(No Model.) 7 Sheets—Sheet 1.

# J. J. HEYS & M. V. BRESNAHAN.

## SOLE MACHINE.

No. 456,413. Patented July 21, 1891.

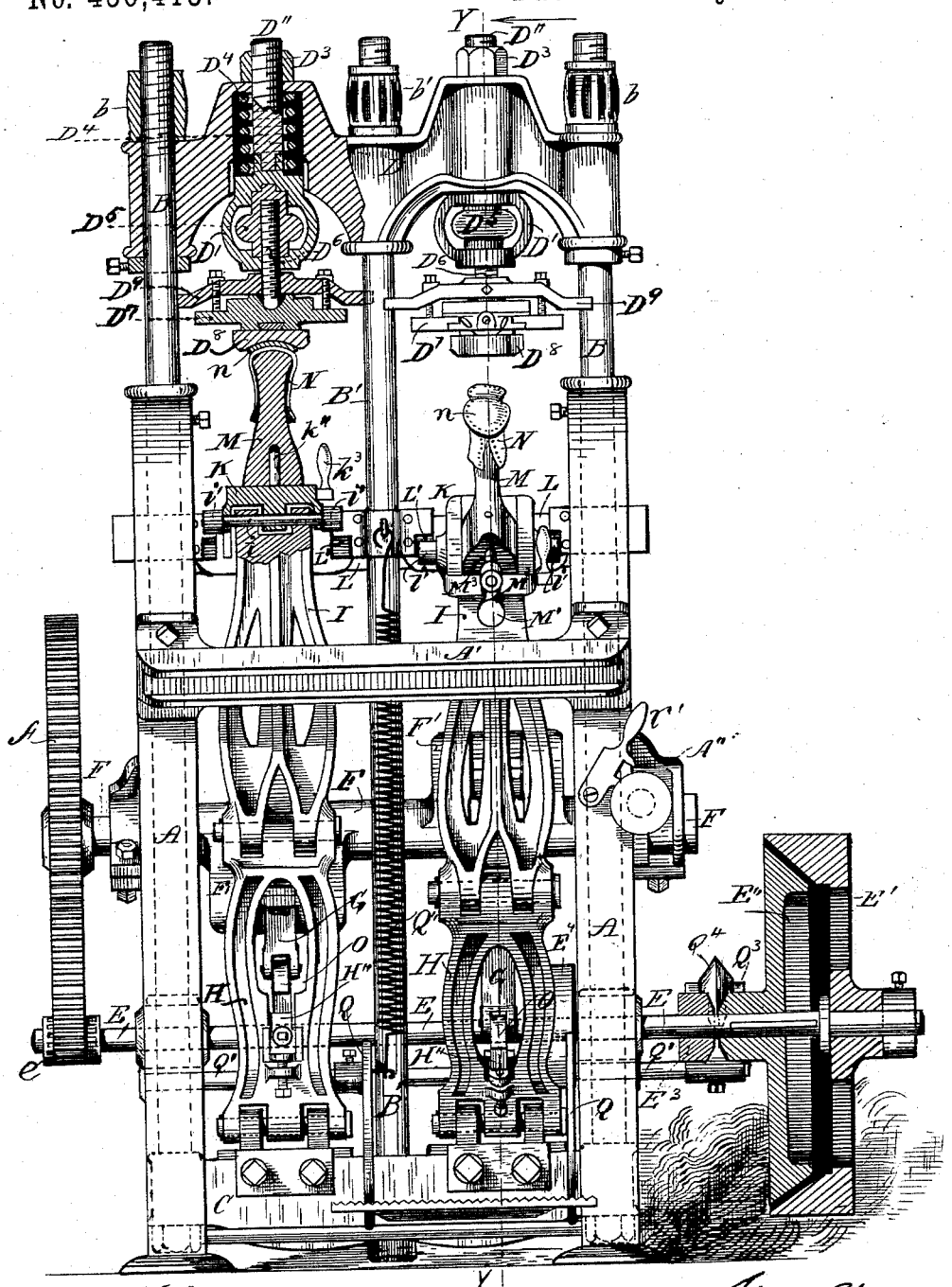

Fig 1.

Witnesses.
Alice A. Perkins.
Emma J. Smith.

Inventors.
John J. Heys, and
Maurice V. Bresnahan
by Albert G. Davis & Thewatts.

(No Model.) 7 Sheets—Sheet 2.

# J. J. HEYS & M. V. BRESNAHAN.

## SOLE MACHINE.

No. 456,413. Patented July 21, 1891.

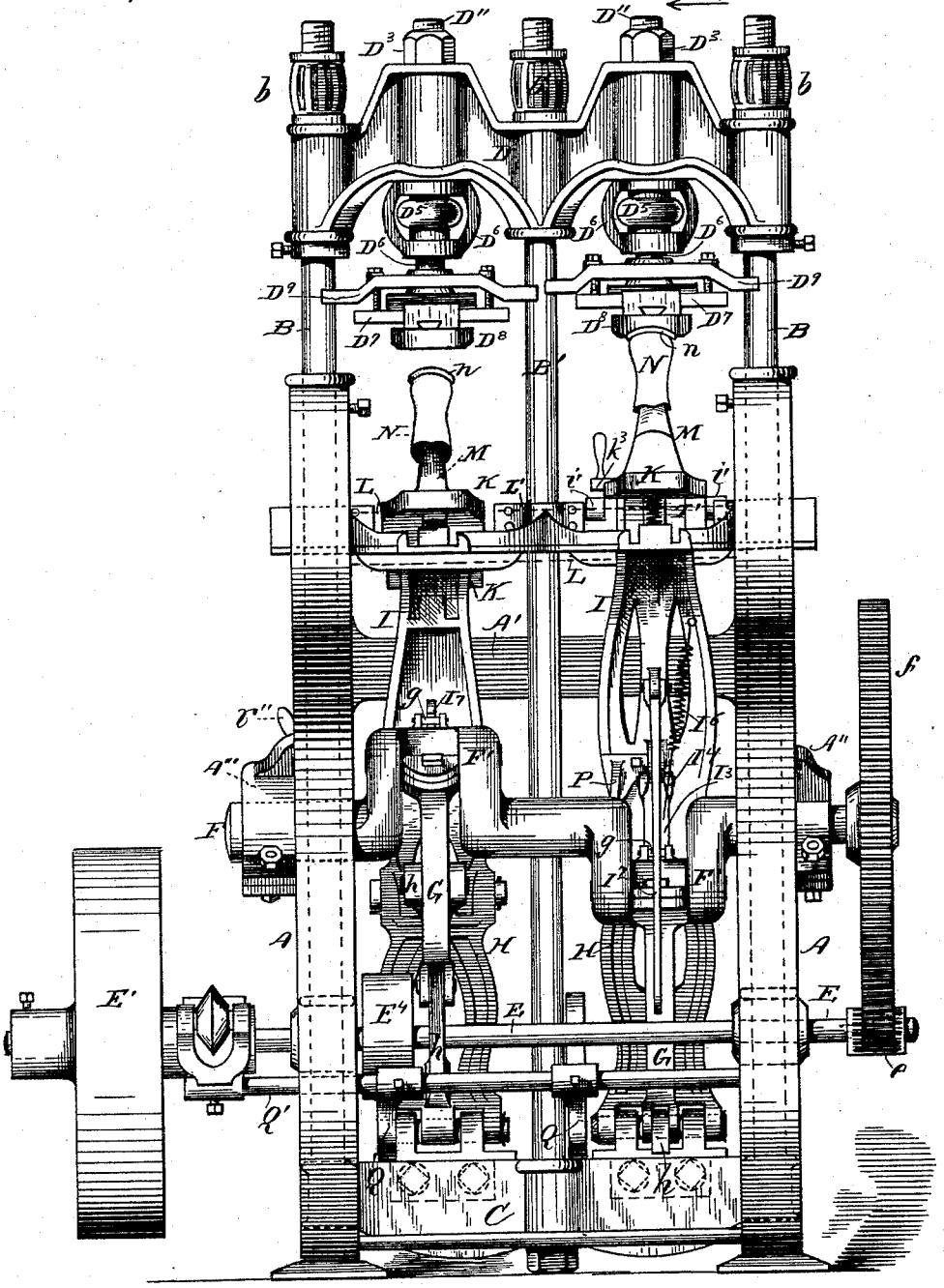

Fig. 2.

Witnesses.
Alice A. Perkins
Emma J. Bennett

Inventors.
John J. Heys and
Maurice V. Bresnahan
by Albert Andrews, their Atty.

(No Model.) 7 Sheets—Sheet 3.

# J. J. HEYS & M. V. BRESNAHAN.

## SOLE MACHINE.

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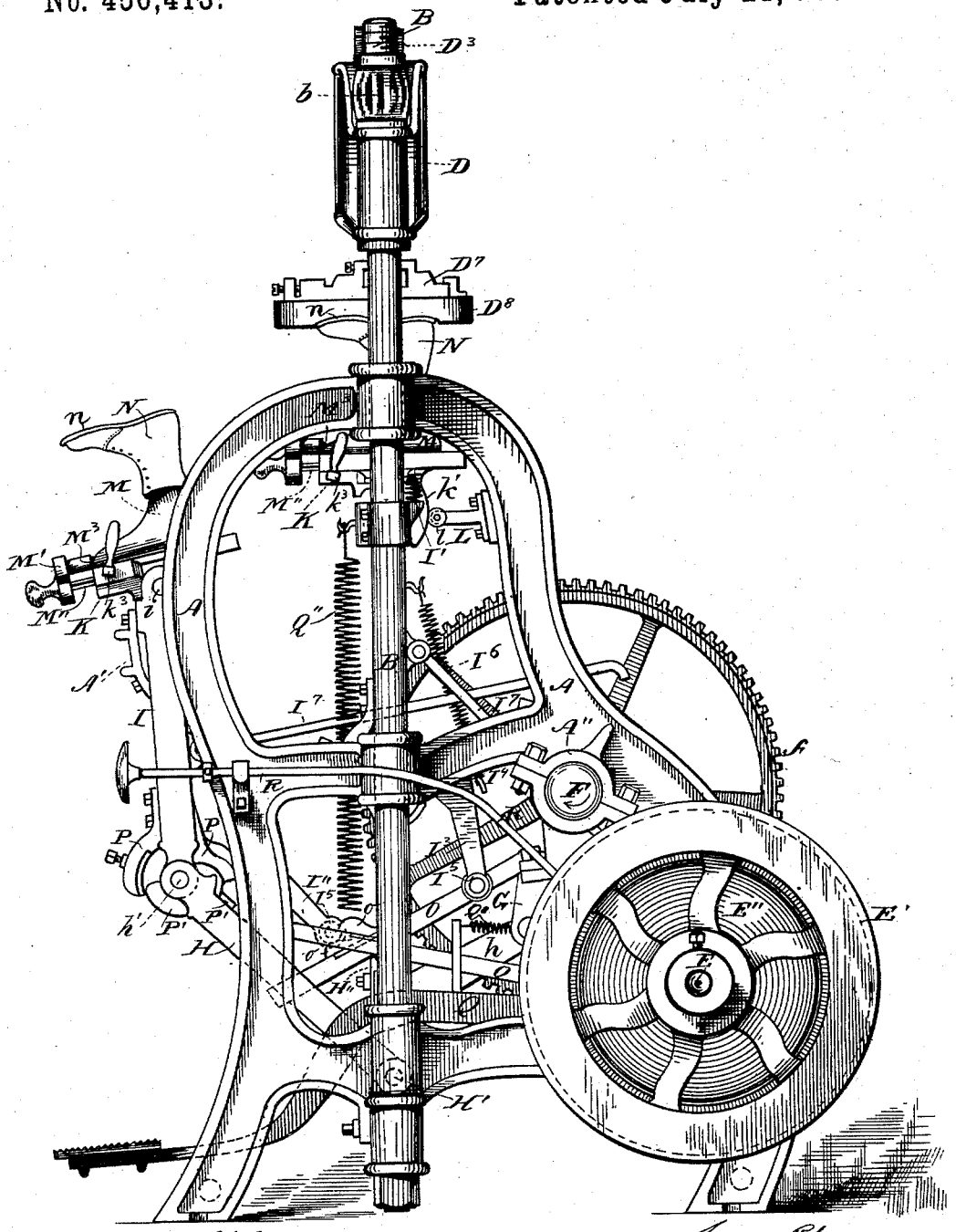


Fig. 3.

Witnesses,
Alice A. Perkins.
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John J. Heys, and
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by Albert Andrews & Co. Atty's

(No Model.) 7 Sheets—Sheet 4.

# J. J. HEYS & M. V. BRESNAHAN.

## SOLE MACHINE.

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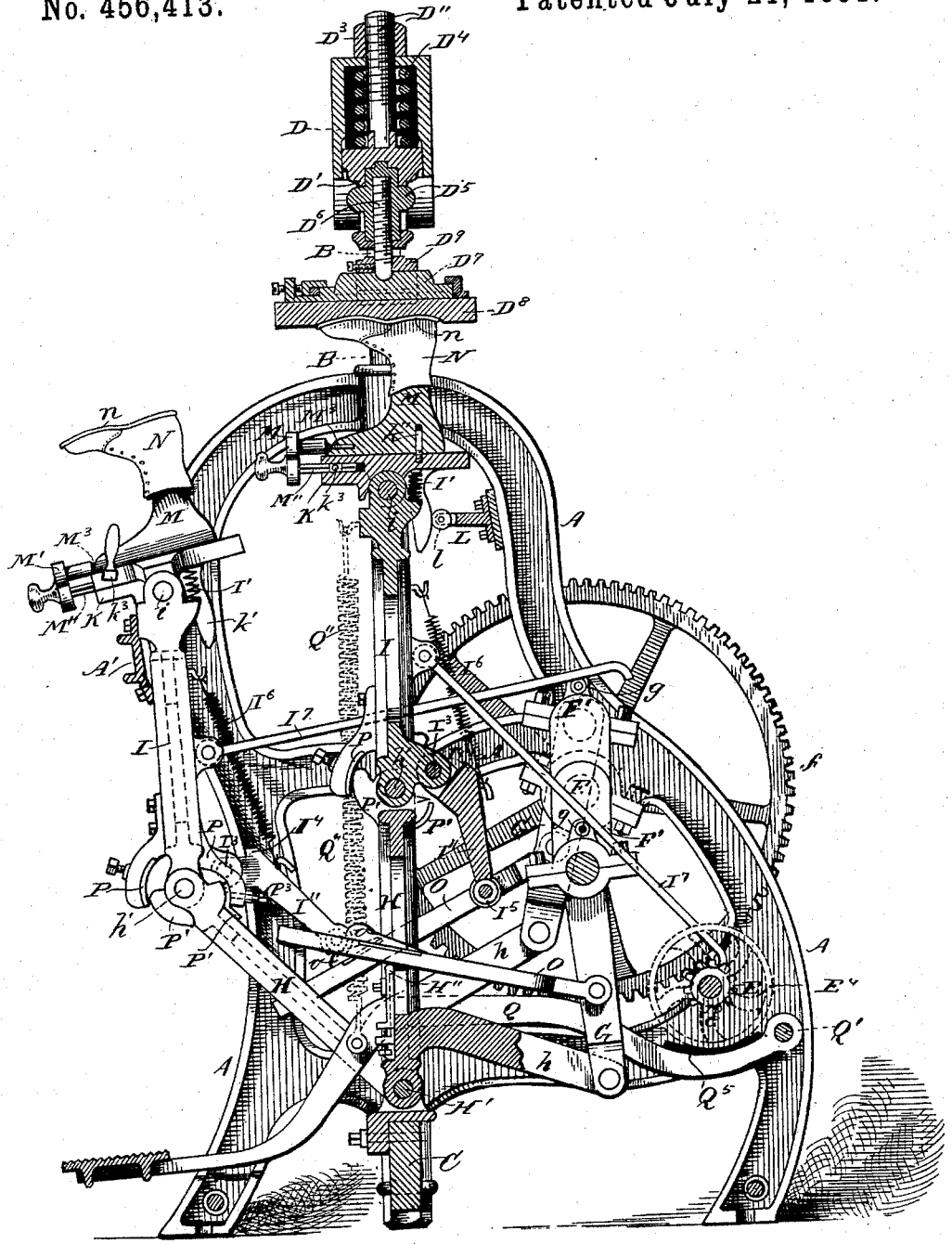

Fig. 4.

Witnesses,
Alice A Perkins
Emma J. Smith

Inventors
John J. Heys, and
Maurice V. Bresnahan.
by Albert Andrews, their Attys.

(No Model.) 7 Sheets—Sheet 5.

# J. J. HEYS & M. V. BRESNAHAN.

## SOLE MACHINE.

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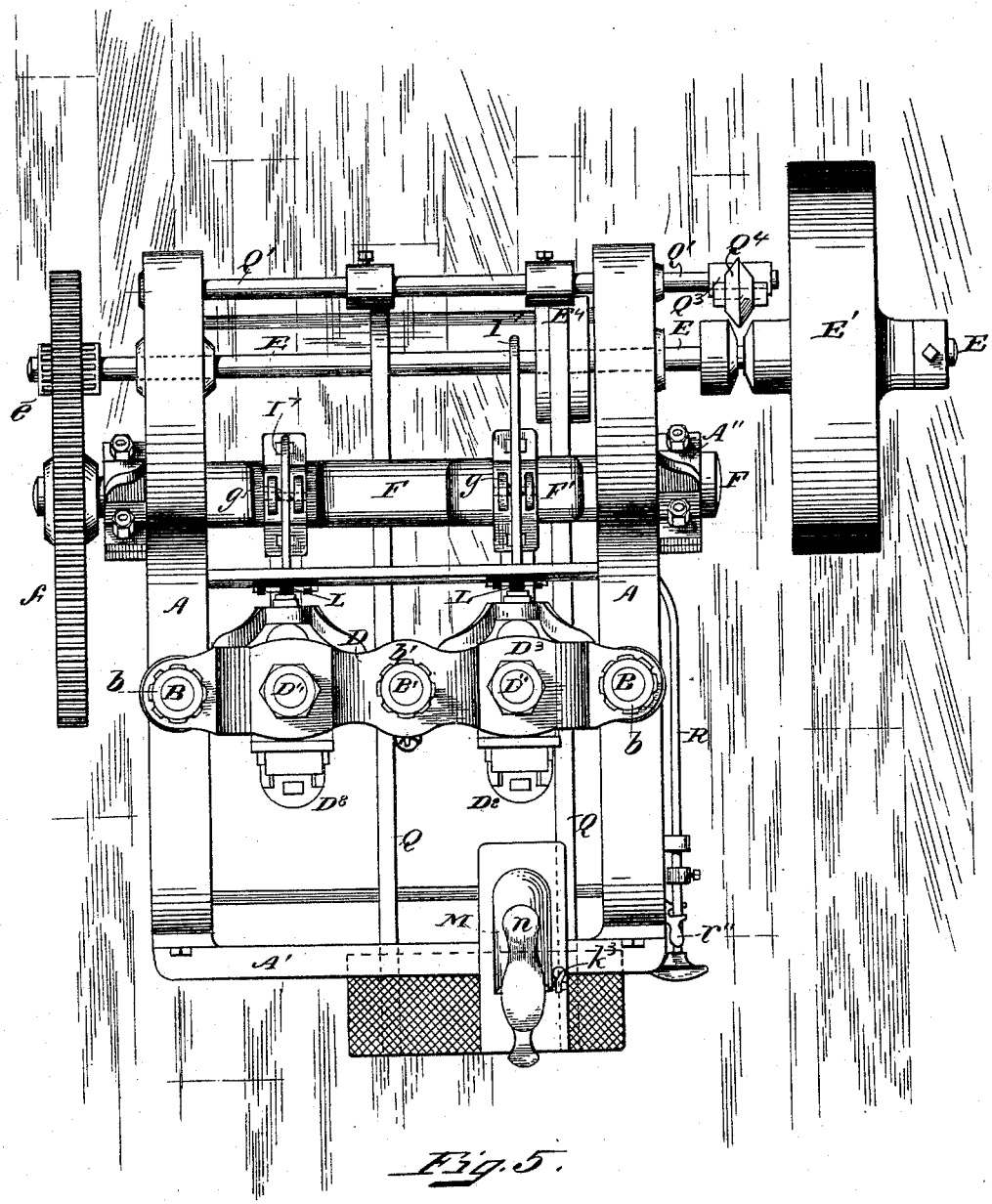

Fig. 5.

Witnesses.
Alice A. Perkins
Emma J. Smith

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John J. Heys, and
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by Albert Andrews, their atty

(No Model.) 7 Sheets—Sheet 6.

# J. J. HEYS & M. V. BRESNAHAN.

## SOLE MACHINE.

No. 456,413. Patented July 21, 1891.

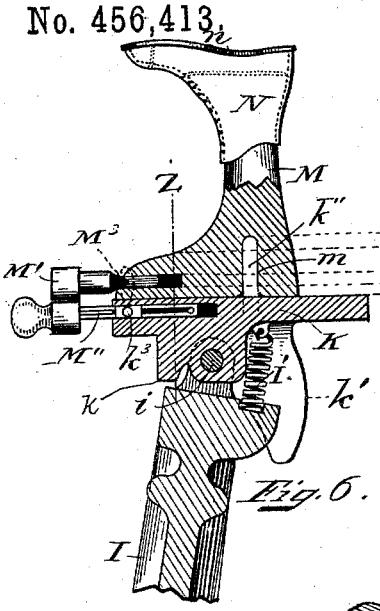


Fig. 6.

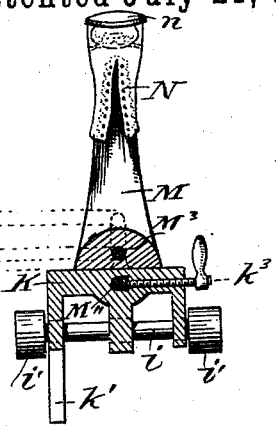


Fig. 7.

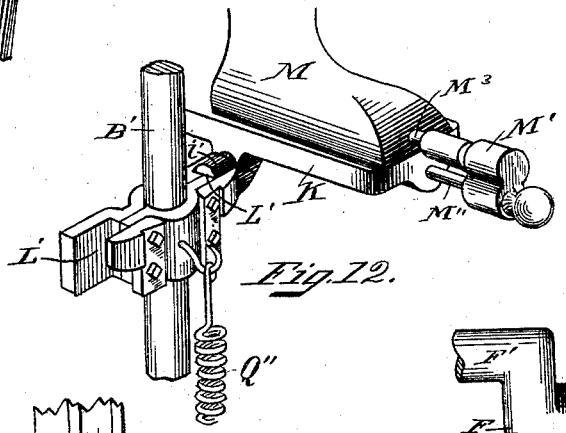


Fig. 12.

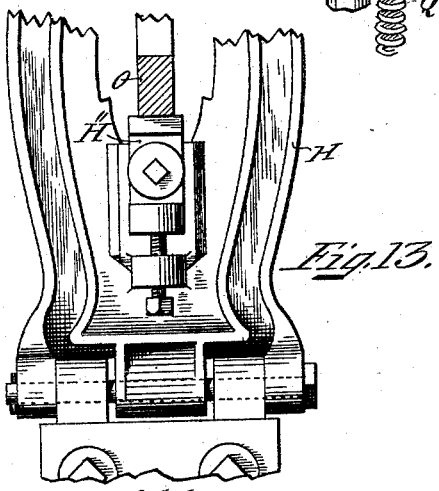


Fig. 13.

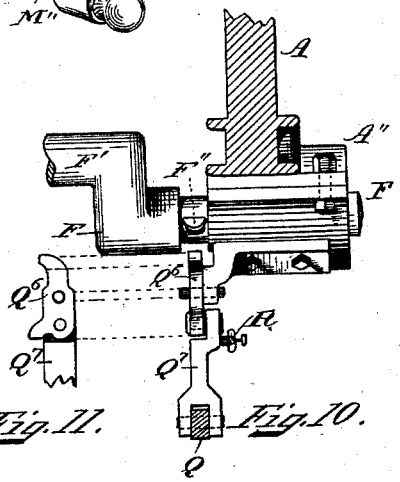


Fig. 11. Fig. 10.

Witnesses.
Alice A Perkins
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(No Model.) 7 Sheets—Sheet 7.

# J. J. HEYS & M. V. BRESNAHAN.

## SOLE MACHINE.

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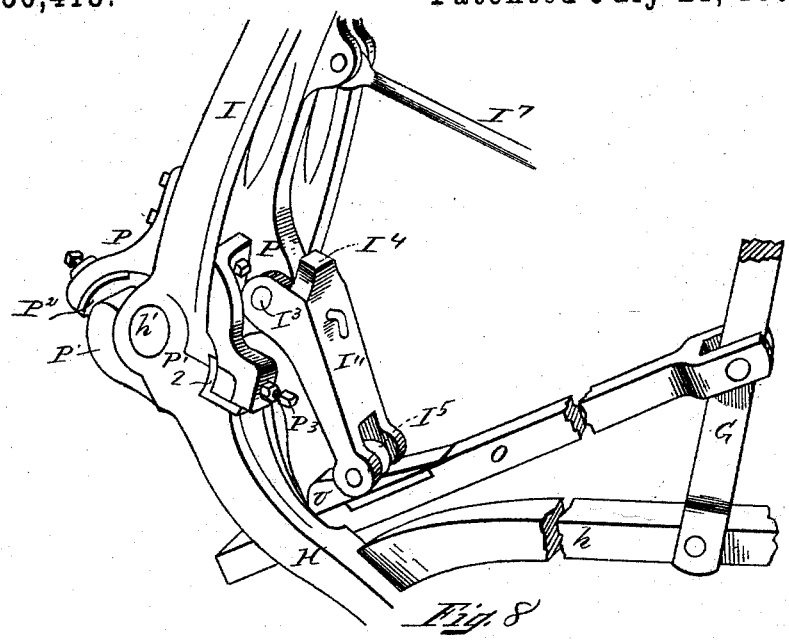


Fig. 8

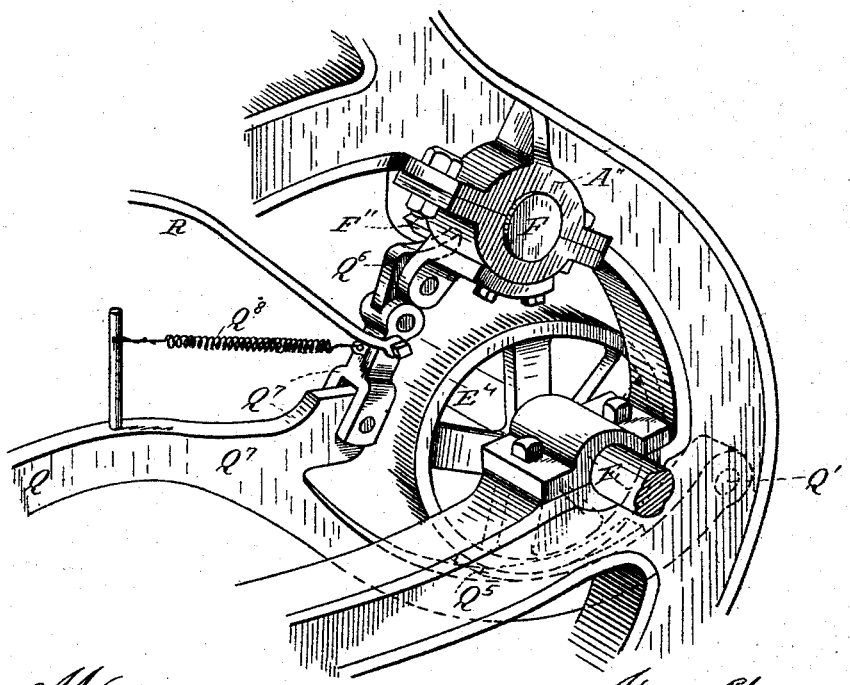


Fig. 9.

Witnesses.
Alice A. Perkins.
Emma J. Quinn

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John J. Heys, and
Maurice V. Bresnahan
by Albert Fredrien their atty

# UNITED STATES PATENT OFFICE.

JOHN J. HEYS AND MAURICE V. BRESNAHAN, OF LYNN, MASSACHUSETTS.

## SOLE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 456,413, dated July 21, 1891.

Application filed March 27, 1891. Serial No. 386,613. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN J. HEYS, a citizen of Great Britain, and a resident of Lynn, in the county of Essex and State of Massachusetts, and MAURICE V. BRESNAHAN, a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have jointly invented new and useful Improvements in Sole Shaping or Leveling Machines for Boots and Shoes, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in sole shaping or leveling machines for boots and shoes, and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a front elevation of the machine, parts of which are shown in section. Fig. 2 is a rear elevation, and Fig. 3 a side elevation, as seen from X in Fig. 1. Fig. 4 represents a vertical section on the line Y Y, shown in Fig. 1. Fig. 5 represents a top plan view of the machine. Fig. 6 represents a detail vertical section of the last-holding device; and Fig. 7 represents a vertical section on the line Z Z, shown in Fig. 6. Fig. 8 represents a detail perspective view of the toggle-joint tripping mechanism for carrying the last toward the operator and locking it in said position after the shoe-sole has been leveled. Fig. 9 represents a detail perspective view of the tripping device for starting and stopping the machine; and Fig. 10 represents a sectional front elevation, and Fig. 11 a side elevation, of said tripping device. Fig. 12 represents a detail perspective view of the center guide-bracket for the last-block, and Fig. 13 represents a detail front view of the tripper-rod adjustment for the toggles.

Similar letters refer to similar parts wherever they occur on the differents parts of the drawings.

A A represent the upright frames or sides of the machine, which are firmly secured together at a proper distance apart, as is usual in machines of this kind.

B B are vertical rods or posts secured in a suitable manner to the frames A A, and B′ is a similar post arranged midway between the posts B B, as shown in Figs. 1, 2, 3, 4, and 5, said posts being preferably secured in their lower ends to a cross-bar C, attached to the frames A A, as shown in Figs. 1 and 2.

D is the head of the machine, which is vertically adjustable upon the rods B B B′, preferably by means of adjusting-nuts *b b b′*, as is common in this kind and similar machines.

The improved machine is preferably made duplex in construction—that is, it is provided with a pair of shoe-holding and pressure devices connected for operation, so as to enable the operator to remove a leveled shoe from one of the lasts and replace it with another while the leveling is done on the other last, and so alternately during the running of the machine.

E is the driving-shaft, located in bearings in the frames A A and having secured to it a pinion *e*, the teeth of which mesh into the teeth of the gear *f*, secured to the crank-shaft F, which is journaled in bearings in the frames A A and provided with diametrically-arranged cranks F′ F′, as shown in Fig. 2. To each crank is pivoted a link G, the lower end of which is pivoted to an actuating bar or rod *h*, connected with the lower toggle-lever H, as shown in Figs. 2, 3, 4, and 8. The said toggle-lever H is pivoted at its lower end at H′ to the cross-bar C and has its upper end pivoted at *h′* to the upper toggle-lever I, as shown in Figs. 1, 4, 6, and 8.

K is the last-block, which is pivoted to the upper end of the toggle-lever I by means of the horizontal pin or bolt *i*, the projecting ends of which are provided with anti-friction rollers or collars *i′ i′*, (shown in detail in Fig. 7,) the purpose of which will hereinafter be described. The last-block is thus freely adjustable with a rocking motion on the pin *i*, so as to permit the shoe-carrying last to adjust itself automatically relative to the shaping plate or form during the leveling operation.

I′ is a forcing-spring arranged between the under side of the last-block K and upper portion of the toggle-lever I, which serves to normally tip the said last-block slightly forward, as shown in Fig. 6, when the pressure is taken off the shoe-sole, such forward tipping motion being limited by a projection *k* on the under side of the last-block coming in contact with the forward upper edge of the toggle-lever I, as shown in said Fig. 6.

On the under side of the last-block K is a cam projection $k'$, which comes in contact with a roller or projection $l$ on the middle brace L when the last-block approaches its highest position, by which said last-block is automatically swung into a level (or nearly so) working position, as shown in Fig. 4.

The brace L is composed of a metallic bar extending from one side of the frame A to the other, as in dotted lines, Fig. 2. To automatically guide the last-block K toward the sole-former $D^8$ as the upper ends of the toggle-levers I rise, I provide the posts B B′ with guides L′, Figs. 1, 2, and 12. These guides comprise vertical grooves or forks, Fig. 12, to receive and guide the lateral guide pieces or rollers $i$ on the last-block K as the toggle-levers I approach the highest position just previous to the shaping or leveling of the shoe-sole.

M is the last supported on the last-block and having, preferably, a recess $m$ on its under side adapted to receive a pin $k''$, secured to the last-block K, as shown in Fig. 6. The last is prevented from turning around the pin $k''$ and locked to the last-block by means of a handle M′, having a rod M″, adapted to slide forward and back in a recess in the last-block, and having a projection or pin $M^3$, adapted to enter a recess in the last M, all as shown in Figs. 6 and 7. After the last has been thus secured to the last-block the rod M″ is secured in place, preferably, by means of a set-screw $k^3$ or equivalent device.

N in Fig. 6 is the shoe placed on the last, and $n$ is its sole, as usual.

D′ is a vertically-yielding yoke adapted to yield slightly in a recess on the under side of the head D, as shown in Fig. 1, said yoke having an upwardly-projecting spindle D″, passing loosely through a perforation in the upper end of the head D, and is there provided with an adjusting-nut $D^3$. In a recess in the head D is located the coiled forcing-spring $D^4$, surrounding the bolt D″ between the upper end of the yoke D′ and the upper end of the recess in the said head D, as shown in Fig. 1, by which a yielding resistance is obtained in shaping the soles. The yoke D′ carries a nut $D^5$, provided with a regulating-screw $D^6$, by which the carriage $D^7$ is adjusted according to the pressure desired in shaping the shoe-sole.

$D^8$ is the sole-former, secured to the carriage $D^7$ in any suitable manner.

$D^9$ is a plate guided on the posts B B B′ and connected loosely to the carriage $D^7$ in any suitable manner, as shown in Fig. 1.

A′ is the front brace, secured in any suitable manner to the front of the frames A A, which brace serves as a rest against which the upper toggle-lever I is held by automatic locking mechanism, hereinafter to be described, when the said toggle-lever and its shoe-holding device are swung forward after the sole of the shoe held on it has been shaped or leveled, so as to permit such shoe to be removed and replaced by another. The automatic locking mechanism above mentioned is constructed as follows: To each link G is pivoted about midway on it an arm or rod O, having a cam projection $o$ on its upper side, as shown in Figs. 3, 4, and 8. The forward end of said rod O rests loosely on a block H″, Figs. 4 and 13, which is adjustably secured to the lower toggle-lever H and capable of a longitudinal adjustment thereon, so as to raise or lower the forward end of the rod O, and thereby to adjust the position of its cam projection $o$ relative to the toggle-tripper I″, on which it acts. The said toggle-tripper I″ is pivoted at $I^3$, Figs. 4 and 8, to the lower end of the toggle-lever I and is free to swing on its pivot in the direction of the arrow shown in Figs. 4 and 8, but is limited in its motion in the opposite direction by a lip or projection $I^4$ coming in contact with that part of the toggle-lever I on which it is hung. The said toggle-tripper I″ is preferably provided with an anti-friction roller $I^5$ in its lower end, and is also preferably held in its normal position by the influence of a yielding spring $I^6$, as shown in the right-hand portion of Fig. 4. The operation of the said toggle-tripper is as follows: As the toggle-levers H I are moved by the crank-shaft F and link G from the vertical to their forward positions, the lower end of the tripper I″ comes in contact with the cam projection $o$ and tends to swing the upper toggle-lever I in the direction of arrow shown upon it in Fig. 4, and as the lower toggle-lever H is swung forward to the extent of its stroke the upper toggle-lever I is brought against the front brace A′ and temporarily held locked against it by the tripper I″ resting on the highest portion of the cam projection $o$, as shown in the left-hand portion of Fig. 4. As the toggle-levers H I are moved from their forward to their vertical position the tripper I″ is released from the cam projection $o$ and automatically swung by the influence of the spring $I^6$ to the position shown in the right-hand portion of Fig. 4, and so on.

For the purpose of preventing jarring of the toggle-levers H I as they are being moved from their forward to their central position, and vice versa, we connect said levers frictionally together at their jointed portion, as follows: To one or both sides of one of the toggle-levers we attach brackets P P and on the other toggle-lever we make segmental friction-surfaces P′ P′, as shown in Fig. 8. P″ is a piece of leather or equivalent material preferably attached to an adjustable friction-block on the inside of the bracket P, and $P^3$ is a set-screw going through the bracket P, by means of which the friction between the surfaces P′ and P″ is adjusted and the wear on said surfaces taken up from time to time, as may be required. The toggle-lever I is moved from its forward to its central position by means of a projection or pin and roll $g$ on the upper end of the link G acting on the hooked rear end of an actuating bar

or rod I', the forward end of which is pivoted or connected in a suitable manner to the toggle-lever I, as shown in Fig. 4.

The machine is started by the depression of a spring-pressed treadle and a suitable friction-clutch, as follows:

Q is the treadle, preferably secured to a rod Q', located in bearings in the frames A A. Said treadle is normally held upward by the agency of a suitable spring Q'' or equivalent device. On the treadle-rod Q' is preferably secured a lever $Q^3$, carrying a spreader-disk $Q^4$, as shown in Figs. 2 and 5. On the driving-shaft E is loosely journaled the belt-pulley E', Fig. 1, to which a constant rotary motion is imparted by means of suitable belt-power. Inside of said loose pulley is splined on the shaft E the conical friction-clutch disk E'', and to the shaft E is secured a collar $E^3$, between which and the hub of the clutch E'' the spreader-roller $Q^4$ is forced by the depression of the treadle Q, causing the pulley E', friction-clutch E'', and the driving-shaft to be frictionally connected as long as the treadle is depressed, during which time the rotary motion from the pulley E' is communicated to the driving-shaft E. We desire to state, however, that any other well-known friction-clutch device may be used for imparting a rotary motion to the driving-shaft from the loosely-rotating belt-pulley without departing from the essence of our invention, and we have only represented the friction-clutch device above mentioned for the purpose of making clear the operation of the machine.

$E^4$, Fig. 9, is a brake-wheel secured to the driving-shaft E, against which is brought the brake-shoe $Q^5$ on the treadle Q (shown in dotted lines in Fig. 9) when the treadle is released, so as to stop the driving-shaft from rotating as soon as the friction-clutch is released. In connection with this our duplex shaping or leveling machine we use an automatic stopping mechanism for automatically stopping the machine as soon as the driving-shaft has completed one-half of its revolution, at which time one of the shoes is being shaped or leveled and the other one held forward toward the operator to enable him to remove it and replace it with another one to be shaped or leveled before starting the machine by the depression of the treadle. This automatic stopping mechanism is constructed as follows: To one of the bearings A'', Figs. 9 and 10, in which the crank-shaft F is journaled, or to any stationary part of the machine, is pivoted a dog $Q^6$, to which is pivoted a link $Q^7$, the lower end of which is pivoted to the treadle Q.

$Q^8$ is a spring connected in one end to the link $Q^7$ and in the other end to the treadle Q, as shown in Fig. 9.

On the shaft F are two diametrically-arranged projections F'' F''. (Shown in Figs. 9 and 10.)

The operation of the said automatic stopping mechanism is as follows: When the treadle Q is depressed for starting the driving-shaft, the link $Q^7$ is drawn forward by the action of the spring $Q^8$ until the three fulcra on which the said link and the dog $Q^6$ are hung come in a line with each other, causing the treadle to be held depressed against the influence of its spring Q'' until one of the projections F'' on the crank-shaft F comes in contact with the upper end of the dog $Q^6$, causing it to be tripped, as shown in Fig. 9, thereby liberating the treadle Q and causing it to be raised by the influence of its spring Q'' at the same time that the friction-clutch E'' is liberated from the rotary pulley E' and the brake-shoe $Q^5$ brought against the pulley $E^4$ on the driving-shaft E, thus automatically stopping the machine at the desired position. The machine remains stationary until the treadle is again depressed by the operator, causing the crank-shaft to rotate one-half of a revolution, and then to be automatically stopped, and so on during the operation of the machine.

In machines of this kind it is desirable that a means should be established for stopping the machine at any time in case of accidents or breakage or in trying the pressure on a change in lasts or forms, and for this purpose we use a rod R, having its rear end connected to the link $Q^7$ and having its forward end suitably guided at the front of the machine and having preferably a handle or knob $r$ for its operation, as shown in Figs. 3 and 9. Thus it will be seen that the machine may be stopped at any time at the will of the operator simply by pushing back the rod R, causing the dog $Q^6$ to be tripped, the treadle to be raised, the friction to be taken off the pulley E', and the brake-shoe $Q^5$ put on the pulley $E^4$.

The rod R may be locked into position for holding the machine stopped by means of a suitable latch $r'$. (Shown in Figs. 1 and 3.)

The operation of the machine is as follows: Before the machine is started the operator puts a shoe on the last, which is for the time being held forward in a locked position, a shoe being in the meantime held upon the other last, which is forced upward against the overhead former while the sole on said shoe is being shaped or leveled. The operator now depresses the treadle, causing the friction to be put on, by which the machine is started and the treadle automatically retained in its starting position. During one-half of a revolution of the crank-shaft the upper toggle-lever, upon the last-block of which the operator has placed a shoe, is released from its tripper and front brace, drawn backward by the hooked rod and projection, as described, and guided between the grooves on the center brace and caused to rise upward, carrying the shoe-sole on its last against the spring-pressed former and keeping it under pressure after the machine is stopped until the treadle is again depressed, said treadle having automatically been released and the machine stopped at the completion of half

a revolution of the crank-shaft. The last-block being pivoted to the toggle-lever will automatically adjust itself against the sole-former at or about the time it is brought against it. While this takes place the toggle-lever and last which were under pressure have been automatically moved forward and locked in a forward position to enable the operator to remove the leveled shoe and replace it with another, and so on during the operation of the machine.

By having the upper toggle-lever and its last movable to and from the operator great facility is obtained in placing the shoes in position and removing them, and liability to accidents caused by the operator's hands being jammed, pressed, or otherwise injured is obviated.

Having thus fully described the nature, construction, and operation of our invention, we wish to secure by Letters Patent and claim—

1. In a sole shaping or leveling machine, the combination, with a sole-former, of toggle-levers having the free upper end provided with a last-block and movable vertically to and from the sole-former and also backward and forward in a direction at right angles to the vertical movement, an actuating bar or rod connected with the toggle-levers, and automatically-operating mechanism, substantially as described, for operating the rod or bar to move the toggle-levers and last-block back and forth and raise the latter toward the sole-former, as set forth.

2. In a sole shaping or leveling machine, the combination, with a sole-former, of toggle-levers having the free upper end provided with a last-block having lateral guide-pieces and movable vertically to and from the sole-former and also backward and forward in a direction at right angles to the vertical movement, automatically-operating mechanism, substantially as described, for automatically raising the toggle-levers vertically and moving them with the last-block back and forth, as set forth, and grooved or forked guides into and out of engagement with which the guide-pieces of the last-block move as the toggle-levers rise and fall.

3. In a sole shaping or leveling machine, the combination, with a sole-former, of toggle-levers swinging at their upper ends in the arc of a circle and provided with a last-block having guide-pieces, actuating bars or rods connected with the toggle-levers, automatically-operating mechanism, substantially as described, operating said bars or rods for swinging the toggle-levers and extending the same to elevate the last-block, and grooved or forked guides arranged to receive and guide the guide-pieces of the last-block as the latter rises toward the sole-former, substantially as described.

4. In a sole-shaping machine, a sole and a last pivoted to the upper end of a system of toggles and having a downwardly-projecting arm $k'$, adapted to come in contact with a pin or pin and roll $l$ for the purpose of properly presenting the shoe to the sole-former, substantially as specified.

5. In a sole shaping or leveling machine, the combination, with a sole-former, of a system of toggle-levers having the free upper end provided with a last-block and rising and falling and moving back and forth with the last-block, a driven crank-shaft, and a link connection between the crank-shaft and one of the toggle-levers, which automatically swings the upper ends of the toggle-levers back and forth with the last-block, substantially as described.

6. In a sole-shaping machine, a sole-former and a last mounted upon a system of toggles, combined with a crank-shaft, a link connecting said shaft and one of the toggle-levers, a pivoted tripper on the upper toggle, and a reciprocating arm having a projection for actuating said tripper in locking the toggles in their forward position, substantially as and for the purpose set forth.

7. In a sole shaping or leveling machine, a sole-former and a last mounted upon a system of toggles, combined with a crank and intermediate connection to the lower toggle for oscillating the same, a projection on the crank or its connection, and a hooked rod connected to the upper toggle for moving the latter toward its rear position, substantially as and for the purpose set forth.

8. In a sole shaping or leveling machine, a sole-former and a last mounted upon the upper end of a system of toggles and a crank-shaft for actuating said toggles, combined with a treadle having pivoted to it a link $Q^7$, a tripper-dog $Q^6$, pivoted to said link, and a stationary fulcrum and projections on the crank-shaft for automatically stopping the machine at the desired point of revolution of the crank-shaft, substantially as specified.

9. In a sole shaping or leveling machine, a sole-former and a last mounted upon the upper end of a system of toggles H and I, combined with a friction device arranged at or near the junction of said toggles on one or both sides thereof, substantially as and for the purpose set forth.

10. In a sole shaping or leveling machine, a sole-former and a last mounted upon the upper end of a system of toggles and a crank-shaft for actuating the toggles, combined with a treadle having a toggle-tripping device, substantially as described, projections on the crank-shaft for automatically stopping the machine, and an independent non-automatic stop mechanism connected with the toggle-tripping device and under control of the operator for stopping the machine, substantially as described.

11. The last M, supported on the last-block K and having a recess adapted to receive a projection $k''$ on the last-block, combined

with a handle M′, having a rod M″, adjustable in the last-block and having a projection $M^3$, adapted to lock into a corresponding recess in the last, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 20th day of February, A D. 1891.

JOHN J. HEYS.
MAURICE V. BRESNAHAN.

Witnesses:
ALBAN ANDRÉN,
NORA J. BRESNAHAN.