(No Model.) 9 Sheets—Sheet 1.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. Patented July 27, 1897.

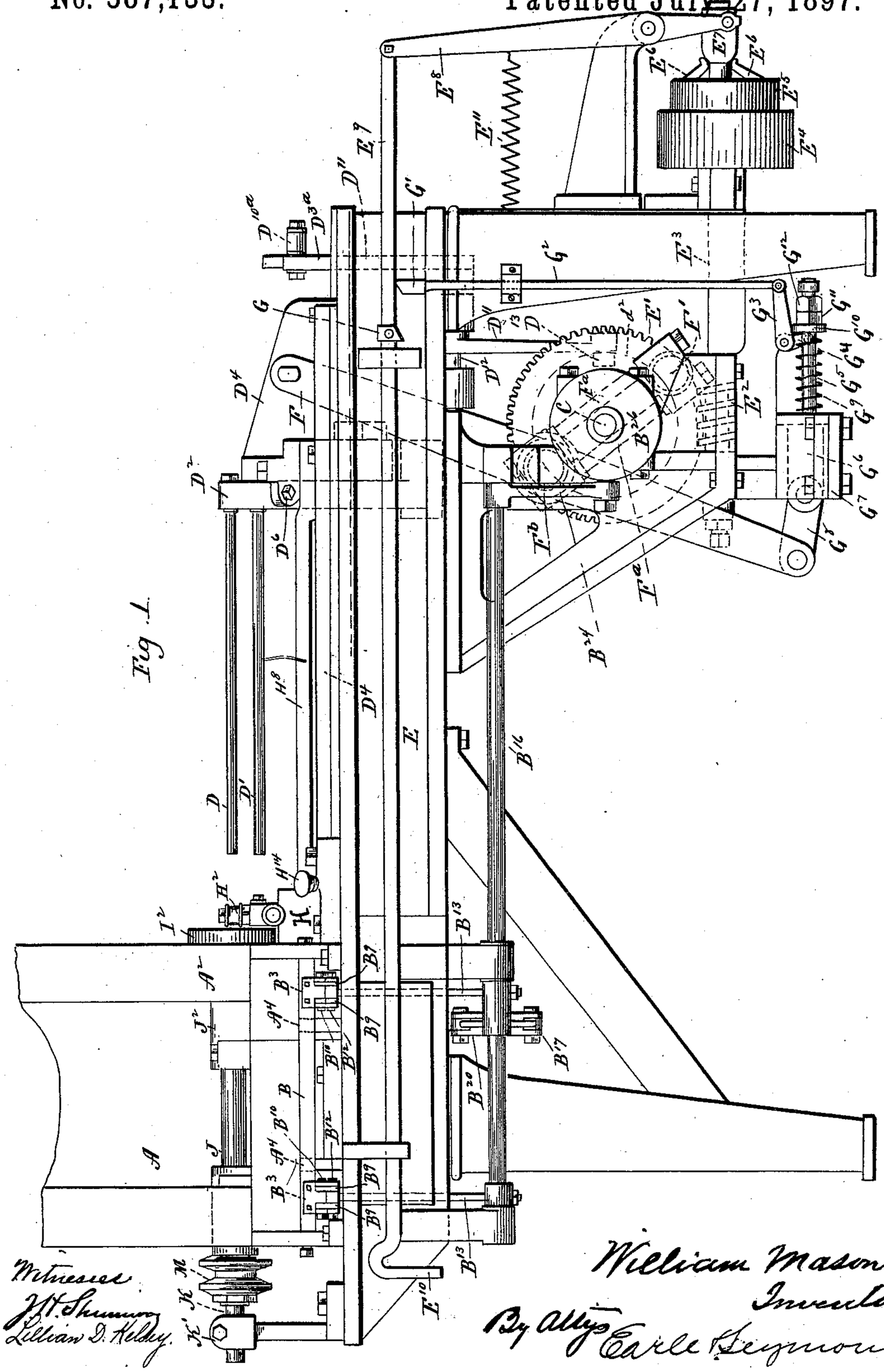


Fig. 1.

Witnesses
J. W. Shumway
Lillian D. Kelley.

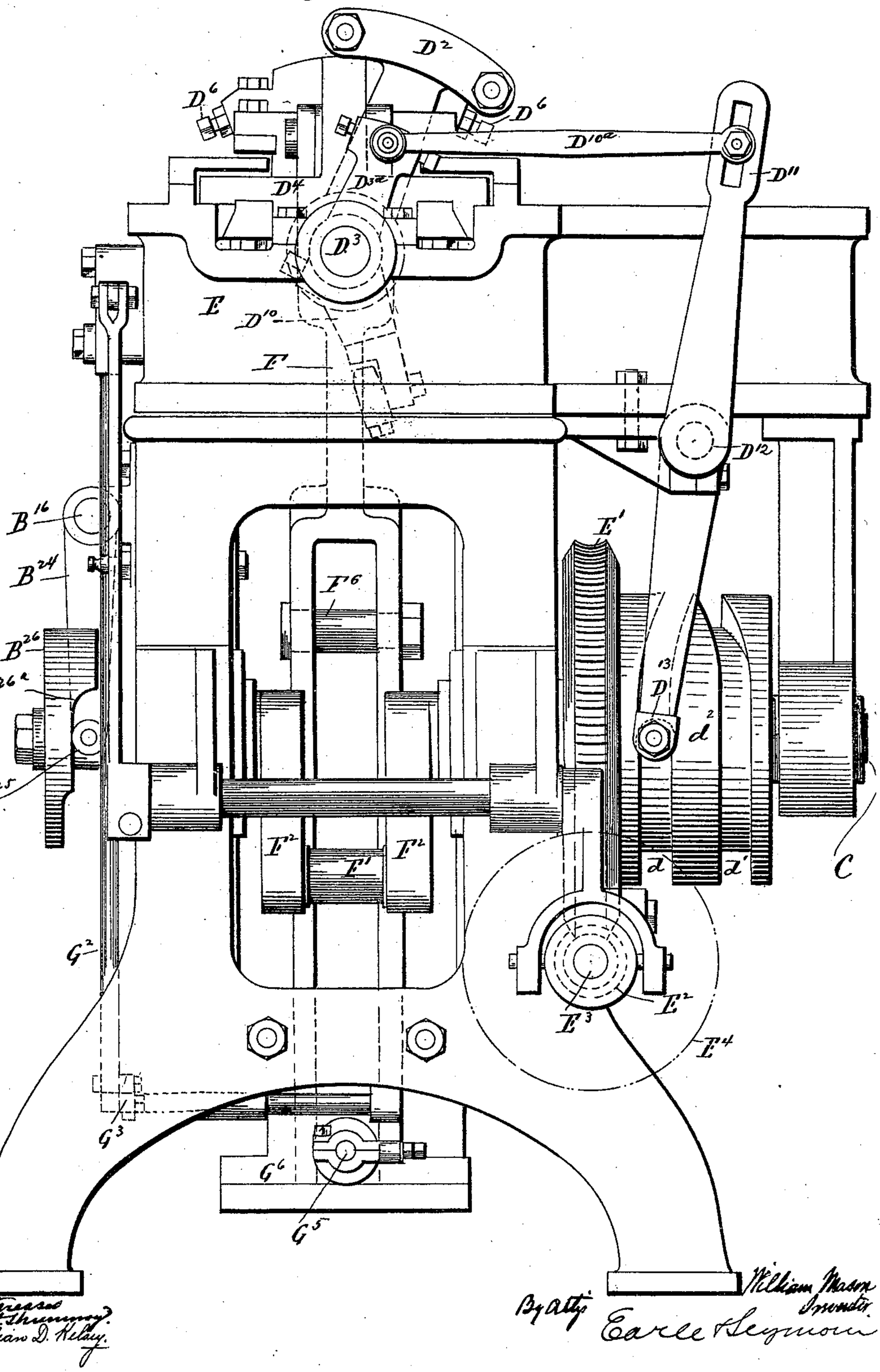
William Mason
Inventor
By Alleyn Earle & Seymour

(No Model.) 9 Sheets—Sheet 2.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. *Fig. 2* Patented July 27, 1897.



Witnesses
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Lillian D. Kelsey.

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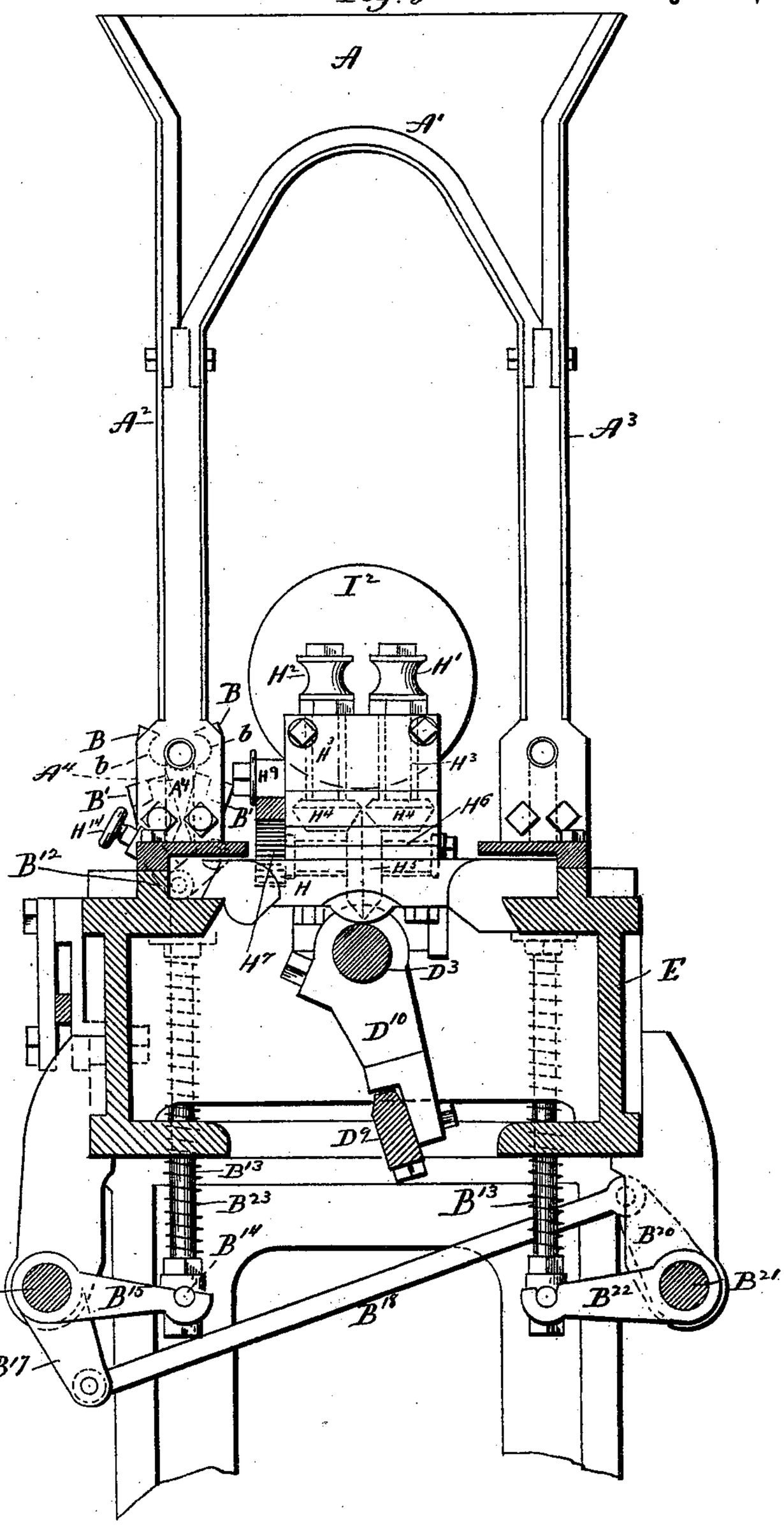
(No Model.) 9 Sheets—Sheet 3.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. Patented July 27, 1897.

Fig. 3.



Witnesses
J. H. Shumway
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(No Model.) 9 Sheets—Sheet 4.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. Patented July 27, 1897.

Fig. 4.

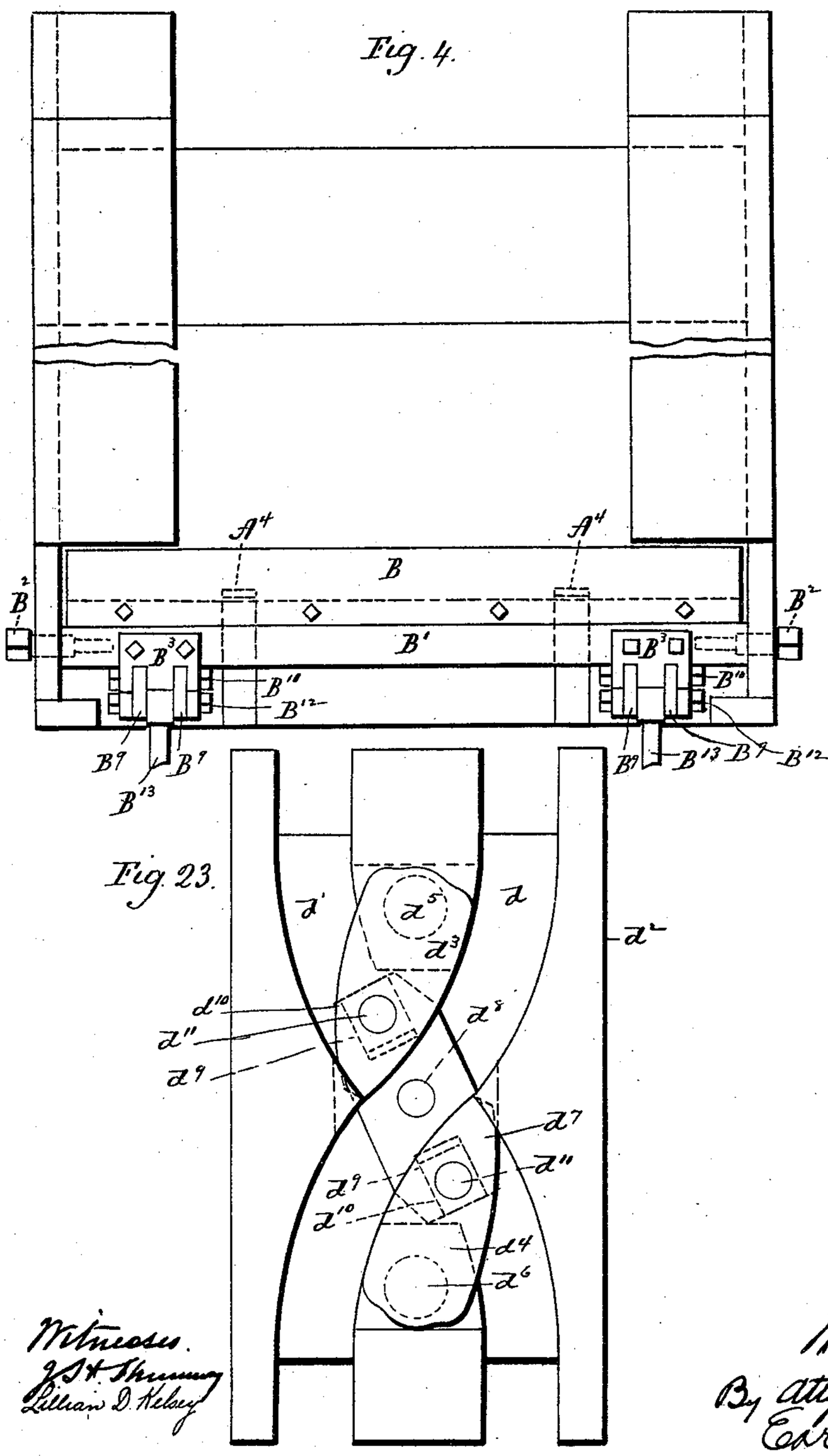

Fig. 5

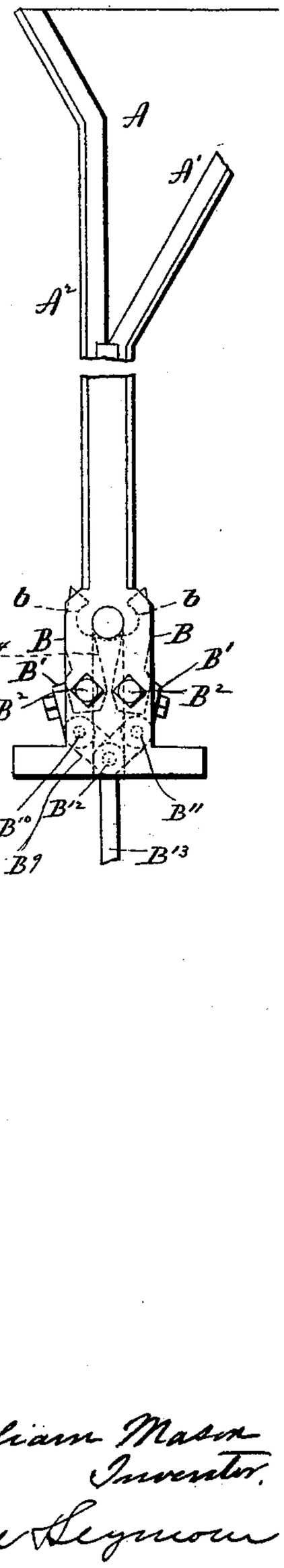

Fig. 23.

Witnesses.
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Earle & Seymour

(No Model.) 9 Sheets—Sheet 5.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. Patented July 27, 1897.

Fig. 6

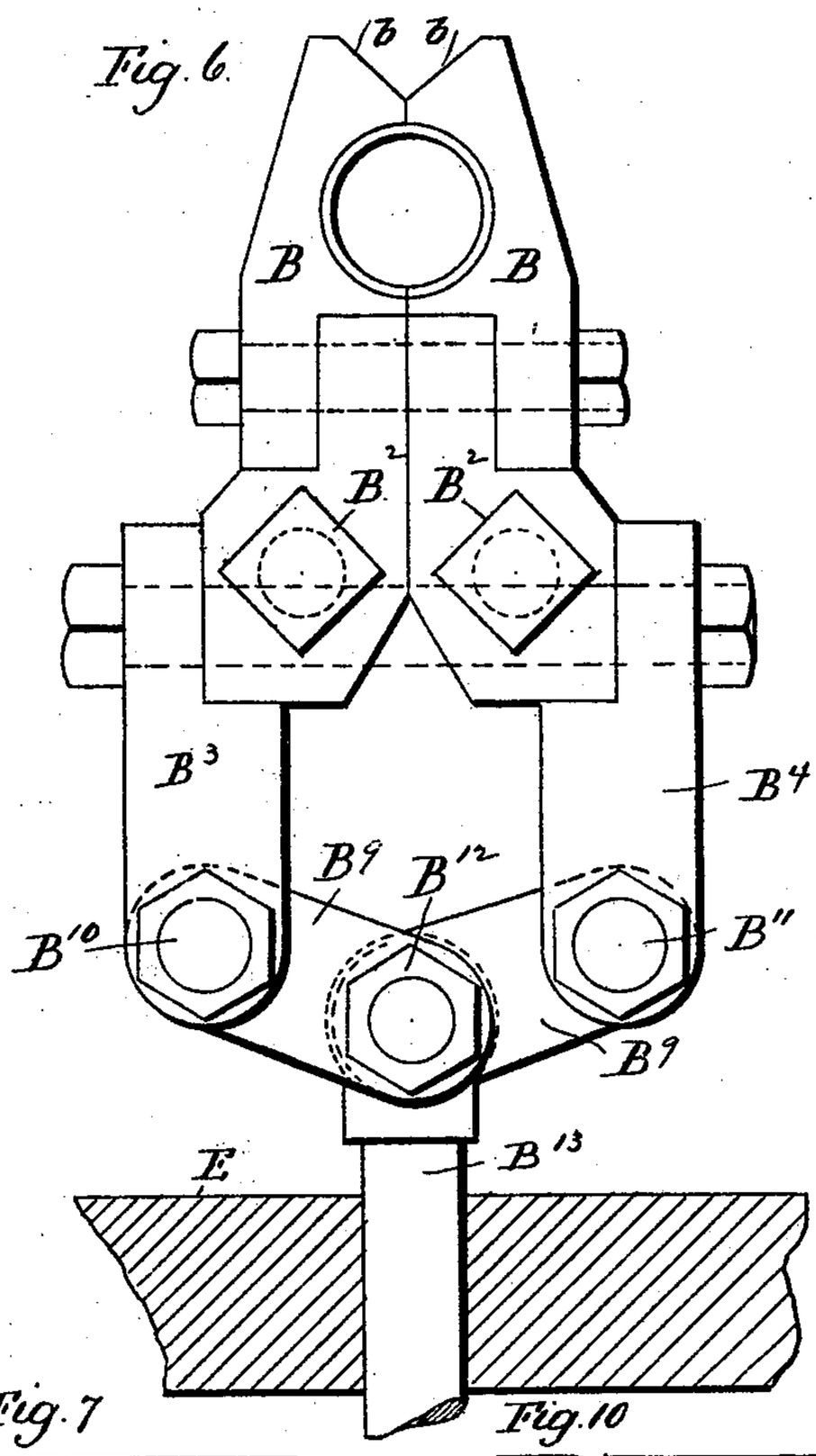


Fig. 8

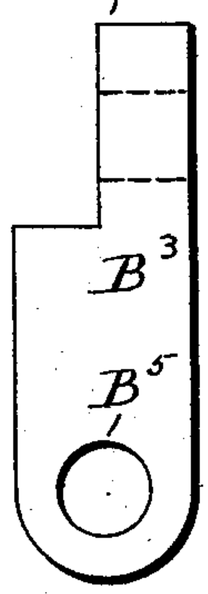


Fig. 7

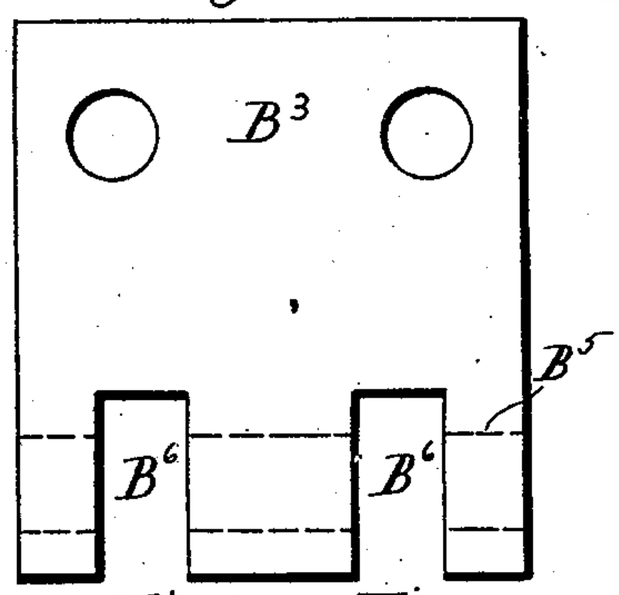


Fig. 10

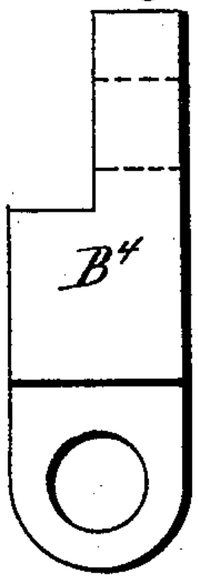


Fig. 9

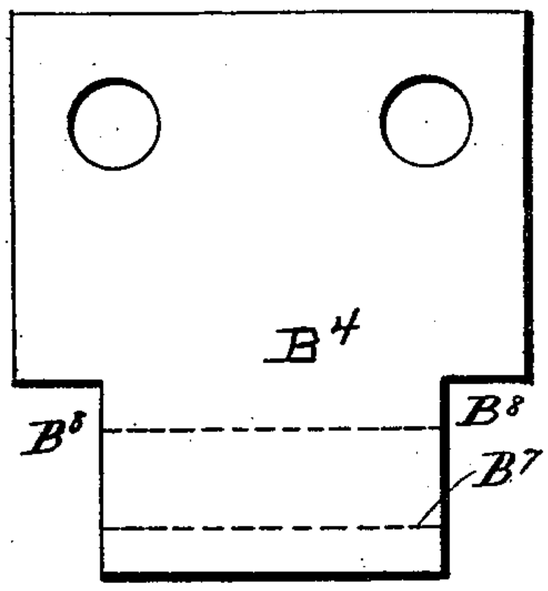


Fig. 11.

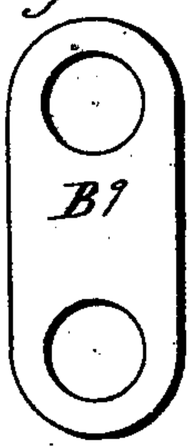
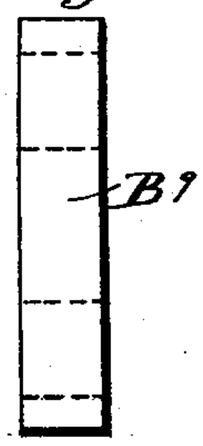


Fig. 12.



Witnesses.
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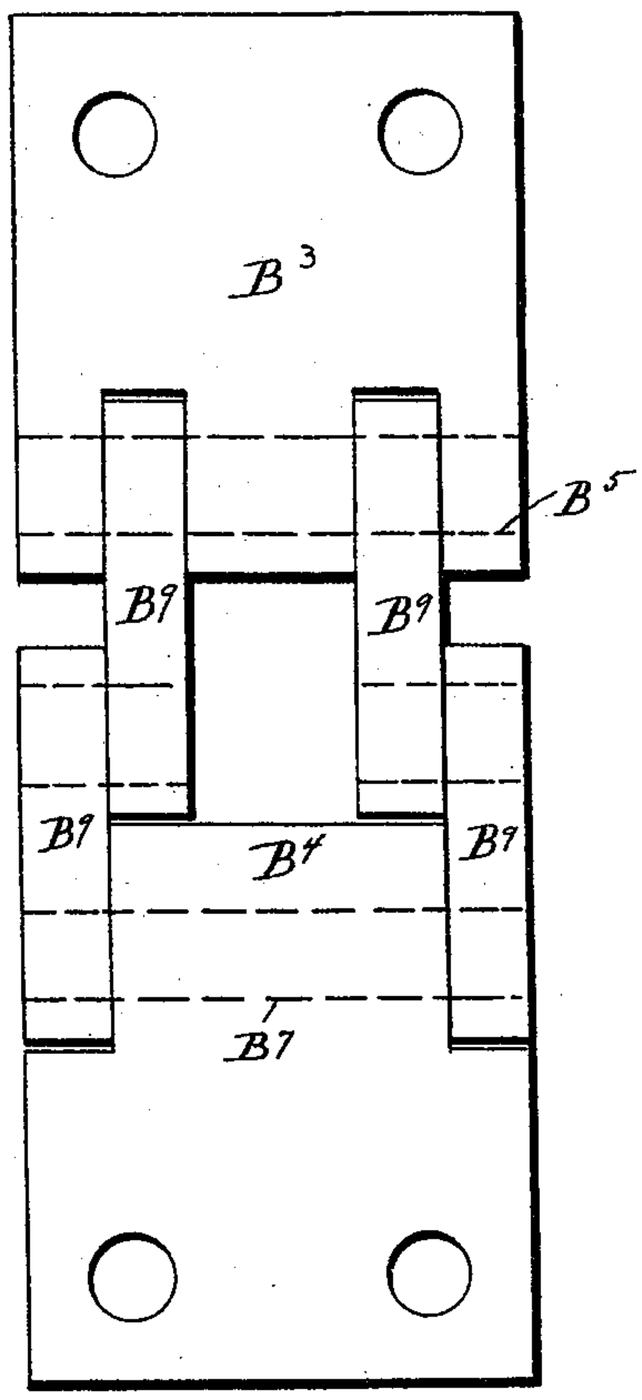
(No Model.) 9 Sheets—Sheet 6.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. Patented July 27, 1897.

Fig. 13.



Witnesses.
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(No Model.) 9 Sheets—Sheet 7.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. Patented July 27, 1897.

Fig. 14

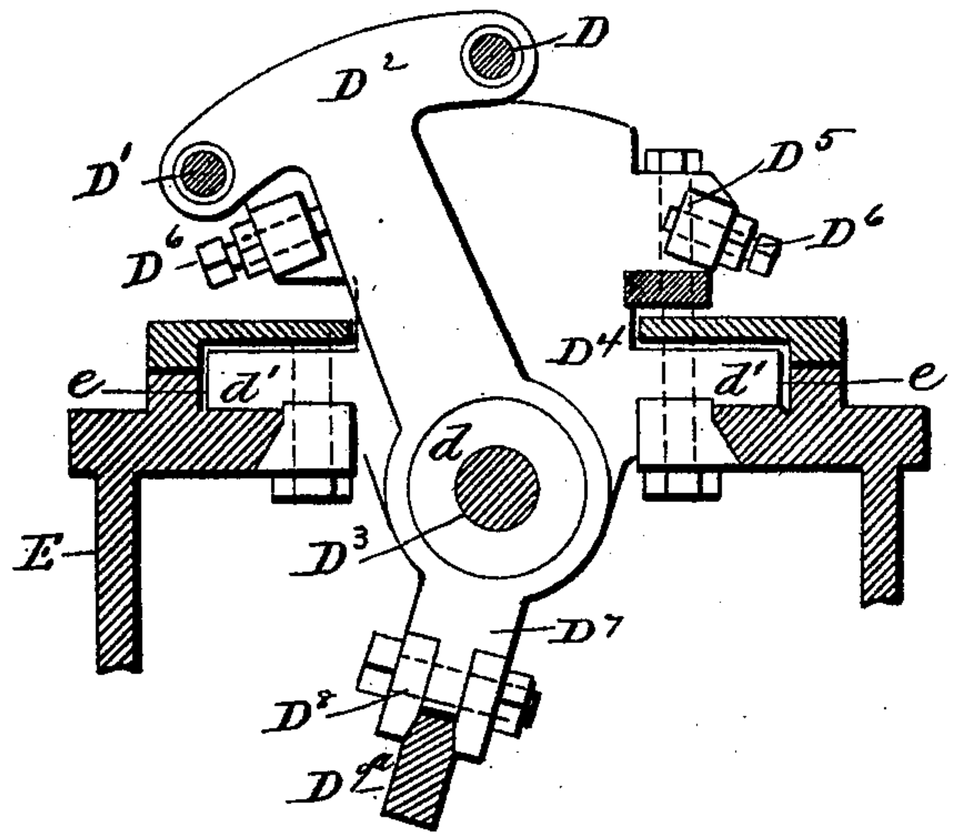


Fig. 15.

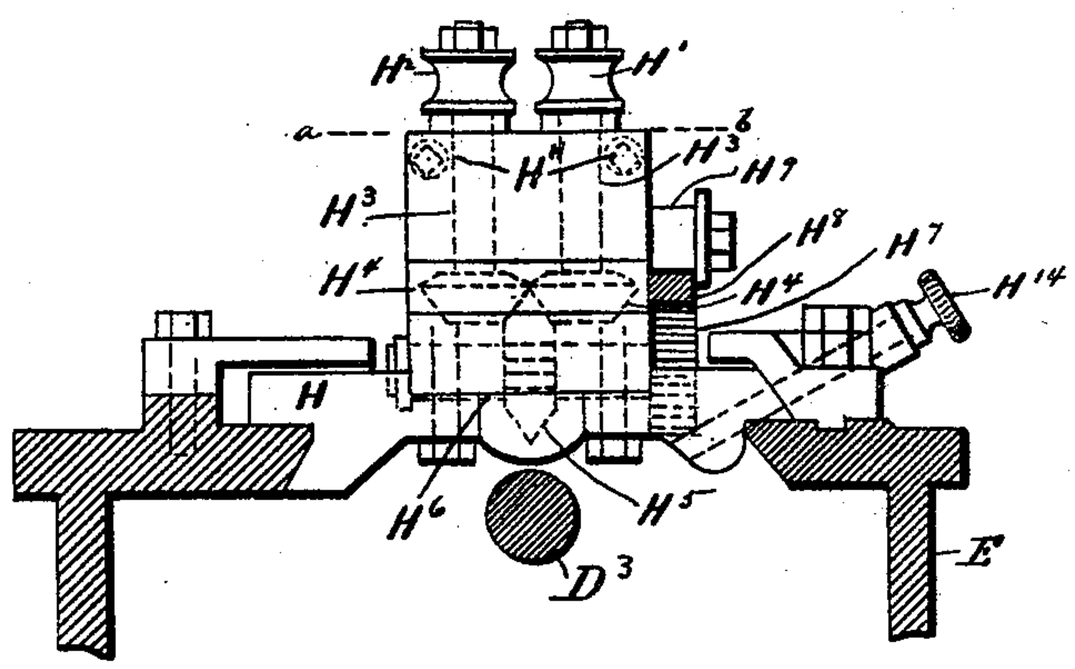
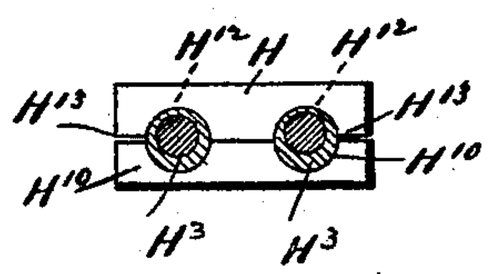


Fig. 16



Witnesses.
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(No Model.) 9 Sheets—Sheet 9.

W. MASON.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER SHELL CARTRIDGES.

No. 587,133. Patented July 27, 1897.

Fig. 24

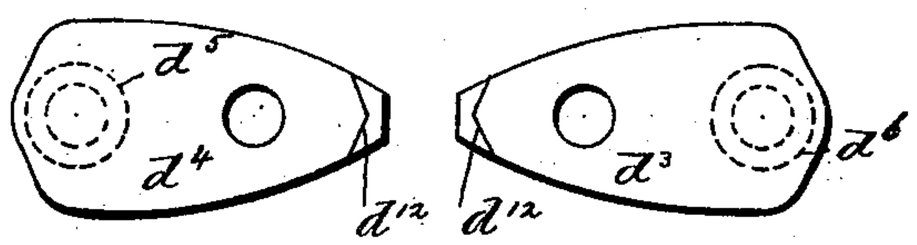

Fig. 25

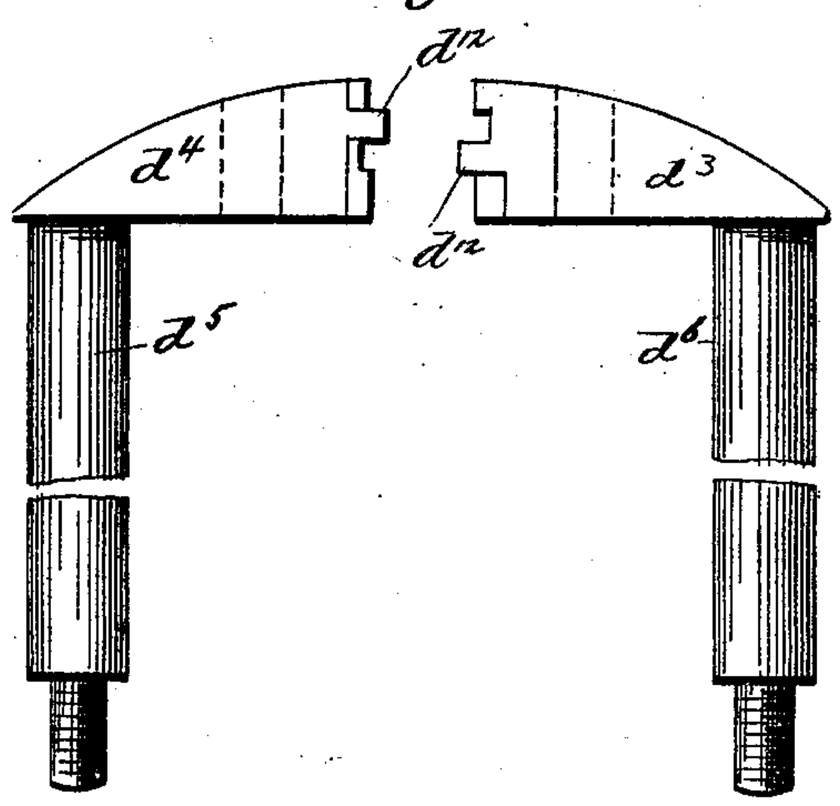

Fig. 26

Fig. 27

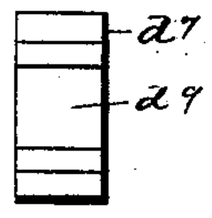

Fig. 28

Witnesses.
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By attys
Earle & Seymour

UNITED STATES PATENT OFFICE.

WILLIAM MASON, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE WINCHESTER REPEATING ARMS COMPANY, OF SAME PLACE.

AUTOMATIC MACHINE FOR BURNISHING TUBES FOR PAPER-SHELL CARTRIDGES.

SPECIFICATION forming part of Letters Patent No. 587,133, dated July 27, 1897.

Application filed August 5, 1895. Serial No. 558,227. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MASON, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Automatic Machines for Burnishing Tubes for Paper-Shell Cartridges; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in side elevation of one form which an automatic burnishing-machine constructed in accordance with my invention may assume; Fig. 2, an end view of the machine, looking toward the driving connections thereof, the pitman employed to transmit the power of the main shaft C to the operating-lever F having been omitted from this figure for the sake of clearness; Fig. 3, a view of the machine in vertical transverse section, looking toward the tube-feeding mechanism thereof; Fig. 4, a detached view, in side elevation, of the hopper; Fig. 5, a broken view thereof in end elevation; Fig. 6, a detached view, in end elevation and on a larger scale, of one pair of the tube-holding jaws; Fig. 7, a detached plan view of one of the knuckle-joint plates employed for operating the said jaws; Fig. 8, a similar end view of the plate; Fig. 9, a detached plan view of the fellow of the knuckle-joint plate shown in Figs. 7 and 8; Fig. 10, a similar end view of the plate; Fig. 11, a plan view of one of the links employed with the said plates; Fig. 12, an edge view thereof; Fig. 13, a plan view of the plates and links when combined and shown as spread out flat for perspicuity; Fig. 14, a detail view, in transverse section, looking at the front face of the oscillating arbor-head; Fig. 15, a sectional view, in front elevation, of the feed-roll carriage; Fig. 16, a view of the feed-roll carriage on the line *a b* of Fig. 15; Fig. 17, a detached enlarged view, in vertical section, of the burnishing mechanism; Fig. 17^a, a broken sectional view, on a larger scale, of the forward ends of the auxiliary tube and jaws of the stripping mechanism; Fig. 18, a detached view, in front elevation, of the die head or chuck which contains the burnishing-dies; Fig. 19, a detached view, in central longitudinal section, of the stripping-jaws; Fig. 20, a view thereof in front elevation; Fig. 21, a detached view, in central longitudinal section, of the spring-tube; Fig. 22, a detached view of one of the burnishing-jaws; Fig. 23, a detached view of the double-path cam, looking at the intersection of its paths and the shifting mechanism located thereat; Fig. 24, a detached plan view of the two shifting cams; Fig. 25, a detached view of the cams in side elevation; Fig. 26, a detached view of the double coupling-yoke employed to connect the cams; Fig. 27, an end view of the yoke; Fig. 28, one of the slides employed to connect the yoke and shifting cams.

My invention relates to an improvement in machines for burnishing the paper tubes employed in the manufacture of paper-shell cartridges, for which purpose they are cut up into short lengths, the object being to produce an automatic machine having a large capacity for work of superior character and adapted to be operated with the minimum of attention.

With these ends in view my invention consists in the combination, with tube feeding and burnishing mechanisms, of an automatically-operated arbor to remove the tubes one by one from the tube-feeding mechanism and present them to the action of the burnishing mechanism.

My invention further consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In carrying out my invention I employ, as shown, tube-feeding mechanism comprising a hopper A, containing an arched deflector A′, which shunts the tubes introduced into it in opposite directions and into two parallel depending vertical chutes A^2 and A^3, secured to it. In the opening at the lower end of each chute I locate two vertically-adjustable stops or posts A^4 A^4, arranged in the same vertical plane and having their upper ends concaved to receive the tubes, which descend upon them through the chutes and which they combine to support in a horizontal position. I also provide each chute with a pair of hori-

with two wearing-plates D^8 D^8, separated from each other and receiving between them the beveled upper edge of an oscillating bar D^{2a}, supported at its respective ends by two arms D^{10}, one of which is seen in Fig. 3. The said arms D^{10} are rigidly secured to and depend from the opposite ends of the shaft D^3. The said arm D^7, wearing-plates D^8 D^8, bar D^{2a}, and arms D^{10} D^{10} connect the arbor-head D^2 with the shaft D^3, whereby the arbor-head partakes of the rocking movement of the shaft. The parts mentioned take the place of a spline or feather connection between the arbor-head and rock-shaft, though in one view of the construction the bar D^{2a} may be considered as a flying or detached feather or spline, its distant location from the shaft securing a long and advantageous leverage. The said rock-shaft D^3 is rocked by means of a crank-arm D^{3a}, secured to and projecting upward from its rear end and pivotally connected with the inner end of a link D^{10a}, the outer end of which is adjustably connected with the upper end of the main operating-lever D^{11}, which is hung upon a stud D^{12}, provided at its lower end with an antifriction-roll D^{13}, which alternately travels in two intersecting paths d and d', formed in the double-path cam d^2, mounted upon the main shaft C. At the intersection of the said paths d and d' I locate two shifting cams d^3 and d^4, provided at their outer ends with pivots d^5 and d^6, by means of which they are pivotally mounted in the double-path cam d^2 aforesaid. These shifting cams d^3 and d^4 are coupled together at a point below the bottoms of the intersecting paths d and d' by means of a double yoke d^7, swinging on a central pivot d^8 and having each of its ends constructed with a slot d^9 d^9, receiving-blocks d^{10} d^{10}, swiveled upon pivots d^{11} d^{11}, respectively mounted toward the outer ends of the said cams. Under this construction one shifting cam will always stand across one of the two paths, while the other shifting cam will complete the wall of the other path. Now as the double-path cam d^2 revolves one of the shifting cams or the other will strike the antifriction-roll D^{13}, whereby the said shifting cam will be deflected and pushed out of the way to make a passage for the roll. The movement of this shifting cam will be transmitted through the coupling-yoke to the other shifting cam, which will be correspondingly moved across the other path and into position to strike the said roll when the double-path cam d^2 is about completing another revolution. It will be observed by reference to Figs. 24 and 25 that the free ends d^{12} d^{12} of the shifting cams are notched. This is done to adapt their ends to interlock, as it were, into the side walls of the paths d' d' of the double-path cam d^2, so as to make the walls of the said paths more continuous to the passage of the antifriction-roll D^{13}. This interlocking, however, is not shown. Under this construction the arbor-head D^4 is operated back and forth once for every two revolutions of the main shaft C. In other words, it requires one revolution of the main shaft C to cause the antifriction-roll D^{13} to make the circuit of one of the paths d of the cam and another complete revolution to cause the said roll to make the circuit of the other path d' of the cam. This double-path cam might be constructed in other ways than shown or its place might be taken by two cams, but the construction represented is very simple, compact, and effective.

The carriage is actuated back and forth by means of the main or carriage lever F, which is connected at its upper end to the carriage and by a compound pitman F^a with the wrist F′ of the crank F^2 of the main shaft C aforesaid. The said compound pitman F^a is composed of two parallel rods united at their ends by boxes, one of which receives the wrist-pin F′ before mentioned and the other of which receives a pin F^b, mounted transversely in the lever F, as clearly shown in Fig. 2, from which the pitman has been omitted, so as to clearly show the wrist-pin F′ and transverse pin F^b. For driving the said main shaft I mount upon it a worm-gear E′, which meshes into a worm E^2, mounted upon the driving-shaft E^3 and carrying a friction-clutch pulley E^4, over which a power-belt is led from any convenient source of power and which coacts with a friction-clutch E^5, mounted on the same shaft and comprising clutch-levers E^6 E^6 and a movable clutch-head E^7, which is engaged with and actuated by the forked lower end of an operating-lever E^8, the upper end of which is connected with a long starting-rod E^9, arranged for horizontal reciprocation under the bed of the machine and having its opposite end furnished with a starting-handle E^{10}. A spring E^{11}, connected with the lever E^8 and with the frame of the machine, exerts a constant effort to operate the lever, so as to cause the clutch to release the driving-pulley E^7 and permit the same to rotate freely on the driving-shaft, thus stopping the machine.

To provide for automatically stopping the machine in the case of accident, I employ a safety mechanism comprising an adjustable coupling-block G, mounted upon the starting-rod E^9 and having its lower edge beveled and coacting with the beveled upper edge of a safety-block G′, located at the upper end of the vertically-movable safety-rod G^2, the lower end of which is attached to the horizontal arm G^3 of a bell-crank lever, the depending vertical arm G^4 of which is engaged with the outer end of the stem G^5 of a longitudinally-movable block G^6, mounted in bearings G^7 and connected by a link G^8 with the lower end of the main lever F. A spring G^9 encircles the stem G^5 and is interposed between the bearing or box G^7 and the washer G^{10}, mounted upon the extreme outer end of the stem and adjusted thereon through the medium of the jam-nuts G^{11} G^{12}.

It will be apparent from the foregoing description that the load upon the upper portion of the lever during the inward movement thereof will in part fall upon the spring G^9 and that if on account of any accident or for other cause the load is greater than the resistance of the spring to compression the same will be compressed and the block G^6, together with its stem G^5, will move inward, causing the arm G^2 of the bell-crank lever to move inward and the arm G^3 thereof to be moved downward, whereby the safety-rod G^2 will be drawn downward and the coupling-block G′ at its upper end disengaged from the coupling-block G, leaving the spring E^{11} free to operate the lever E^8 in throwing off the clutch and stopping the machine.

Between the arbor-carriage and the burnishing mechanism I locate a feed-roll carriage H, which is normally stationary, but which may be moved outward on the machine-bed for convenience of access to the burnishing mechanism. This carriage carries two grooved feed-rolls H′ H^2, arranged in the same horizontal plane and mounted upon the upper ends of vertical shafts H^3 H^3, each of which is furnished at its lower end with a bevel-gear H^4 H^4, both of which take into a double bevel-gear H^6, Fig. 15, mounted on a shaft H^5, provided at one of its ends with a small pinion H^7, meshing into a rack H^8, held down upon the pinion by an antifriction-roll H^9. The said rack H^8 is arranged horizontally and secured at its rear end to the carriage D^4, whereby the rotation of the rolls H′ and H^2 always corresponds exactly to the rate at which the arbor-carriage and hence the arbors move. The shafts H^3 H^3 are journaled, as shown in Fig. 16, in eccentric bushings H^{10} h^{10}, normally clamped against rotation by means of clamping-screws H^{11} H^{11}, extending transversely through the upper end of the carriage H, which is chambered, as at H^{12} H^{12}, to receive said bushings, and split, as at H^{13} H^{13}, to be clamped thereupon.

It will be obvious that by releasing and rotating the bushings the shafts H^3 H^3 may be moved toward or away from each other, and hence the feed-rolls H′ and H^2, between which the arbors pass, the bushings being released by reversing the clamping-screws H^{11} H^{11} before mentioned.

In the forward movement of the arbors the rolls frictionally engage with the shells upon the arbors and assist in supporting them and feeding them into the burnishing mechanism, the rolls being rotated, as before mentioned, at the same rate at which the carriage moves forward, so that their operation is always in harmony with its operation. In the outward movement of the carriage the rolls are rotated in reverse direction and idly. For the purpose of securing the carriage in its proper position I provide it with a locating-pin H^{14}, the inner end of which takes into a small socket formed for it in right position in a portion of the bed of the machine. By drawing the said pin H^{14} outward, so as to clear it from the said socket, the carriage is free to be slid outward on the bed E of the machine, so as to make the burnishing mechanism more convenient of access.

The burnishing mechanism is located in line with the feed-rolls and centrally between the two chutes of the tube-feeding mechanism and comprises two burnishing-dies I I, a detached view of one of which is shown in Fig. 22. These dies are located in a transverse slot I′, formed in the circular die-head 12, and are adjusted back and forth, as required, by means of adjusting-screws 13 13. The inner face of the die-head 12 is furnished with an internally-threaded projecting hub 14, which adapts it to be screwed upon the projecting forward end of a spindle J, supported in suitable bearings J′, one of which is shown in Fig. 17, which also shows a packing J^2, of Babbitt metal, for the said spindle to run in.

The tube-stripping mechanism is located in line with and directly in rear of the burnishing mechanism. It comprises a non-rotatable tube K, located within the spindle J and projecting from the rear end thereof, as shown in Fig. 17, the said projecting end of the tube being supported and held against rotation by a stationary clip K′. The forward end of the stationary tube K does not extend to the forward end of the spindle, but is reduced in diameter and externally threaded to form a hub K^2, which receives the internally-threaded inner end of an auxiliary tube K^3, the forward end of which projects slightly beyond the forward end of the spindle and is constructed with an inwardly-projecting double-faced annular rib, the outer bevel *k* of which serves to center the burnished tubes and direct them into the stationary tube, while the inner bevel *k′* of the rib coacts with the stripping-jaws L and L′, which strip the burnished tubes from the arbors. The said jaws L and L′ are semicircular in form and constructed so as to have slight lateral play toward and away from each other, their outer ends being constructed with spreading bevels *l*, contracting bevels *l′*, and gripping-shoulders l^2. The inner ends of these jaws rest against the outer end of a tube L^2, the inner end of which extends into the threaded neck K^2 of the tube K.

The outer face of the tube L^2 is cut away for the reception of a spiral spring L^3, one end of which impinges against an exterior annular shoulder l^3, formed at the forward end of the said tube L^2, and the inner end of which rests upon the end of the threaded neck K^2. This spring exerts a constant effort to force the jaws forward and cause their contracting bevels *l′* to coact with the bevel *k′* of the auxiliary tube K^3, whereby the forward ends of the jaws are drawn toward each other.

It will be understood that the arbors pass the tubes through the feed-rolls and thence to the burnishing-dies, which revolve around

the tubes with great velocity and condense and polish them. Then when the outer ends of the tubes enter between the jaws they strike the spreading bevels *l* thereof, causing the jaws to move longitudinally inward against the tension of the spring L^3 and also to move laterally outward, permitting the passage of the tubes into the stationary tube K. When the arbors have carried the inner ends of the tubes beyond the stripping-jaws, the same move inward and engage with the said ends of the tubes, causing them to be stripped from the arbors when the same move outward again.

In Figs. 19 and 20 the stripping-jaws are represented in the positions which they will assume when pushed back by an incoming tube and separated preparatory to gripping the tube for stripping it from the arbor.

A pulley M, mounted upon the spindle J, provides for rotating the same at a high rate of speed.

Although the operation of the different features of my improved machine have been described in connection with the detailed description of their construction, it may be well to state that in the operation of the machine as a whole the tubes to be burnished are fed into the hopper by an attendant, after which they gravitate downward through the two chutes of the hopper, in which chutes they form two vertical columns of tubes, the lower tube of each column resting upon the stops located below the open lower ends of the chutes. When the machine is started, it will be understood that the carriage is reciprocated back and forth upon the machine-bed, carrying the arbor-head with it, and that the arbor-head is also oscillated back and forth independently of the carriage and at a right angle to the movement thereof. When the arbor-head is swung to the limit of its movement in one direction, it is moved forward, whereby one of its arbors moves under one chute to take the lowermost tube of the column therein, while at the same time the other arbor passes inward and subjects the tube which it carries to the action of the burnishing mechanism, supposing that the arbor last mentioned has previously taken the lowermost tube of the column in the other chute. Now when the carriage makes its outward excursion with the arbor-head in its same position the arbor which has just been entered into a tube withdraws the same from under the chute, while the tube which has just been burnished is stripped from the other arbor. The arbor-head is now swung to the limit of its other position, after which the carriage makes its inward excursion, whereby the tube last picked up, so to speak, is burnished, and whereby the other arbor is entered into the lowermost tube in the other chute. The carriage now makes its outward excursion, whereby the burnished tube is stripped from one arbor, while the tube last picked up is removed from the chute. The arbor is then swung back to the other limit of its oscillating movement and the carriage moved inward again, and so on. It will thus be seen that for every inward excursion of the carriage one arbor picks up a tube, while the other arbor burnishes a previously-picked-up tube, and for every outward excursion of the carriage the tube picked up is withdrawn from under the chute, where it was obtained, and the tube just burnished stripped from the other arbor.

It will be seen from the foregoing that the action of my improved machine is purely automatic except so far as the introduction of loose tubes into the hopper is concerned.

It is apparent that in carrying out my invention some changes in the construction herein shown and described may be made, and I would have it understood that I do not limit myself to the exact combination set forth, but hold myself at liberty to make such alterations as fall within the spirit of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a tube-feeding mechanism having two chutes, of a burnishing mechanism, and two automatically-operated arbors which act alternately in removing tubes from the respective chutes and then presenting them to the action of the burnishing mechanism, substantially as described.

2. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a tube-feeding mechanism having two chutes, of a burnishing mechanism, an oscillating head carrying two arbors, and means for reciprocating the said head toward and away from the said tube feeding and burnishing mechanisms and for oscillating it, substantially as described, and whereby while one arbor is preparing to remove a tube from one chute the other arbor is presenting a tube removed from the other chute to the burnishing mechanism and vice versa.

3. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a tube-feeding mechanism having two chutes, of a burnishing mechanism located centrally between the said chutes, an oscillating head, two parallel arbors carried thereby, means for reciprocating the said head toward and away from the said chutes and mechanism and for oscillating it, and a stripping mechanism located in the rear of and in line with the burnishing mechanism, substantially as described.

4. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with tube feeding and burnishing mechanisms, of an automatically-operated arbor to remove the tubes from one mechanism and subject them to the action of the other, and

feed-rolls through which the arbor passes the tubes on their way to the burnishing mechanism, substantially as described.

5. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a hopper, of a vertically-arranged chute leading downward therefrom, two vertically-arranged pivotal jaws located below the open lower end of the chute, means for actuating the said jaws, an arbor which is entered into a tube while the same is gripped by the said jaws, means for automatically operating the said arbor, a burnishing mechanism to the action of which the tube on the arbor is subjected after it is withdrawn by the arbor from said jaws, and a stripping mechanism for stripping the tube from the arbor after it has been burnished thereupon.

6. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a hopper provided with a chute, of stops consisting of vertically-adjustable posts having their upper ends concaved and located below the opening at the lower end of the chute, for receiving the tubes from the chute, vertically-arranged pivotal jaws extending above the said stops for closing upon the tube supported thereby, an arbor which is entered into the tubes when they are gripped by the jaws, a burnishing mechanism to the action of which the tubes are subjected by the arbor, and means for stripping the burnished tubes from the arbor.

7. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a tube-feeding mechanism having two chutes, of a burnishing mechanism located between the said chutes, an arbor-head provided with two arbors, means for reciprocating the said head toward and away from the chutes and burnishing mechanism, and means for oscillating the head and supporting it at the limit of each end of its oscillating movement, so that for every inward excursion of the head it is changed in position so as to alternately present its tubes to the chutes and burnishing mechanism.

8. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with tube feeding and burnishing mechanisms, of an automatically-reciprocated arbor which transfers the tubes one by one from the tube-feeding mechanism to the burnishing mechanism, feed-rolls between which the arbor passes the rolls on their way to the burnishing mechanism, and means for actuating the rolls in harmony with the speed of the reciprocation of the arbor, substantially as described.

9. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a feeding mechanism, of an arbor which removes the tubes one by one from the feeding mechanism, a pair of feed-rolls, a burnishing mechanism, a reciprocating carriage for the arbor, and a rack attached to the said carriage and geared to the feed-rolls which are therefore actuated in harmony with the movement of the carriage back and forth, substantially as described.

10. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a burnishing mechanism, of a reciprocating arbor-carriage, and a feed-roll carriage interposed between the burnishing mechanism and the arbor-carriage, and provided with two feed-rolls, substantially as described.

11. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with tube feeding and burnishing mechanisms, of a carriage, means for reciprocating the said carriage, whereby it is moved toward and away from the said mechanisms, a rock-shaft extending parallel with the movement of the carriage, an arbor-head provided with two arbors and connected with the carriage for oscillation in a plane at a right angle to the line in which the same reciprocates, means for rocking the said shaft, and connection between the shaft and head, whereby the latter is oscillated by the former independent of its movement back and forth with the carriage.

12. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with tube feeding and burnishing mechanisms, of a carriage, means for reciprocating the said carriage whereby it is moved toward and away from the said mechanisms, a rock-shaft extending parallel with the movement of the carriage, an arbor-head provided with two arbors and connected with the carriage for oscillation in a plane at a right angle to the line in which the same reciprocates, means for rocking the said shaft, two arms connected with the shaft, a bar carried by the said arms, and an arm connected with the said oscillating head and having sliding connection with the said bar, whereby the oscillation of the shaft is transmitted to the head for the oscillation thereof.

13. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a tube-feeding mechanism, of an arbor, a reciprocating carriage therefor, a lever connected with the said carriage for reciprocating the same back and forth, means for operating the said lever, a spring connected with the lower end of the lever, and yielding in case of accident, a friction-clutch, a spring exerting a constant effort to operate the same, and means actuated by the compression of the spring for permitting the spring last mentioned to act in throwing off the clutch and stopping the machine, substantially as described.

14. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination with a tube-feeding mechanism, of a burnishing mechanism, an oscillating arbor-head provided with two arbors, a reciprocating carriage to which the said head is attached,

means for reciprocating the carriage, and means for oscillating the head, including a cam having two paths which intersect each other, two shifting cams located at the intersection of the said paths, and a coupling-yoke connecting the said cams, whereby when one cam is retired the other is brought into operating position, substantially as described.

15. In an automatic machine for burnishing tubes for paper-shell cartridges, the combination, in a burnishing mechanism, with two burnishing-dies, of a die-head in which the same are mounted, a hollow spindle to which the die-head is attached, a non-rotatable tube entering the said hollow spindle, an auxiliary tube secured to the forward end of the said non-rotatable tube, and having its forward end beveled, two semicircular jaws located within the auxiliary tube, and having their forward ends adapted to coact with the beveled forward ends thereof, and a spring acting upon the said jaws, and tending to push the same forward so as to force them together, substantially as described.

16. In a machine for burnishing tubes for paper-shell cartridges, a tube-feeding mechanism having a hopper, a chute leading downward therefrom, jaws located below the lower end of the chute, receiving the tubes therefrom, and having their upper ends beveled to lift the column of tubes when they come together and so isolate the tube gripped by the jaws from the tubes of the column, means for operating the jaws, and stops located below the lower end of the chute for arresting the tubes in position to be gripped by the jaws.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM MASON.

Witnesses:
FRED. C. EARLE,
GEO. D. SEYMOUR.

(No Model.)

J. A. MOSHER.

RAIL BOND.

No. 587,134. Patented July 27, 1897.

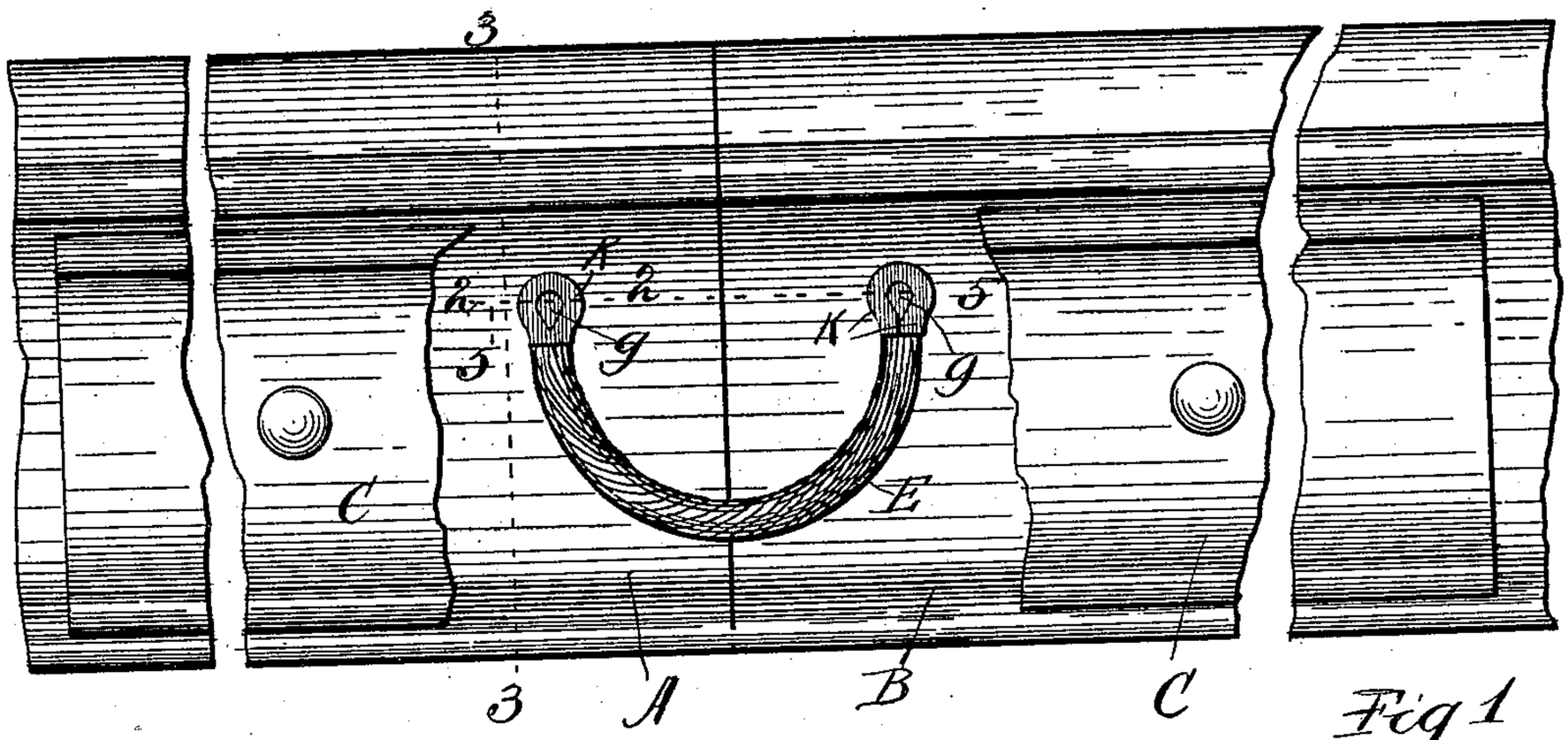

Fig 1

Fig 2

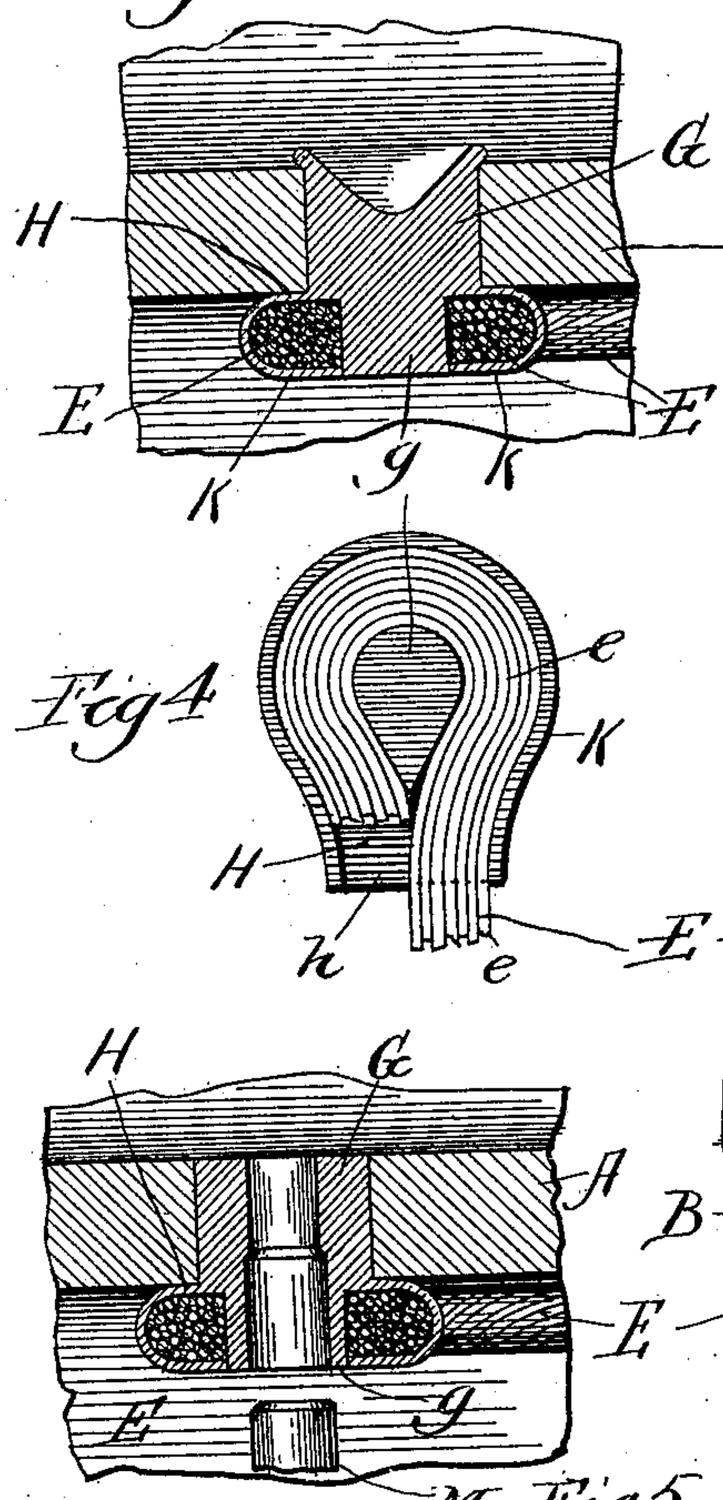

Fig 3

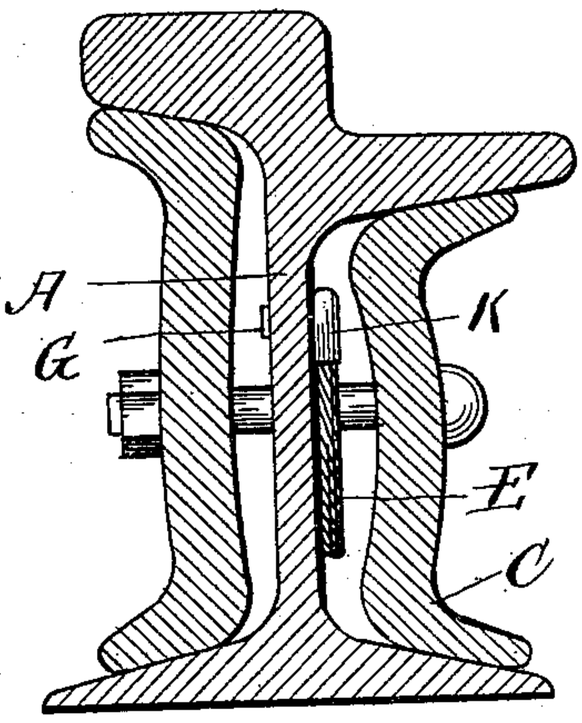

Fig 4

Fig 8

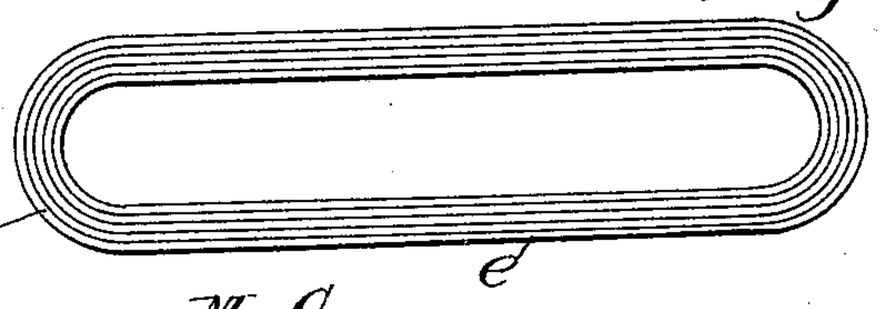

Fig 5.

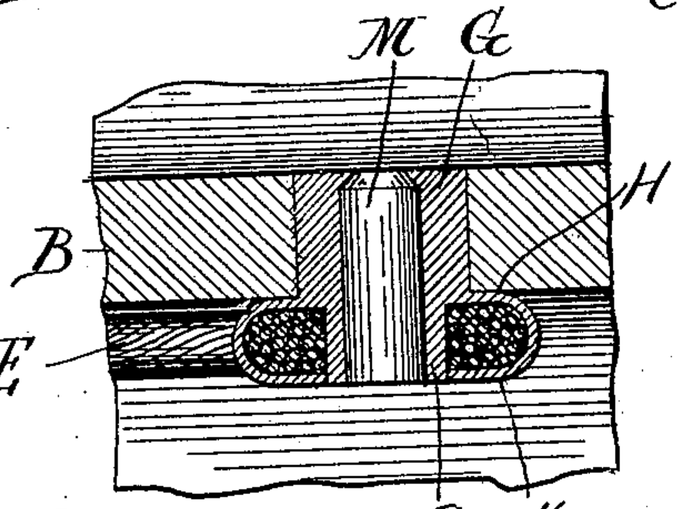

Fig 6

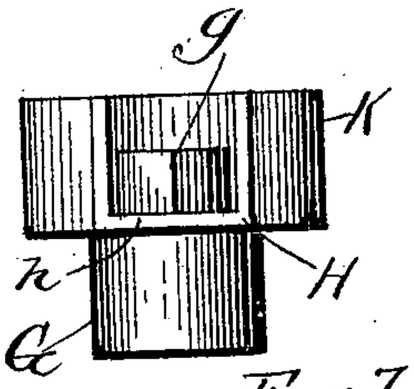

Fig 7

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