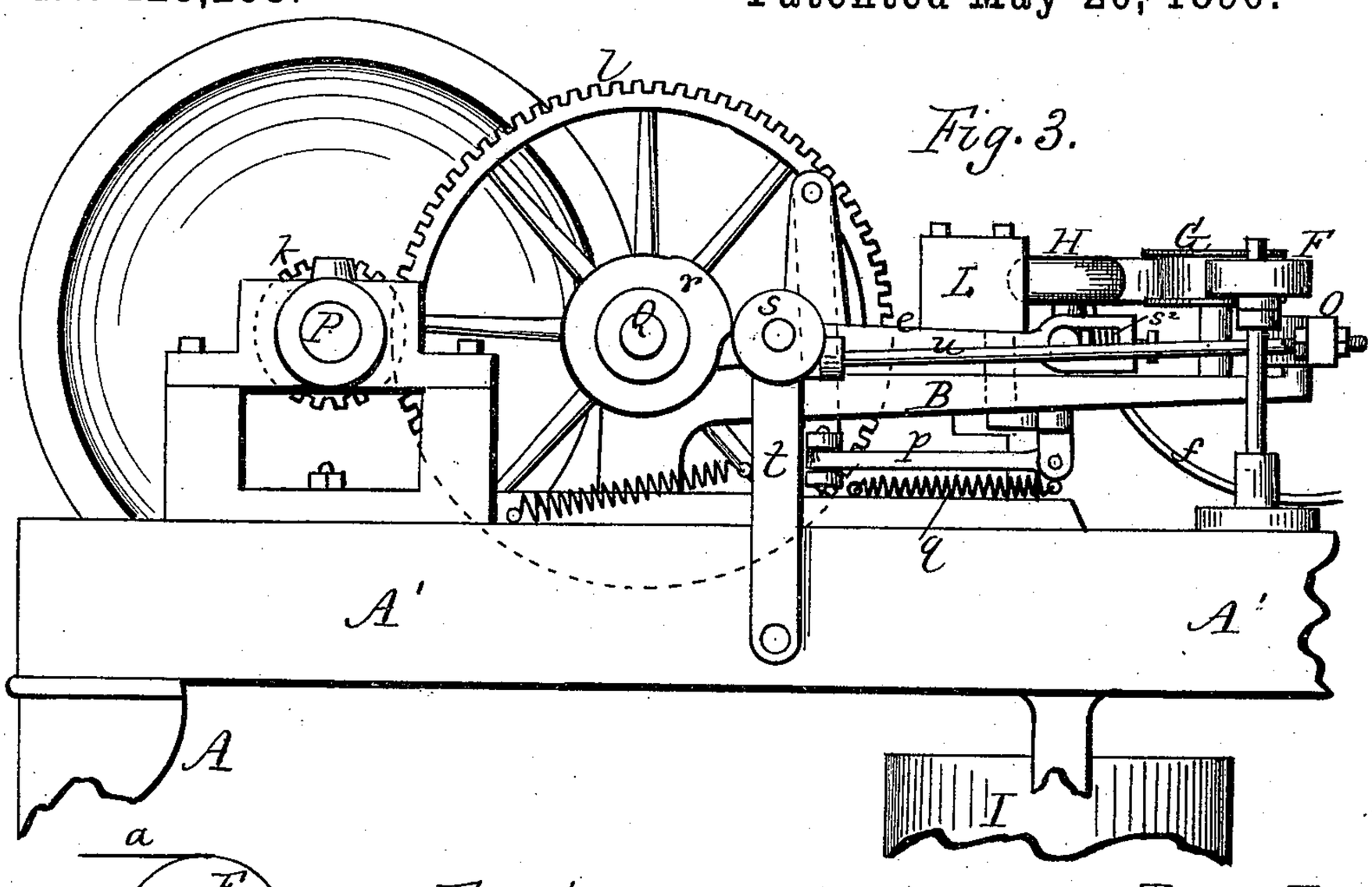


Fig. 4.

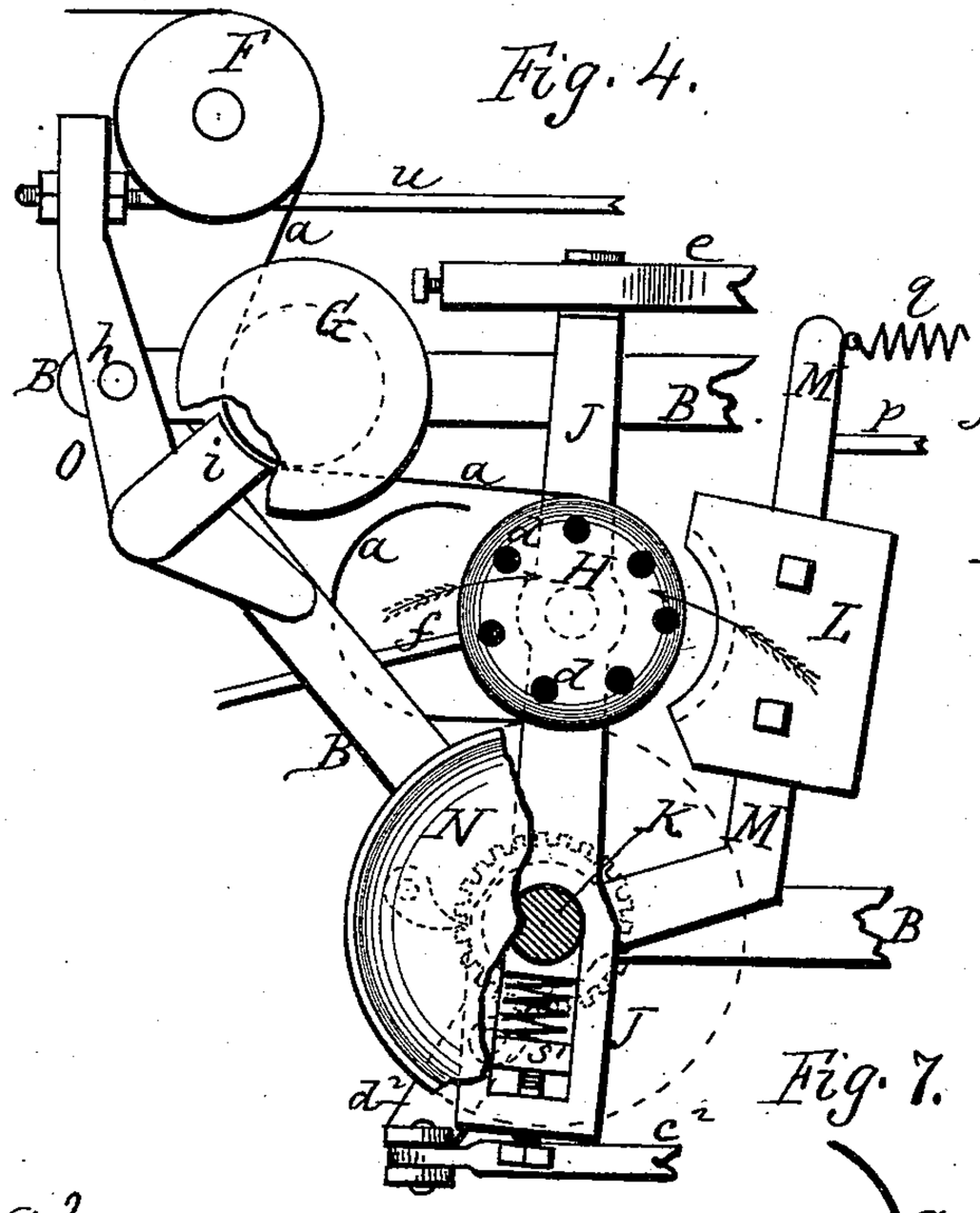


Fig. 5.

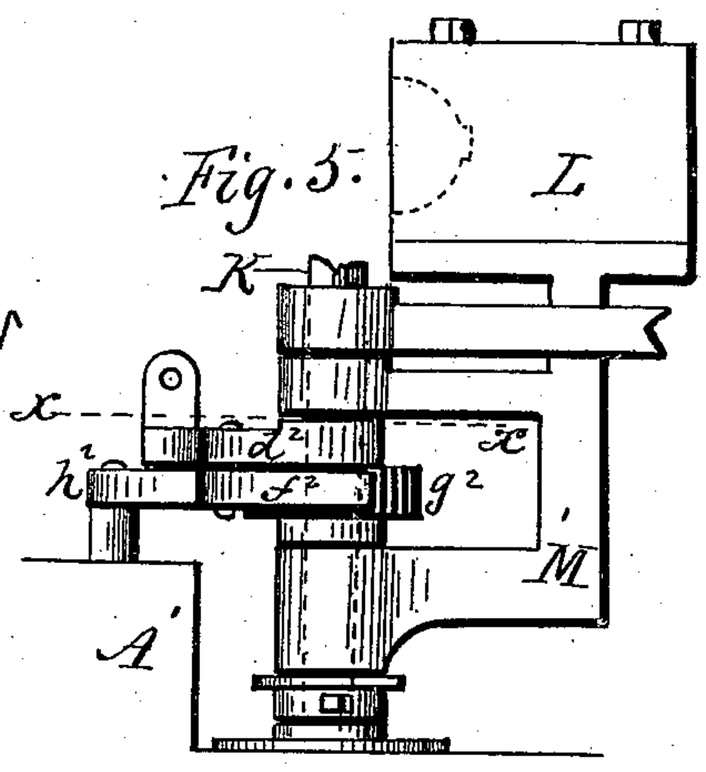


Fig. 6.

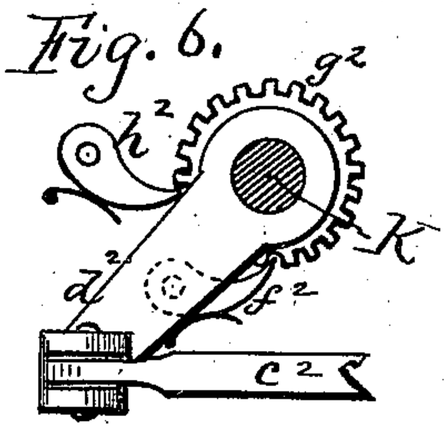
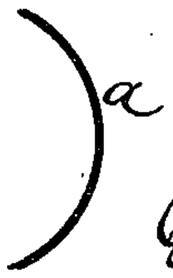


Fig. 7.



Witnesses.
C. G. Crannell.
A. H. La Casse.

Inventors.
Quentin W. Booth,
Irving E. Booth,
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UNITED STATES PATENT OFFICE.

QUENTIN W. BOOTH AND IRVING E. BOOTH, OF ROCHESTER, NEW YORK.

APPARATUS FOR MOLDING ABRASIVE STRIPS.

SPECIFICATION forming part of Letters Patent No. 428,298, dated May 20, 1890.

Application filed September 24, 1889. Serial No. 324,963. (No model.)

To all whom it may concern:

Be it known that we, QUENTIN W. BOOTH and IRVING E. BOOTH, citizens of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Apparatus for Molding Abrasive Strips, of which the following is a description.

Our improvement relates to an apparatus for molding sand-paper strips or other abrasive fabrics into convex form, to be attached to the convex periphery of wheels used in finishing the heels and shanks of boots or shoes preparatory to burnishing. The paper for this purpose is molded with its outside or abrasive surface in convex form both longitudinally and in cross-section. In other machines of this kind the strip of paper is run around wheels and molded by a constant and unvarying movement forward.

In our invention the paper is molded by an intermittent action and by successive movements of the molding-wheel against a concave pressing or finishing block, the paper being held stationary on opposite sides of the molding-wheel while the latter moves forward, thus properly stretching the paper before the pressing action takes place. By thus molding the paper while it is held stationary its abrasive quality is not injured, and by the square action of the finishing-block the wrinkles at the edges are more uniformly distributed and a better quality of paper obtained.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a side elevation looking in the direction of the arrow at the bottom in Fig. 1. Fig. 3 is a similar side elevation looking in the direction of the arrow at the top in Fig. 1. Fig. 4 is a diagram showing an enlarged plan view of the apparatus for molding the strip. Fig. 5 is a detail view showing a side elevation of the apparatus for giving motion to the feed-wheel. Fig. 6 is a horizontal section in line $x\,x$ of Fig. 5. Fig. 7 is a cross-section of the molded strip.

A indicates the main frame having a table or bed A′, on which the working parts are mounted.

B is a sub-frame holding the working parts.

C is a wheel forming the reel on which the strip of paper a is wound preparatory to being molded.

D is a moistening-wheel covered with cloth, over which the strip passes. These wheels are connected by a band b, that runs around pulleys $c\,c'$, by which means the moistening-wheel D revolves in opposition to the passage of the paper over it. The surface of the paper is thereby more effectively moistened than it would be if it ran in the same direction with the paper.

E is a water-tank, into which the moistening-wheel dips to take up water to moisten the smooth side of the paper.

F is a guide-wheel attached to table A′, so as to revolve freely. The strip of paper, after leaving the moistening-wheel, passes around this wheel, being turned up edgewise in a vertical position.

G is another guide-wheel, which we denominate the "clamp-wheel," attached to frame B and turning freely. The strip passes from wheel F to wheel G and between projecting flanges of the latter, which keep it in position.

H is the molding-wheel by which the paper strip is molded in the convex form shown in the cross-section, Fig. 7. This wheel is convex on its rim, and is hollow and provided with draft-openings $d\,d$, Fig. 4, to allow the combustion of gas inside to heat the wheel. The gas is supplied through a pipe f, which opens into the hollow on the under side. From the clamp-wheel G the strip passes to and around the molding-wheel H, and thence, after being crimped by the means hereinafter described, it falls in coiled form into a receptacle I, Figs. 2 and 3, which receives intermittent rotary motion with the other apparatus and prevents the coiled strip from kinking or clogging.

Motion may be imparted to receptacle I by any suitable means, that shown in the drawings being a driving-pulley c^3, from which proceeds a crossed band d^3, passing around a pulley f^3 on a shaft g^3. On the lower end of the shaft is another pulley h^3, from which proceeds an uncrossed band i^3 to a pulley k^3 on the lower end of the receptacle.

The molding-wheel H has free turning movement on its axis and revolves while the paper is being fed, and is attached to a swinging arm J, Fig. 4, that turns freely on a vertical shaft or spindle K.

L is a pressing or finishing block standing

back of the molding-wheel H and serving to press the edges of the paper against the molding-wheel. This block is provided with a concave face to fit wheel H, and is movable toward and from the molding-wheel, being attached to a crank-shaped arm M, Figs. 4 and 5, that turns freely on the shaft or spindle K.

N is a feed-wheel attached to the shaft K, its periphery covered with leather or other suitable material and coming in contact with the rim of the molding-wheel and giving motion to the same. The pressure between the molding-wheel H and the feed-wheel N is adjusted by the spring and screw s'. The spring rests in a slot of the arm J, and the shaft K passes through the slot. The spring presses against a box which rests around the shaft and has a tendency to draw the arm J endwise, thus bringing the molding-wheel against the feed-wheel. The tension of the spring is regulated by the screw. By the intermittent turning movement of the feed-wheel the strip of paper is drawn along after it has been molded, as before described.

O, Figs. 1 and 4, is a rock-lever pivoted at h to the frame B and provided with a clamp i, with a concave inner end that bears against the clamp-wheel G and operates intermittently to clamp the strip of paper that passes around the wheel and release it, so that it can be drawn forward.

The apparatus is driven by suitable means, one form of which is shown in the drawings.

P is the driving-shaft, having thereon a fixed spur-pinion k. This pinion engages with a spur-gear l, attached to a second shaft Q. On the shaft Q is an eccentric j, that gives motion to a strap e, connected at the outer end with the swinging arm J, by which means reciprocating motion forward and back is given to the molding-wheel H. The spring s^2 in the end of strap e relieves any excessive pressure between the molding-wheel H and the block L. On the same shaft Q is a cam m, that strikes a roller n, attached to the lower end of a rock-arm o. To the lower end of this rock-arm is pivoted a connecting-rod p, jointed at the opposite end to the arm M, that carries the pressing-block L. By this means said block is thrown forward, and it is retracted by a spring q, attached to the arm and connected with the frame in the rear. On the same shaft Q is a cam r, Fig. 3, that strikes a roller s on a rock-arm t, pivoted at its lower end to the main frame. To this rock-arm is pivoted a connecting-rod u, attached at the other end to the rock-lever O, by which means the clamp i is operated. On the same shaft Q is a crank v, Figs. 1 and 2, to which is pivoted a pitman w, extending down and jointed at the lower end to a stiff V-shaped crank-arm z, pivoted at a^2 to the main frame. To the outer end of the crank-arm z is pivoted a connecting-rod c^2, which is jointed at the outer end to a rock-arm d^2, Figs. 5 and 6, turning freely on the spindle K. To the under side of the rock-arm d^2 is attached a pawl f^2, that engages with a ratchet or gear wheel g^2, fixedly attached to spindle K. By this means the spindle is turned, and corresponding intermittent movement is given to the feed-wheel N, attached to the top of the spindle.

h^2, Fig. 6, is a detent to catch the ratchet g^2 and hold the feed-wheel N while the paper is being stretched.

The operation is as follows: The paper strip is fed around and between the wheels, as before described, and at every intermittent movement of the molding-wheel H against the finishing-block L the paper is stretched and crimped into circular form longitudinally and in cross-section, as shown in cross-section, Fig. 7. During the forward movement of said molding-wheel to meet the block the two ends of the loop of the paper strip are held stationary, one end being firmly held by the clamp i pressing against wheel G, and the other end being held by the feed-wheel N bearing against the periphery of the molding-wheel, the feed-wheel being at that time stationary. The effect is therefore to stretch the center of the paper strip between the clamp i and the feed-wheel N by the forward movement of the molding-wheel sufficiently to make it taut, but without tearing or breaking it. As soon as one crimping action has taken place the strip is released and is ready to be fed forward again. The strip is released by the disengagement of clamp i from the guide-wheel G, and at the same time the molding-wheel H is drawn back, which leaves the strip free to be drawn forward. It is drawn forward by the feed-wheel N, which preserves its bearing against the molding-wheel as the latter is drawn back. The action is thus intermittent, the crimping being done by successive movements instead of by a continuous action. By this means the crimping action is more effective and the edges of the paper are smoother and freer of wrinkles, as greater pressure is applied.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine for molding abrasive strips, the combination of a clamp-wheel, an intermittent clamp operating in connection therewith, a molding-wheel movable forward and back, and an intermittent feeding-wheel resting against the molding-wheel, as and for the purpose specified.

2. In a machine for molding paper strips, the combination, with a guide-wheel on one side and a feed-wheel on the other, of a molding-wheel receiving intermittent motion forward and back, and a finishing-block to press against the molding-wheel, as herein shown and described.

3. In a machine for molding paper strips, the combination of a finishing-block provided with a concave face, and an intermittently-movable molding-wheel provided with a convex periphery, as and for the purpose specified.

4. In a machine for molding abrasive strips, the combination, with a convex molding-wheel and an intermittent feeding-wheel operating in connection therewith, of a concave finishing-block having an intermittent motion toward and from the molding-wheel, as and for the purpose specified.

5. The combination, with the clamp-wheel G, of the pivoted rock-lever O, provided with the clamp *i*, the connecting-rod *u*, rock-arm *t*, and cam *r*, as and for the purpose specified.

6. The combination, with the finishing-block L, provided with the arm M, of the connecting-rod *p*, the rock-arm *o*, cam *m*, and retracting-spring, as and for the purpose specified.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

QUENTIN W. BOOTH.
IRVING E. BOOTH.

Witnesses:
R. F. OSGOOD,
WM. J. MCPHERSON.