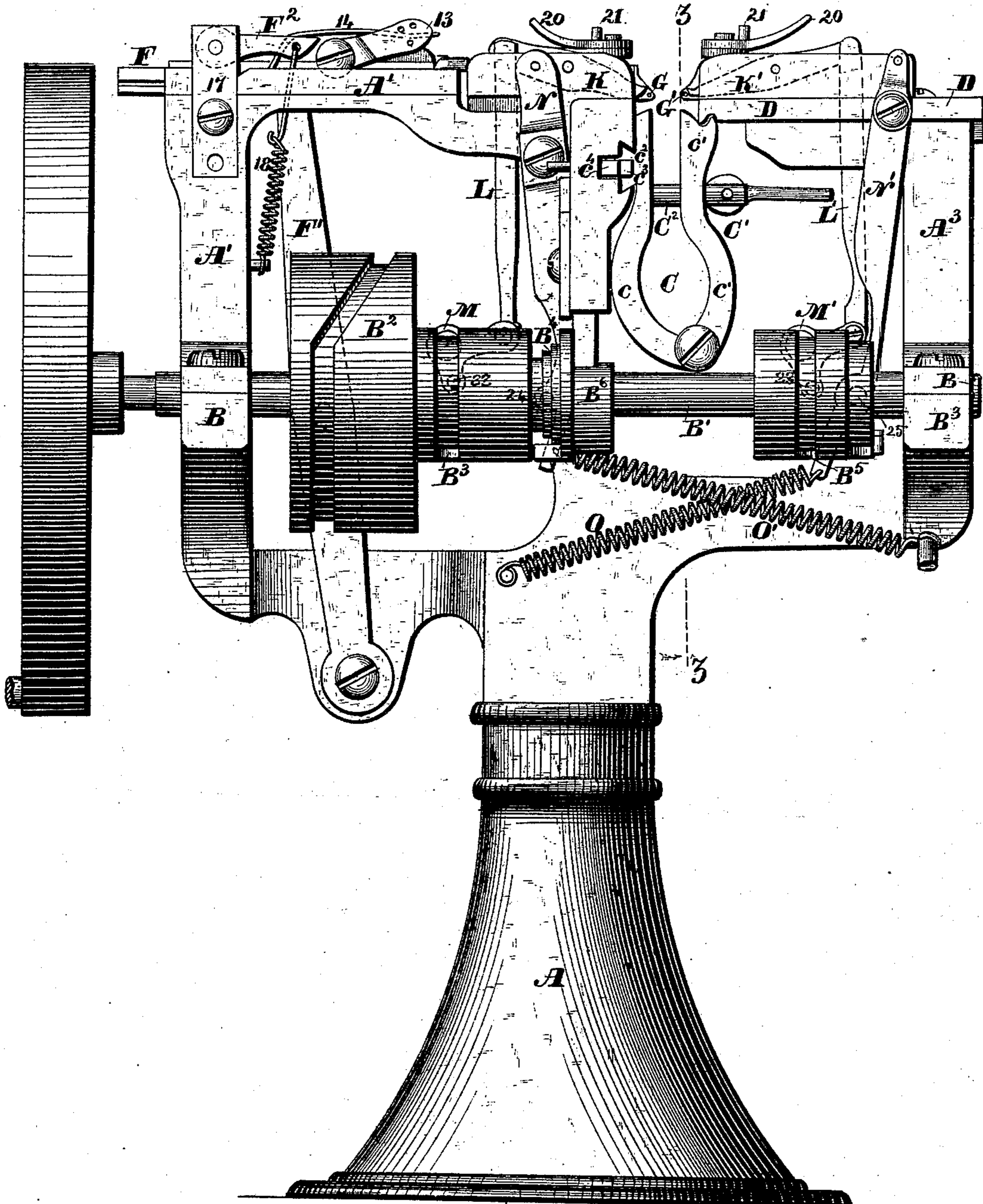


J. WAGNER, Jr., & L. WAGNER.
Wire Sewing-Machine.

No. 227,138.

Patented May 4, 1880.

Fig. 1.



Attest:

*J. Henry Kaiser
Victor Coombs*

Inventors:

*Jacob Wagner Jr.
and
Louis Wagner*

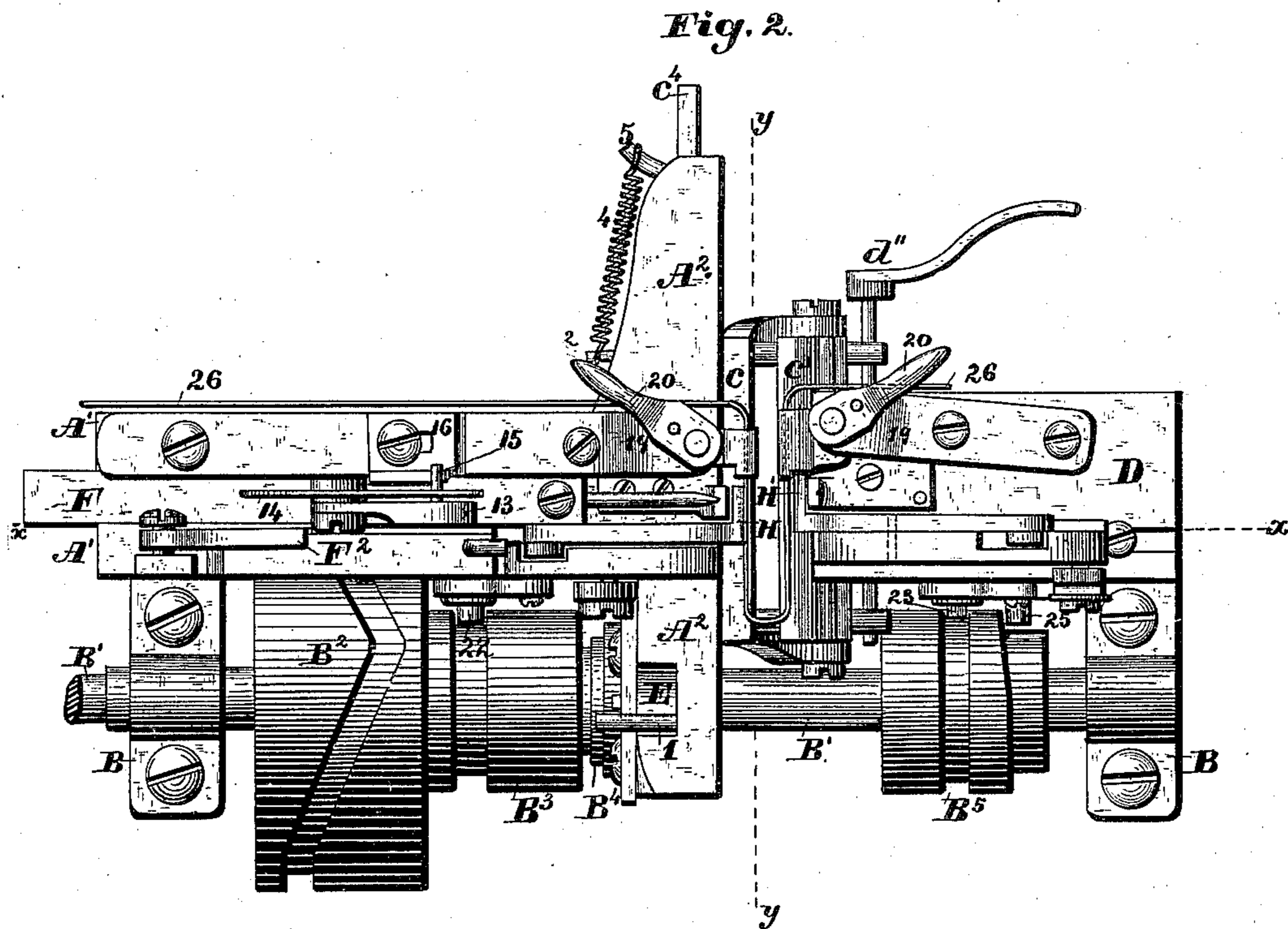
*By
Boyer and Elliott*

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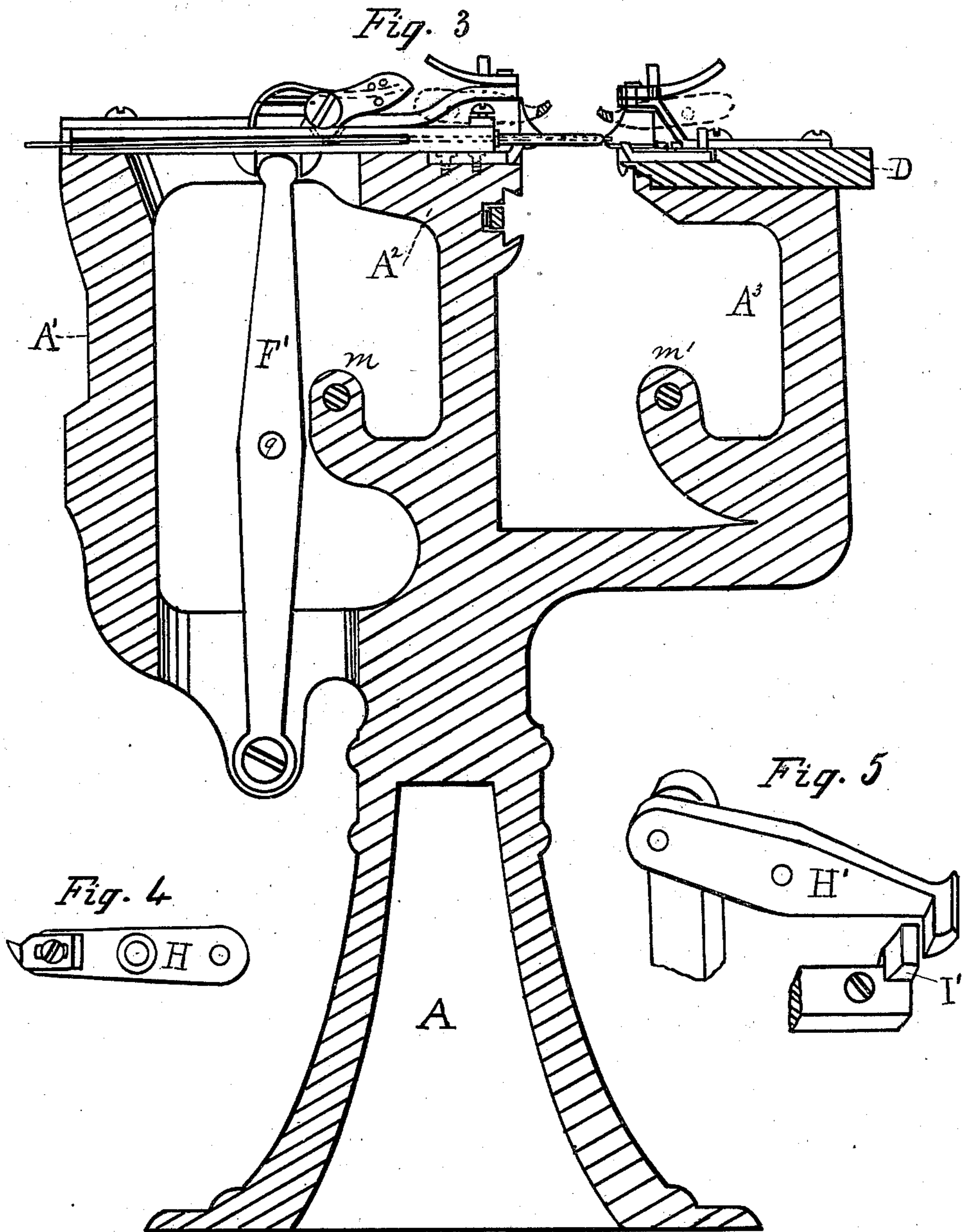
Attest:
J. Henry Kaiser
Vinton Coombe

Inventors:
Jacob Wagner Jr.
and
Louis Wagner.
By *Coyne and Elliott*
Attys.

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WITNESSES

J. P. Whitney
Chas. H. Schaff

INVENTORS

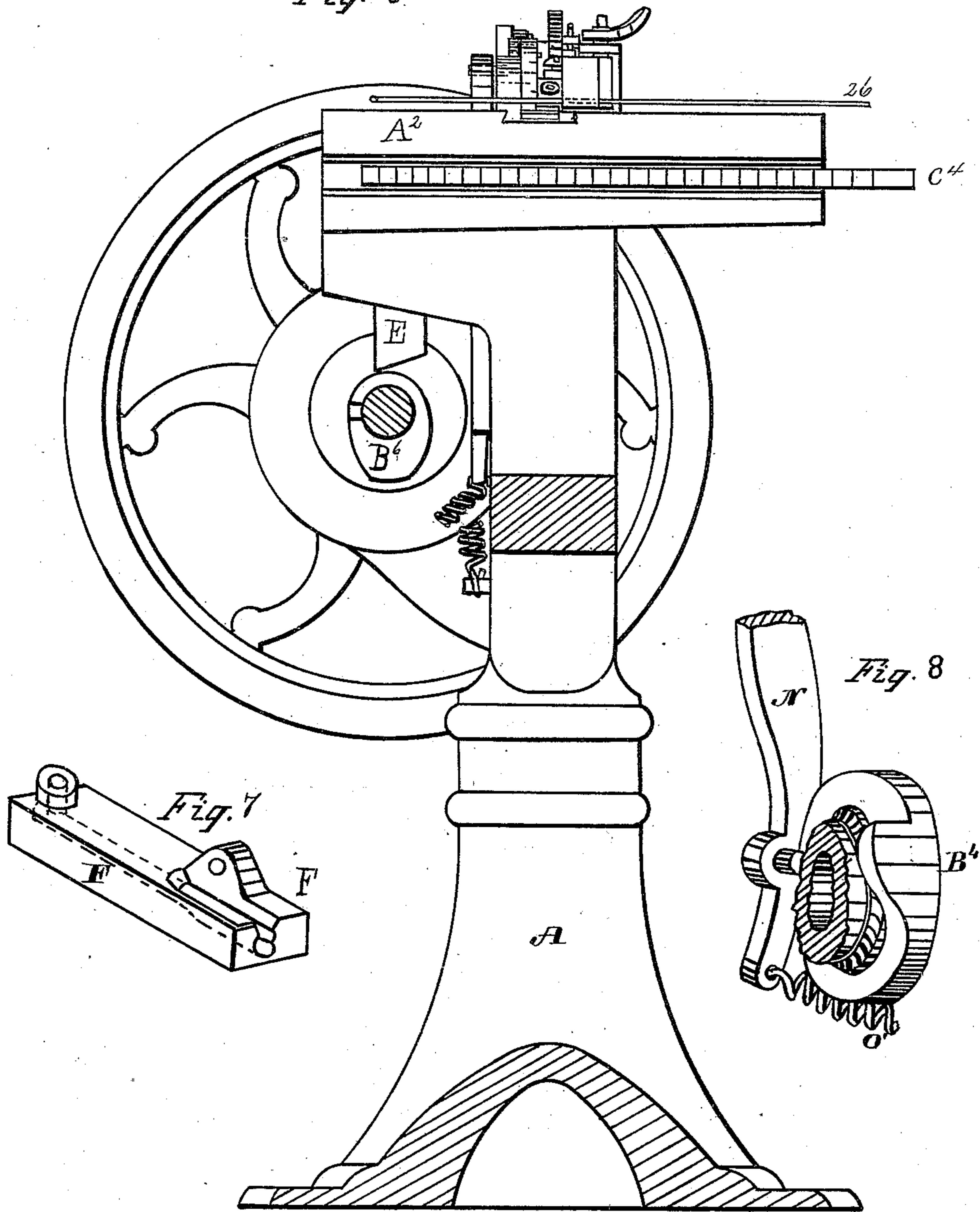
Jacob Wagner Jr. and Louis Wagner.
By Coyne and Elliott
Attorneys

J. WAGNER, Jr., & L. WAGNER.
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Fig. 6



WITNESSES
J. P. Whitney
Chas. A. Schaff

INVENTORS
Jacob Wagner Jr. & Louis Wagner
By *Coyne & Elliott*
Attorneys

J. WAGNER, Jr., & L. WAGNER.

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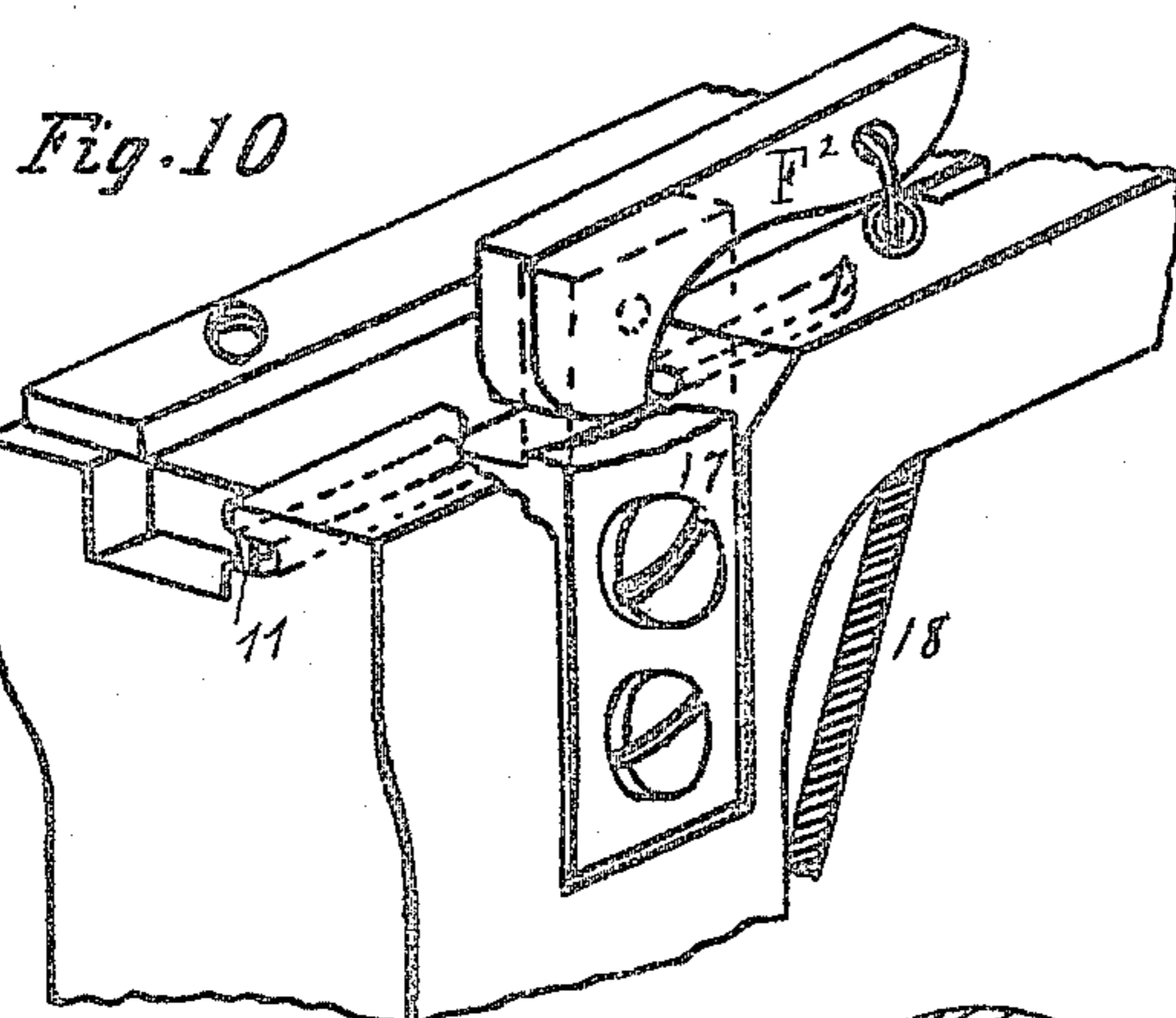
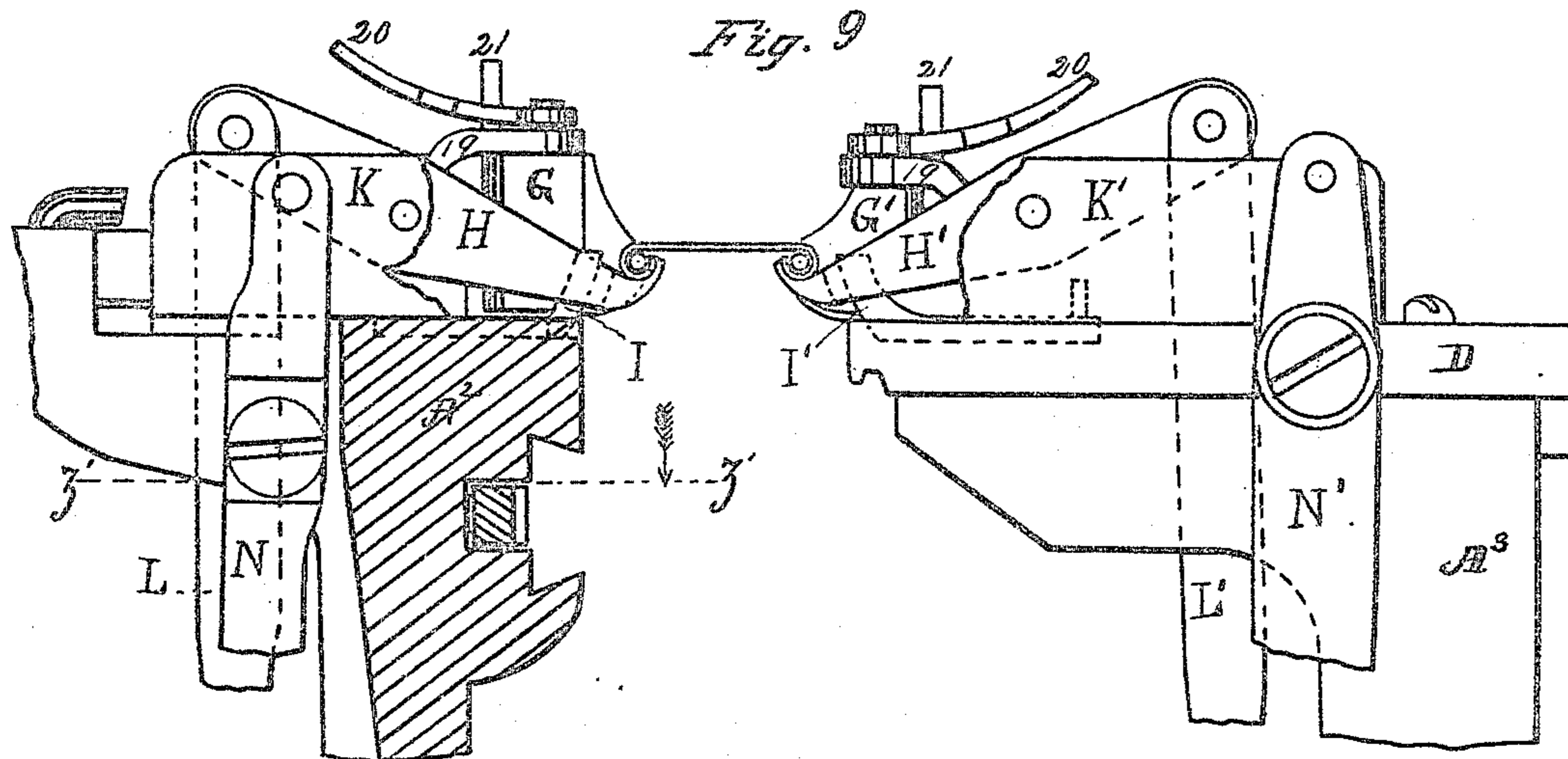
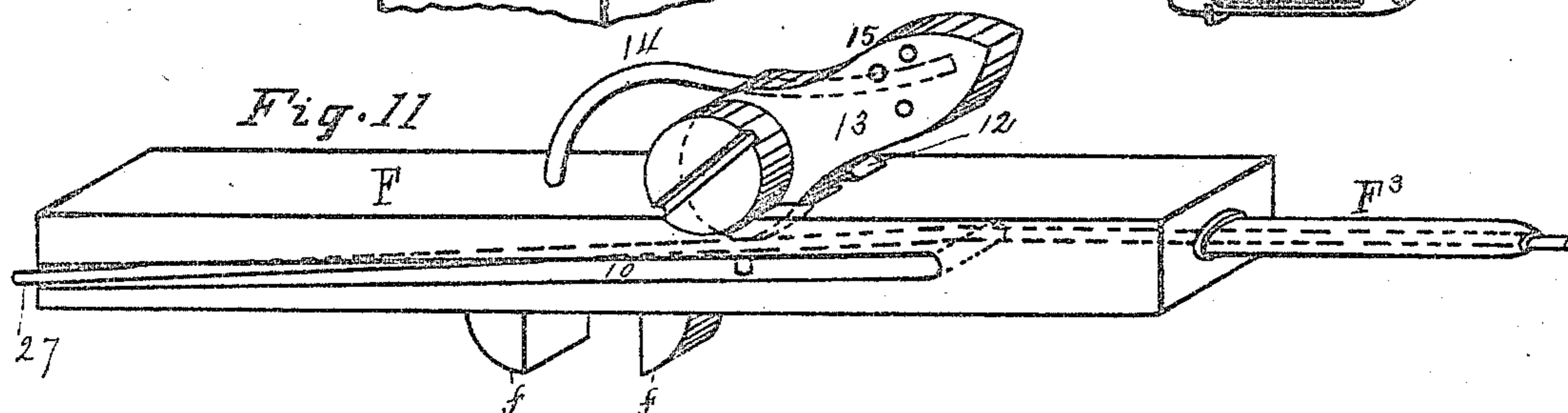


Fig. 13



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J. P. Whitney
Chas. H. Schaff

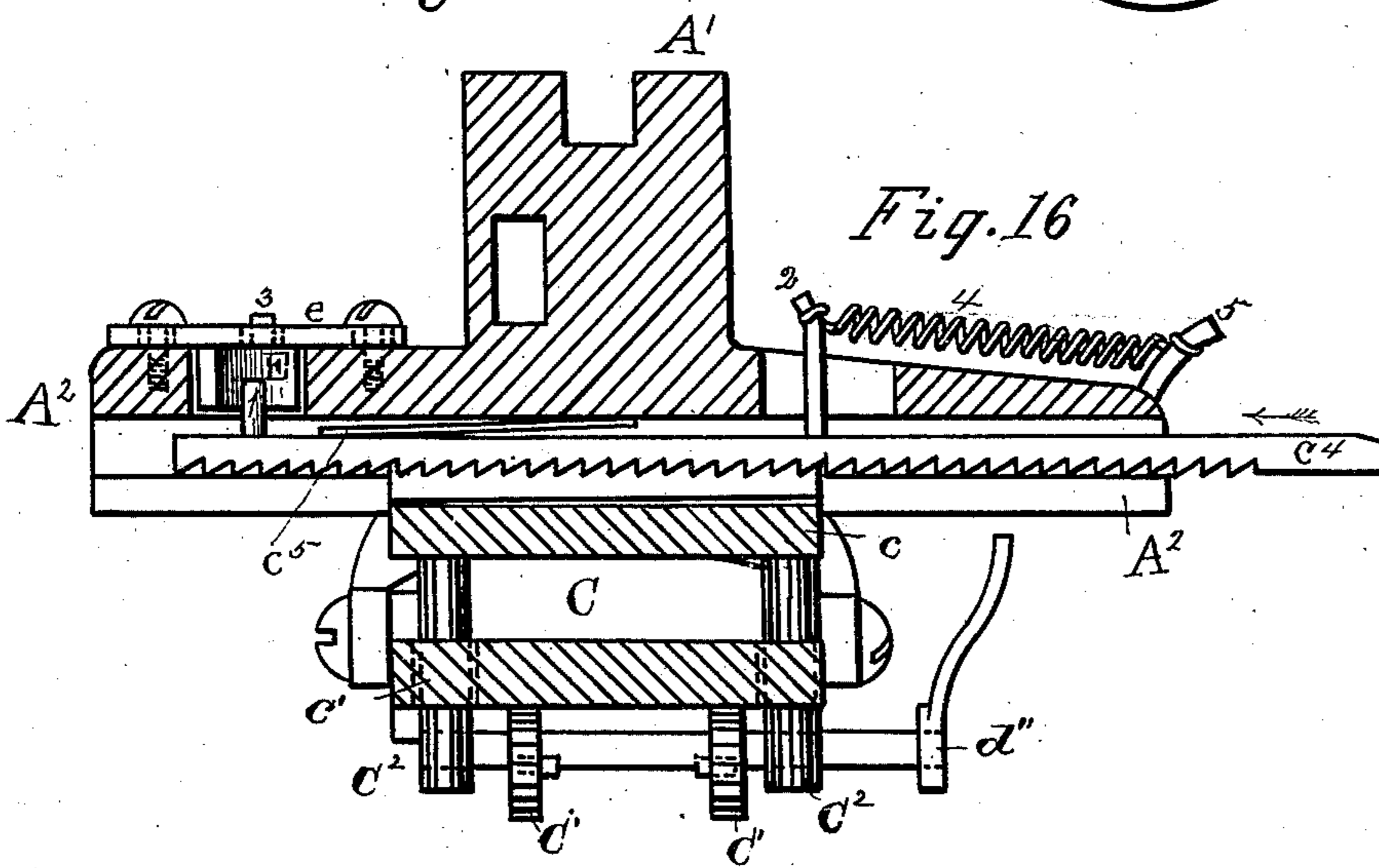
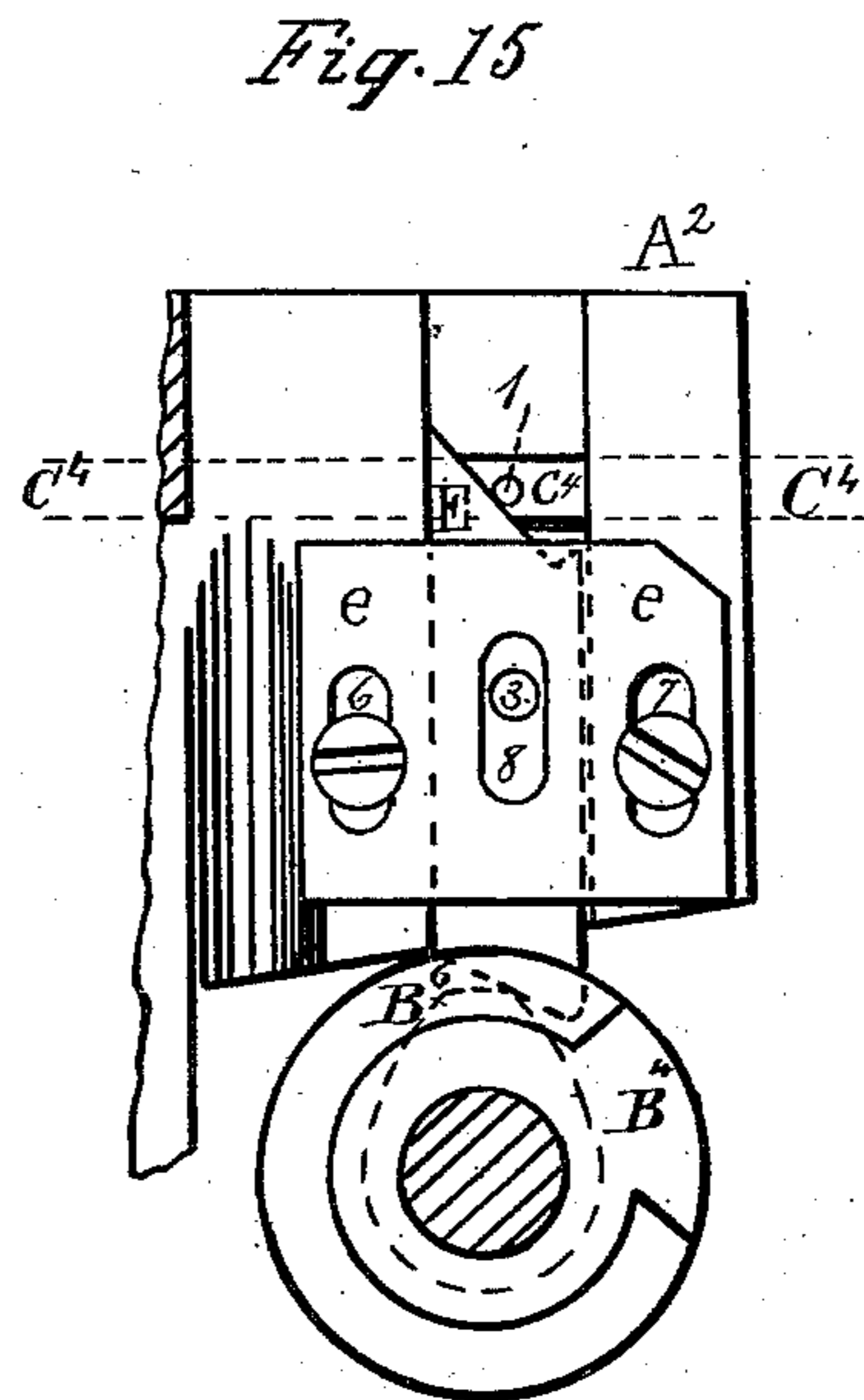
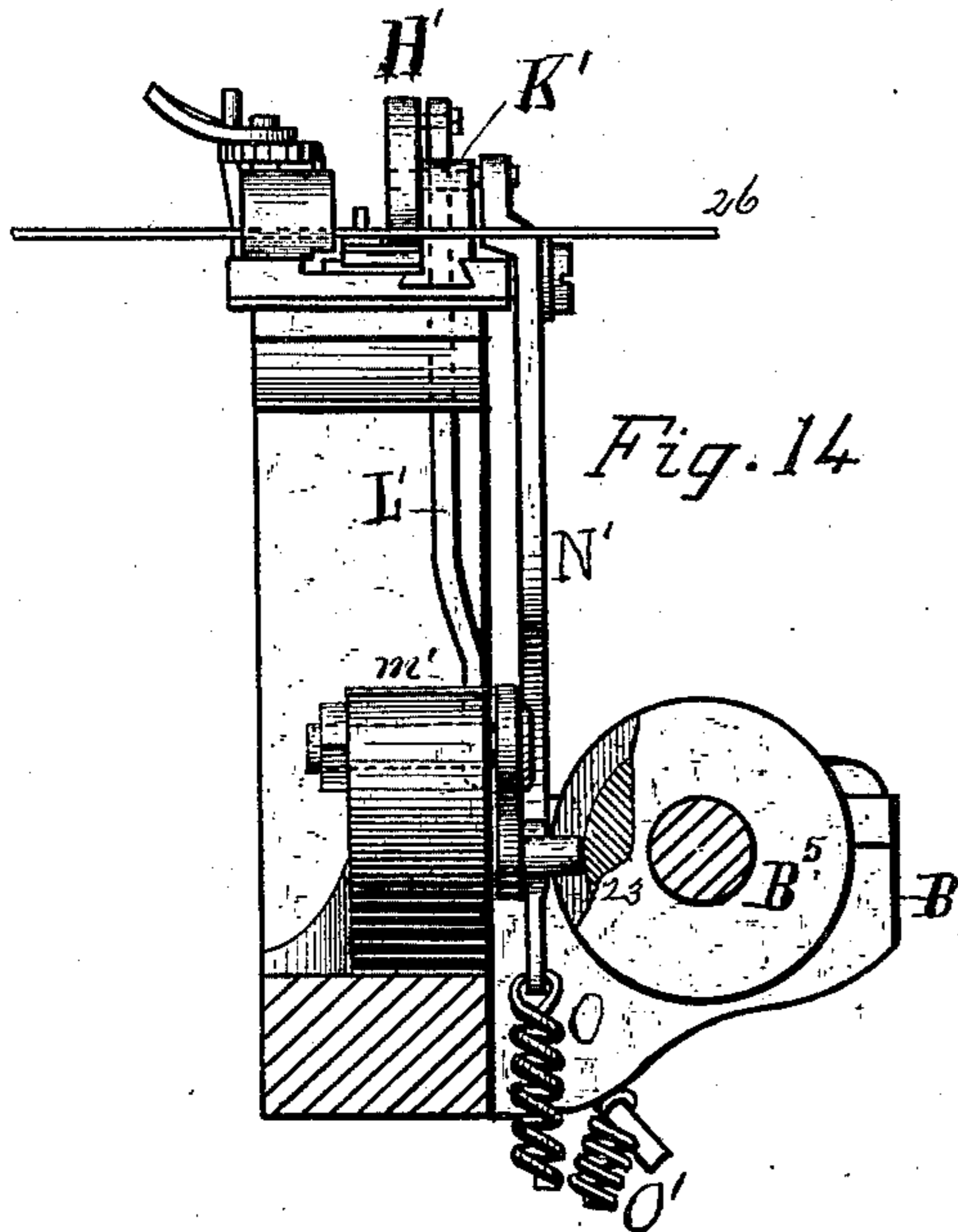
INVENTORS

Jacob Wagner Jr. and Louis Wagner
By *Coyne and Elliott*
Attorneys

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WITNESSES

J. P. Whitney
Chas. H. Schaff

INVENTORS

Jacob Wagner Jr. & Louis Wagner
By *Coyne & Elliott*
Attorneys.

J. WAGNER, Jr., & L. WAGNER.
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Fig. 17

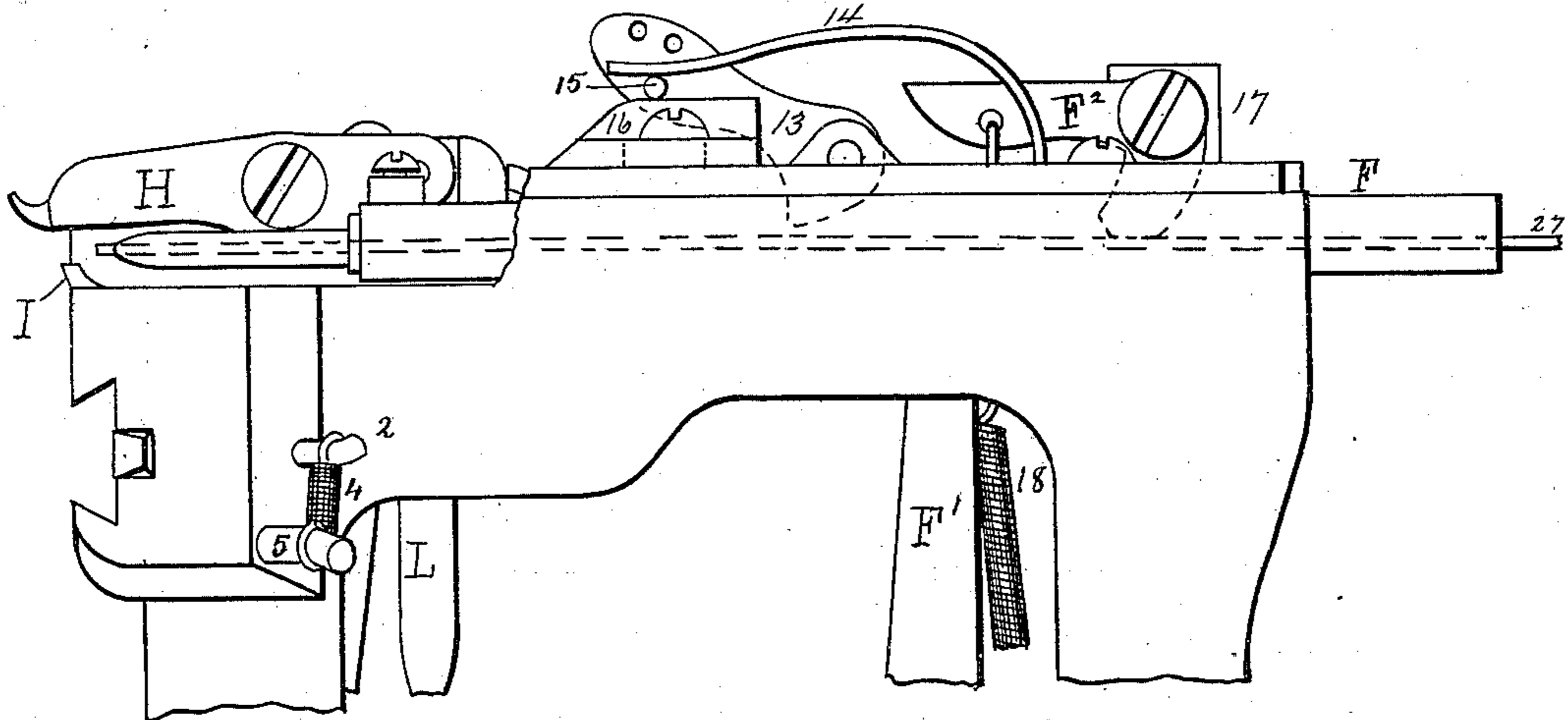
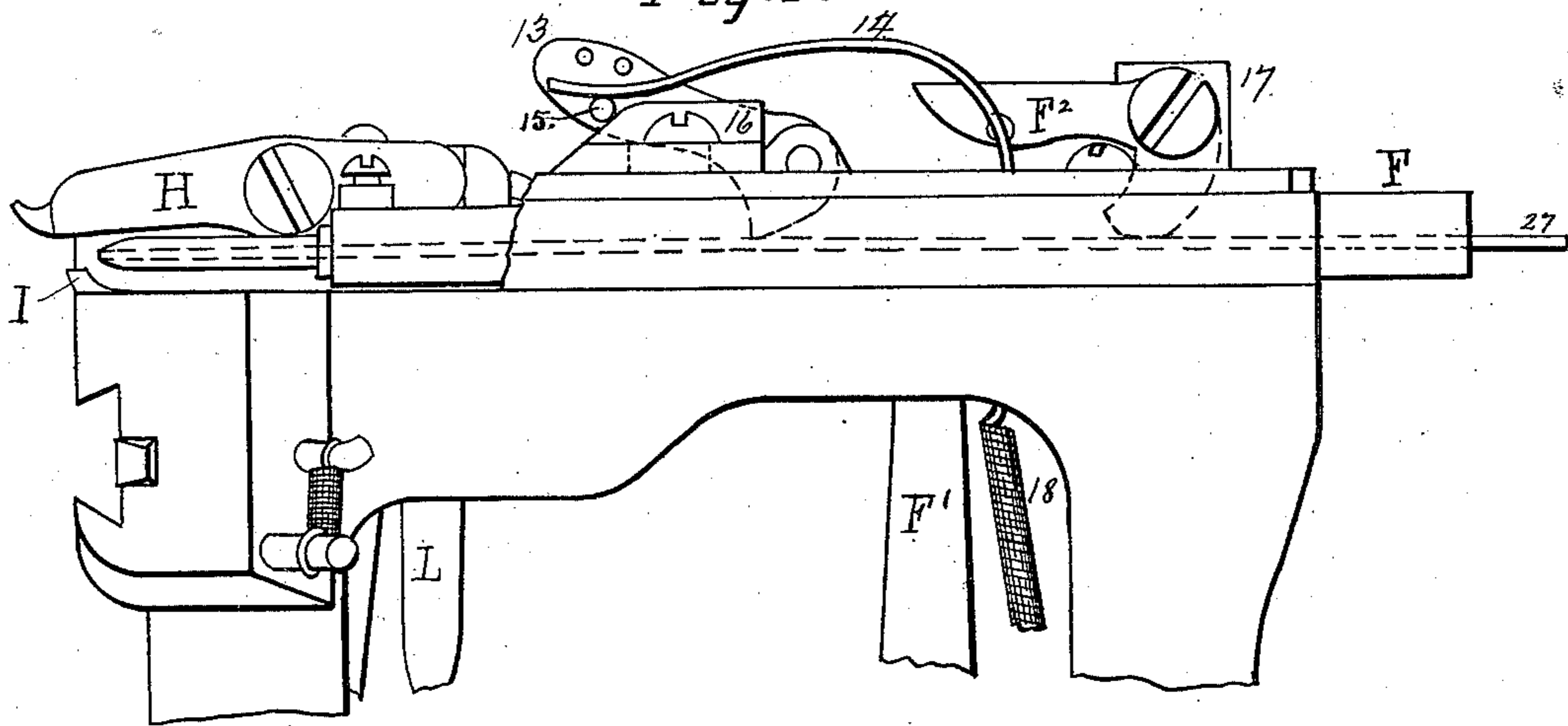


Fig. 18



WITNESSES

J. H. Lawlor
John Elliott

INVENTORS

Jacob Wagner Jr and Louis Wagner
Coyne and Elliott
Attorneys

UNITED STATES PATENT OFFICE.

JACOB WAGNER, JR., AND LOUIS WAGNER, OF CHICAGO, ILLINOIS,
ASSIGNORS, BY MESNE ASSIGNMENT, TO WAGNER WIRE SEWING
MACHINE COMPANY, OF SAME PLACE.

WIRE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 227,138, dated May 4, 1880.

Application filed April 21, 1879.

To all whom it may concern:

Be it known that we, JACOB WAGNER, Jr., and LOUIS WAGNER, both of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Wire-Sewing Machines, of which the following is a specification.

This invention relates to machines for binding and sewing brooms with wire, in contradistinction to machines for binding and sewing them with thread or cord.

Heretofore machines for this purpose have required that the band should be formed and closed about the broom before making the stitches, and are provided with a series of punches, erroneously called "needles," to perforate the broom, so that after being withdrawn stiff wires corresponding in number to said punches and to the number of stitches to be made may be forced through the broom to form said stitches. Others have the clamping device provided with mechanism to revolve it so as to wind the wire about the broom to form the band, to which stitches of thread or cord are secured by means of a needle and shuttle, the forming of said stitches by the above means requiring the broom-clamp to be further provided with mechanism to cause it to present alternately the sides of the broom at different angles to the needle.

The object of our invention is to form a wire band about a broom and to secure thereto stitches of fine wire by means of a single needle as the broom is being fed through the machine, every part of the operation being continuous and automatic.

A further object is to have mechanism for advancing the broom-clamp adjustable, so that the distance between the feeds, and consequently the number of stitches, may be varied as desired.

A still further object is to have portions of the frame-work supporting the mechanism adjustable, so that the machine may be adapted for making brooms of different sizes, both in width and breadth.

Finally, our object is to automatically form the band about the clamped broom, feed and place the stitching-wires in position, sever

them from the coil, and clamp said wires in position on the band while the broom is being fed through the machine and before the free ends of the band are closed.

In the accompanying drawings similar letters of reference indicate like parts.

Figure 1 is a side elevation of our machine; Fig. 2, a plan view of the same; Fig. 3, a vertical longitudinal section on the line *xx* of Fig. 2. Fig. 4 is a side view of the cutting and clinching blade. Fig. 5 is a perspective of the same, showing its relative position to the rigid blade upon which the wire is cut; Fig. 6, a vertical transverse section on the line *yy* of Fig. 2 with the clamp removed; Fig. 7, a modified construction of the needle-bar perforated from end to end; Fig. 8, a detail view of one of the two levers and its cam for operating the stitch-clinching devices; Fig. 9, a sectional side view, showing the position while in operation of the cutting and clinching mechanism, and also an end view of the spring-seated rack-bar for feeding the clamps. Fig. 10 is a perspective detail of the longitudinally-grooved frame, the needle-bar, and the friction-cam upon the frame to prevent the backward movement of the stitching-wire as it is being fed to the broom. Fig. 11 is an enlarged perspective view of the needle-bar and the cam-lever mounted upon it; Fig. 12, a side elevation of the cam-lever that works on the needle-bar; Fig. 13, a modification of the needle shown in Fig. 11; Fig. 14, a detail on the line *zz* of Fig. 1; Fig. 15, a detail of the mechanism for moving forward the spring-seated rack-bar and the slotted plate with its beveled stud for regulating the length of stroke; Fig. 16, a detail horizontal section on the line *z'z'* of Fig. 9, showing the position of the spring-seated rack-bar in its guideway and the mechanism for impelling the same. Figs. 17 and 18 are detail elevations of the needle-bar and needle, showing the relative position of the feeding-cams to the wire during their operation.

A represents a stand supporting the frames *A'* *A*² and bracket *A*³, carrying the mechanism of our device.

The frames *A'* and *A*², when taken together,

are in a horizontal plane T-shaped, as shown in Fig. 2 of the drawings, and the bracket A³ in a vertical plane D-shaped, as shown in Fig. 3, its upper end being separated from the frame A² a sufficient distance to allow for the to-and-fro play between them of a sliding support or clamp for the broom shown at C, and retained in a grooved way made in the face of A².

B B are brackets upon the side of frame A' and bracket-frame A³, forming bearings for a shaft, B', carrying cam-grooved wheels B² B³ B⁴ B⁵ and cam-wheel B⁶, for imparting, by means of levers connected thereto, the various movements to the operating parts of the machine.

C is a broom-clamp provided with jaws or plates c c', pivoted together at their lower ends, and provided with cams C' upon a shaft passing through the guide-bars C² C², as shown in Figs. 1 and 2, to force and hold the jaws so as to clamp the broom, said guide-bars being secured to the plate c and passed through slots in plate c' of the clamp. Near the upper edge, and extending along the side of the jaw c, is a dovetailed rib, c², fitting a corresponding groove in the frame A², to form a track and guideway for the clamp, the opposite jaw, c', being grooved to receive and be guided by a projecting rib on the sliding support D of the bracket A³.

The dovetailed rib c² has a longitudinal groove in its face, in which is secured a horizontal ratchet-bar, c³, provided with beveled teeth, and engaging with a similar bar, c⁴, in a groove in the back wall of the dovetailed mortise for rib c².

The object in making the ratched bar c³ removable is to replace it with a new one when worn out; but instead of attaching it in this manner it may be cast in one piece with the rib c². Upon the back of the ratched bar c⁴, and so as to press it in contact with bar c³, is a spring, c⁵, (see Fig. 16,) and on both sides thereof are pins 1 and 2, secured to bar c⁴, so as to play in their respective slots in each end of frame A².

E is a vertical bar having its ends beveled so as to be in a line about parallel to each other, and provided upon its side with a pin, 3, passing through a slot, 8, in the vertically-adjustable plate e on the frame A². The lower end of the bar E engages with the cam-wheel B⁶, which moves it up and permits it to descend in a vertical slot in the frame A². As the pin 1 of the ratchet-bar c⁴ rests upon the upper and beveled end of the sliding bar E, as plainly shown in Figs. 15 and 16, it will be seen that as the sliding bar is raised by the cam B⁶ working upon the lower bevel face of said bar the ratchet-bar will be moved forward in a horizontal line, as indicated by the arrow in Fig. 16, until the pin reaches the lowest part of the upper inclined face of the sliding bar E, when, as the cam is revolved, the lower bevel face of said bar sinks into its depression to follow it, and thus releases pin

1 of the ratchet-bar. The bar, disengaging itself from the clamp, will be drawn back to its original position ready for another feed by means of a coiled spring, 4, secured at one end to the pin 2 of the bar c⁴, and its other end to a fixed pin, 5, on the end of frame A².

The ratchet-bar, when it has reached the limit of its backward stroke, is re-engaged and held in contact with the teeth upon the clamp by means of the straight spring c⁵, so as to again draw the clamp forward during the next upward stroke of the sliding bar E, and thus intermittently feed the clamp through the machine.

The plate e is provided with vertical extending slots 6 and 7, through which are passed screws to secure it to the extension-frame A², whereby it is made vertically adjustable, so that by means of a pin, 3, upon the bar E, playing in a slot, 8, in the center of plate e, which slot corresponds with slots 6 and 7, the stroke of the sliding bar may be varied and the forward stroke of the rack-bar c⁴ and of the clamp correspondingly lengthened or shortened, as desired. For instance, it will be seen that if the plate be raised to its highest position the pin 3, and with it the vertical bar, will be restricted in their downward movement, and consequently the pin 1 will not move the entire length of the incline on the upper end of the bar before receding, so that the forward stroke of the pin and the ratchet-bar will also be accordingly shortened, thus requiring a longer time for the clamp to pass through the machine, the purpose of which will be more fully hereinafter explained.

F is a needle-bar resting in a longitudinal, horizontal, and slotted way in the top of frame A', and provided on its under side (see Fig. 11) with lugs f f, passing down through a narrow slot of the frame A'. Between said lugs the upper end of a lever, F', is held, (see Fig. 3,) said lever having its lower end pivoted to an arm on frame A', and provided midway of its length with a pin, 9, which engages with the cam-grooved wheel B², whereby it is caused to oscillate and the attached needle-bar to reciprocate.

The needle-bar (see Fig. 11) is provided with a guideway for the sewing-wire, which consists of a groove, 10, commencing at one rear and side corner, and extends diagonally toward the center of the bar for about three-fourths of its length, where it merges into a perforation, forming a continuation and terminating in the center of the forward end of the bar.

Instead of having the groove in the needle-bar as above described, the frame A' may be grooved, as shown in dotted lines in Fig. 10, and provided with a pin, 11, to keep the wire from coming in contact with the bar until it reaches the perforation in the same, which perforation would in such case open upon the side face of the bar instead of in a groove, as above described.

The perforation in the needle-bar may be

made to extend from end to end, as shown in the modification in Fig. 7, the main object in any case being to feed the wire in substantially a direct line from a reel, from which it is drawn to the needle F^3 .

To the needle-bar and frame A' are secured spring-actuated or weighted cam-levers, which, by their combined operation with the bar, force or feed the wire to the stitching-needle, and cover the end projecting from the needle after a stitch is made, and before the needle is returned to the broom to make a second stitch, so that said end will not be bent as the needle is being forced through the broom. To this end the needle-bar is provided about midway of its length with an elongated slot in its upper side, opening into the perforation through which the stitching-wire is passed, and at one side of said slot with a lug or bracket, 12, to which is pivoted a cam-lever, 13, which cam part enters said slot in the needle-bar and presses upon and clamps the stitching-wire at a point between the pivot of the cam-lever and the forward end of the bar.

Bearing upon a pin, 15, on the lever of the cam is the free end of a spring, 14, having its opposite end secured toward the rear end of the bar, as shown in Fig. 2, so as to depress the outer end of the cam-lever to clamp the wire.

To the top of the wall of the guideway for the needle-bar is adjustably secured, by means of a slot and set-screw, a plate or lug, 16, provided with an inclined vertical part having a face or bevel extending forward toward the needle, upon which bevel face the pin 15 of the cam-lever moves to release said cam from the wire during the latter portion of the backward and the earlier portion of the forward movement of the needle-bar, the purpose of which will be hereinafter described.

F^2 is a cam-lever pivotally secured to a standard, 17, upon the frame A' , so as to press upon the stitching-wire in such a manner that it may have a forward, but not a backward, movement in the groove of the frame, thus acting as an auxiliary to the cam-lever upon the needle-bar when the latter is released from the wire by its engagement with the beveled plate. Cam-lever F^2 has the same relative position to its pivot and the forward end of the needle-bar (see Figs. 17 and 18) as cam-lever 13, and the handle is perforated to receive a wire passing through a vertical perforation in the frame, connecting it with a tension-spring, 18, having its lower end secured at a point below, as shown in Figs. 1 and 10, so as to cause the cam to press upon the wire at all times, for the purpose above described.

From this construction it will be seen that when the pin 15 of cam-lever 13 rests upon the top face of the plate 16, as shown in Fig. 17, the needle-bar will have reached the limit of its backward stroke and the cam will be released from the wire. If, when in this position, the needle-bar be moved forward, the wire will re-

main stationary, so that the needle and bar will slide over it until the cam 13 is released from the top face of the beveled plate 16, when the cam will press upon the wire, (see Fig. 18,) and the latter will be carried forward with the needle through the broom a sufficient distance to permit the end of the wire to project beyond the band to form an eye about the same, and the wire is prevented from returning during the backward stroke of the needle-bar by the cam F^2 pinching it to the frame A^2 , the cam 13 sliding over the wire with the needle-bar. In making the backward stroke the needle is withdrawn past the cutting-edge I, hereinafter described, where it stops until the stitch thus made is severed from the main wire, leaving a small end projecting from the needle, which remains thus projecting until after the needle-bar and needle have finished their backward stroke and so much of the following forward one as is represented by the forward travel of the pin 15 on the horizontal portion of the beveled plate 16, and thus, before the cam 13 is again brought in contact with the wire to carry it forward for the second stitch, the said projecting wire end will thus be covered by the needle, and thereby the wire prevented from being bent about the point of the needle during the forward stroke of the same as it enters the broom.

By adjusting the beveled plate 16 forward or backward upon the frame of the machine the play or time of contact of the cam-lever 13 is regulated so that the needle may slide over more or less of the wire before the cam clamps it to draw it forward with the needle, so that when making thick or thin brooms the point beyond the band at which it is necessary to leave the end of the wire may always be determined to cause the stitching-wire to be of the length required. This adjustment of the beveled plate is of great advantage when it is desirable to make thin brooms, for the reason that if there were no such adjustment and the plate were set for thick brooms the wire would be carried through the broom so far beyond the band-wire that too long a portion of its free end would be severed by the cutting-blades, and consequently wasted.

G G' are guide-plates for the band-wire, pivotally secured, by means of the brackets 19, upon frame A^2 and sliding support D, respectively, and are perforated, as shown in Figs. 1, 2, and 9, to receive said wire. Secured to the extended or projecting pivot of these plates are arms 20, provided with perforations to receive pins 21, which also enter corresponding perforations in the brackets 19, whereby the plates are retained in position and prevented from swinging upon their pivots during the time in which the stitches are being secured to the band. We do not, however, consider these arms and pins as an essential part of our invention, and therefore may omit them.

Upon the frame A^2 , and also on sliding support D on bracket A^3 , in the same relative po-

sitions to each other as the guide-plates $G G'$, are shear arms or levers $H H'$ and cutting edges or blades $I I'$, the former pivotally and the latter rigidly secured, as shown in Figs. 3 and 9. The levers $H H'$ are provided upon the edges opposite and above the cutting-edge with curved extensions, the outer faces of which are convex and the inner ones concave, as clearly shown in Fig. 5, the purpose of which will hereinafter be fully explained. These levers are pivoted, about the center of the length of the arm of which they form a part, to horizontally-reciprocating blocks $K K'$ upon their respective supports, and their ends removed from the cutting-edges are pivoted to vertical bars $L L'$, and they are in turn pivoted to bell-cranks $M M'$, (shown in dotted lines in Fig. 1,) which are also in turn pivoted to extensions $m m'$ (see Fig. 3) upon frame A^2 and bracket A^3 , respectively. Upon the lower arm or projection of the bell-cranks are pins 22 23, (see Fig. 2, and dotted lines, Fig. 1,) which respectively engage with the cam-grooves in wheels B^3 and B^5 .

As the pivot and lower pin of the bell-cranks are in line with the straight grooves of the cam-wheels (see Fig. 1) and the point where they pivot onto the bars $L L'$, at a right angle to the pivot and pin, it will be seen that when the pin travels in the angular groove the bars will be raised, so that the cutting-blades $H H'$ will be depressed below the blades $I I'$.

To the upper edge of the reciprocating blocks $K K'$ are pivoted arms $N N'$, which are in turn pivoted, the first to the frame A^2 and the second to the sliding plate D on the bracket A^3 , so that said arms will extend downwardly below the cam-wheels B^4 and B^5 , to connect their ends with the tension-springs $O O'$, said arms being provided near their lower ends with pins 24 and 25, (shown in Fig. 2, and in dotted lines in Fig. 1,) engaging with their respective cam-grooved wheels, so that after the cutting-arms $H H'$ have moved downwardly by means of the levers $L L'$ they will, by means of these arms $N N'$ and the reciprocating blocks $K K'$, then have a forward and an upward movement toward each other. The springs $O O'$ serve to retract the arms $N N'$ by holding their parts in contact with their cams. (See Figs. 1 and 8.)

When operating our device the broom-corn, which has been secured to the stick or handle in the usual manner, is placed vertically in the clamp in such relation thereto that the band will, when placed just above its edge, be in the required position upon the broom, which is then compressed to the required degree between the clamping-plates by means of cam C' being brought to bear against jaw c' , which latter will cause the plate D to move toward the broom and be held so that the mechanism mounted thereon will be in position to properly hold and guide the band and cut and bend the stitching-wires about

the same. The guides $G G'$ are then turned so that their perforations will be in line with each other, when the wire 26, for forming the band of the broom, is passed in a direct line from a reel (not shown) through them with a sufficient length extending beyond the guide G' to form one-half of the band. The needle-bar is then moved until the pin upon the cam-lever 13 is at the top of the incline of the lug 16, when the stitching-wire 27 is passed through the perforation in said bar and in the needle, and the machine put in motion.

It will now be seen that as the eccentric B^6 causes the bar E to rise and fall, the ratched bar c^4 will be intermittently reciprocated and the broom-clamp moved forward to bring the broom, with its faces, in front of and at a right angle to the reciprocating needle carrying the stitching-wire. As the clamp is moved forward the wire for the band, now pressing upon the edge of the broom, will swing the guides upon their pivots, bringing their perforations parallel to each other, (see Figs. 1, 2, and 9,) so that that portion of the wire forming the sides of the band will be at a right angle to the main part of the same wire coming from the spool and the free end, by reason of their being held against the sides of the machine by any suitable device to prevent them swinging out, as they would otherwise do when the guides turn. The guides are thus made to act as tension devices, so that the band-wire will be drawn tightly about the broom.

During the intermittent forward movement of the broom the clamp will remain stationary until the needle has been passed through and withdrawn, leaving the end of the stitching-wire projecting beyond the opposite side of the broom and until the cutting and clinching devices have severed the wire stitch from the main wire and clinched it about the band, as shown in Fig. 9 of the drawings, the cam-wheels being formed to permit it.

The operation of feeding the clamp and forming the band and the stitches is continued until the broom has passed beyond the wire-cutting devices, when the band is severed from the main coil a sufficient distance from the edge of the broom, so that its ends may be fastened together either before or after removing the broom from the clamp, the latter being returned to its former position to receive another broom.

It will now be seen that we have not only constructed a machine which will by a continuous operation form a band about a broom, securing thereto wires forming stitches through the broom, but we have also afforded means for securing these stitches during the formation and before the completion of said band, as well as securing all of them while tightening and before closing the band upon the edges of the broom.

By the construction of our machine we are enabled to use a fine thread-like wire both for the band and the stitches, instead of heavy or

thick wires for either one or both, as heretofore, and secure them so tightly in and about the broom that it will possess greater compactness, and hence durability, than a broom made upon the machines referred to in the first part of the specification.

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

- 10 1. The combination, with a reciprocating needle-bar and a stitching-needle secured thereto, of the broom clamp or carriage moving intermittently forward across the path of the needle.
- 15 2. The combination, with a reciprocating needle-bar and a stitching-needle secured thereto, of the broom clamp or carriage moving intermittently forward across the path of the needle and pivoted tension guides.
- 20 3. A broom-machine provided with guides to hold the band-wire, said guides pivoted so that as the band is being formed about the broom they will bend the wire, thereby causing it to be drawn tightly about the broom.
- 25 4. The combination, with the horizontally-movable clamp, of perforated guides for the band-wire, pivoted as described, whereby the perforations in said guides may be brought in line with each other to thread the wire, and
- 30 then turned to form the loop, by the broom being pressed against it as the clamp with the broom is being fed to the stitching-needle.
5. The combination, with a reciprocating needle-bar and a stitching-needle secured
- 35 thereto, of the broom clamp or carriage provided with ratchet-teeth engaging with a corresponding rack-bar upon the machine-frame.
6. A needle-bar provided with a longitudinal groove or perforation and mechanism to
- 40 reciprocate it, in combination with a perforated or grooved needle, whereby the wire is fed in a direct line and intermittently to the broom.
7. The combination, in a broom-sewing machine, of a broom clamp or carriage provided
- 45 with a series of ratchet-teeth, a rack-bar engaging therewith, and a shifting-bar to reciprocate the rack.
8. The combination, in a broom-sewing machine, of a broom clamp or carriage provided
- 50 with a series of ratchet-teeth, a rack-bar engaging therewith, a shifting-bar to reciprocate the rack, and an adjusting-plate.
9. The combination of a clamp for holding
- 55 a broom to feed it to sewing mechanism with an adjustable supporting-plate carrying a part of said mechanism, and to which said clamp is attached, whereby the clamp and said plate may be simultaneously adjusted for brooms of
- 60 differing thicknesses.
10. A needle-bar for sewing-machines, provided with longitudinal grooves or perforations guiding the wire to a needle, as described and set forth.
- 65 11. The combination, with a needle-bar and needle and devices for reciprocating the same,

of a feeding attachment secured to said bar and operated so as to hold the stitching-wire during the forward and release it during the backward movement of the bar and needle, whereby said wire is automatically fed through the material to form the stitch.

12. A reciprocating needle-bar longitudinally grooved and perforated and provided with a friction-cam, whereby the wire fed through said needle-bar is prevented from slipping when the bar is moving forward to feed it, as and for the purpose described.

13. A reciprocating needle-bar, substantially as described, in combination with an open end perforated or slotted needle having said perforation or slot in line with and contiguous to said needle-bar, whereby the wire is fed in a direct line to the broom to form the stitches in the same.

14. A perforated or grooved needle-bar, having secured thereto and operating in said grooves a friction-cam, in combination with a supporting-frame, said frame having a groove corresponding to and contiguous with the groove or perforation in the needle-bar, substantially as and for the purpose described.

15. The combination, with a needle-bar, substantially as described, having an automatically-operating friction-cam, of a supporting-frame, upon which said bar reciprocates, provided with a contiguous groove or perforation, and with one or more friction-cams, substantially as and for the purpose described.

16. The combination, with the needle-bar and its cam-lever, of a beveled plate secured to a stationary support for operating said lever so that it will be held from contact with the stitching-wire during a portion of the forward movement of the bar and its needle, whereby said bar and needle will slide over the wire and cover the projecting end of the same, for the purpose set forth.

17. The combination, with the needle-bar F and its needle, of the cam-lever 13, adjustable beveled plate 16, and cam-lever F', as and for the purpose described.

18. The combination, with the reciprocating blocks and the bending arm or lever pivoted thereto, of the operating lever and cams, substantially as described.

19. The combination, with the reciprocating blocks and the shear arm or lever pivoted thereto, of operating lever and cams and the cutting-blade.

20. The combination, with the reciprocating blocks, the bending arm or lever pivoted thereto, and operating levers and cams, of the broom clamp or carriage, as and for the purpose set forth.

21. The combination, with a clamp and cutting and clinching mechanism, substantially as described, of a reciprocating needle carrying a stitching-wire, as and for the purpose set forth.

22. The combination, with the reciprocating blocks, the bending arm or lever, operating-

levers, and a reciprocating needle, of the broom clamp or carriage.

23. The combination, with the reciprocating blocks, the bending arm or lever, operating-levers, and cutting-blade, of a reciprocating
5 needle and broom clamp or carriage.

24. The combination, with the reciprocating blocks, the bending arms or levers, cutting-blades, and operating-levers, of a sliding and
10 supporting plate, a broom clamp or carriage engaging with said plate, and a reciprocating needle.

25. The method of manufacturing wire-sewed brooms which consists in securing separate
15 cross wires or stitches to the retaining-band consecutively and continuously during the binding of the band upon the broom.

26. The method of manufacturing wire-sewed brooms which consists in severing each successive stitch from the same continuous wire
20 thread and clinching it around the band in consecutive order until the entire breadth of the broom has been traversed or sewed.

In testimony that we claim the above we have hereunto subscribed our names in the
25 presence of two witnesses.

JACOB WAGNER, JR.
LOUIS WAGNER.

Witnesses:

CARL VEHL,
CHARLES WAGNER.