

(No Model.)

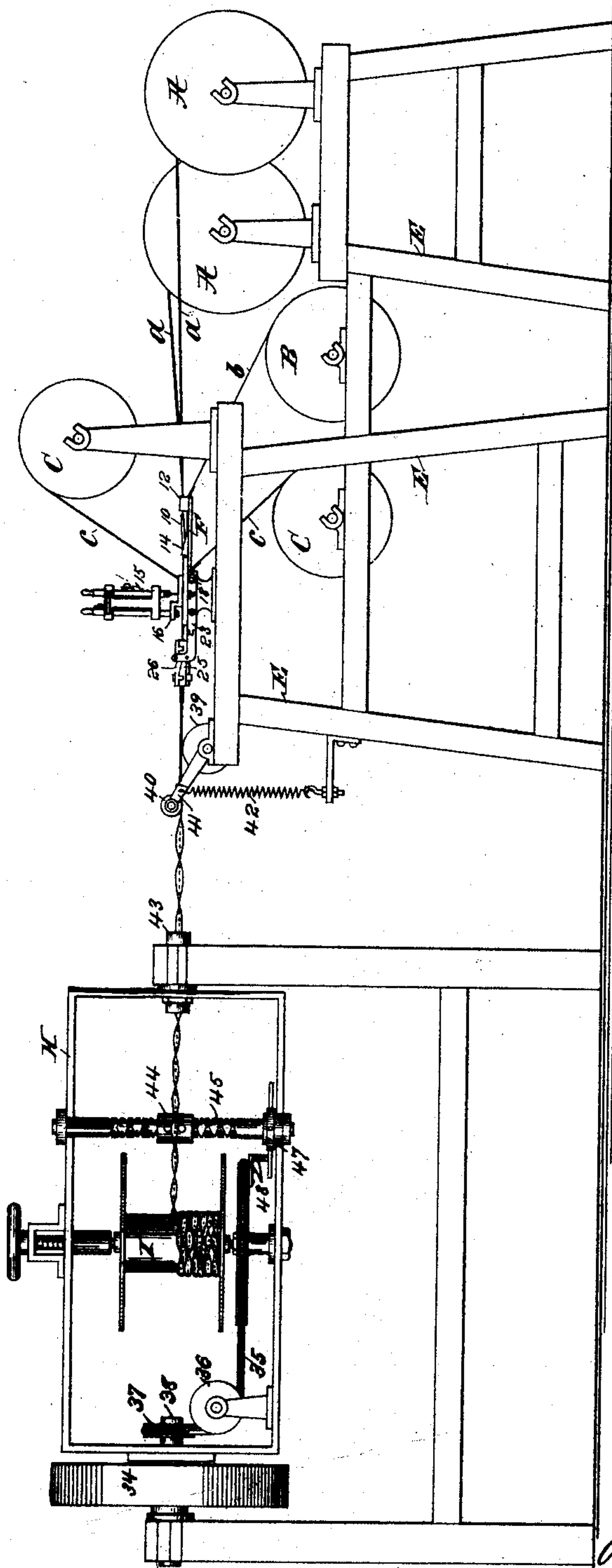
3 Sheets—Sheet 1.

J. A. BARRETT.  
MACHINE FOR COVERING WIRES.

No. 505,379.

Patented Sept. 19, 1893.

*Fig. 1.*



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Fig. 2.

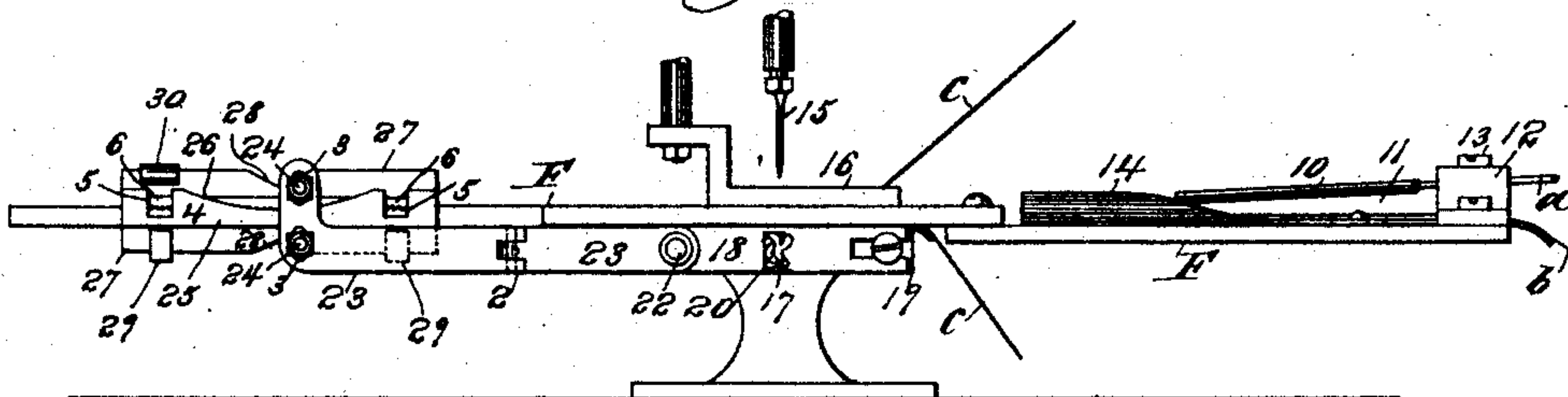
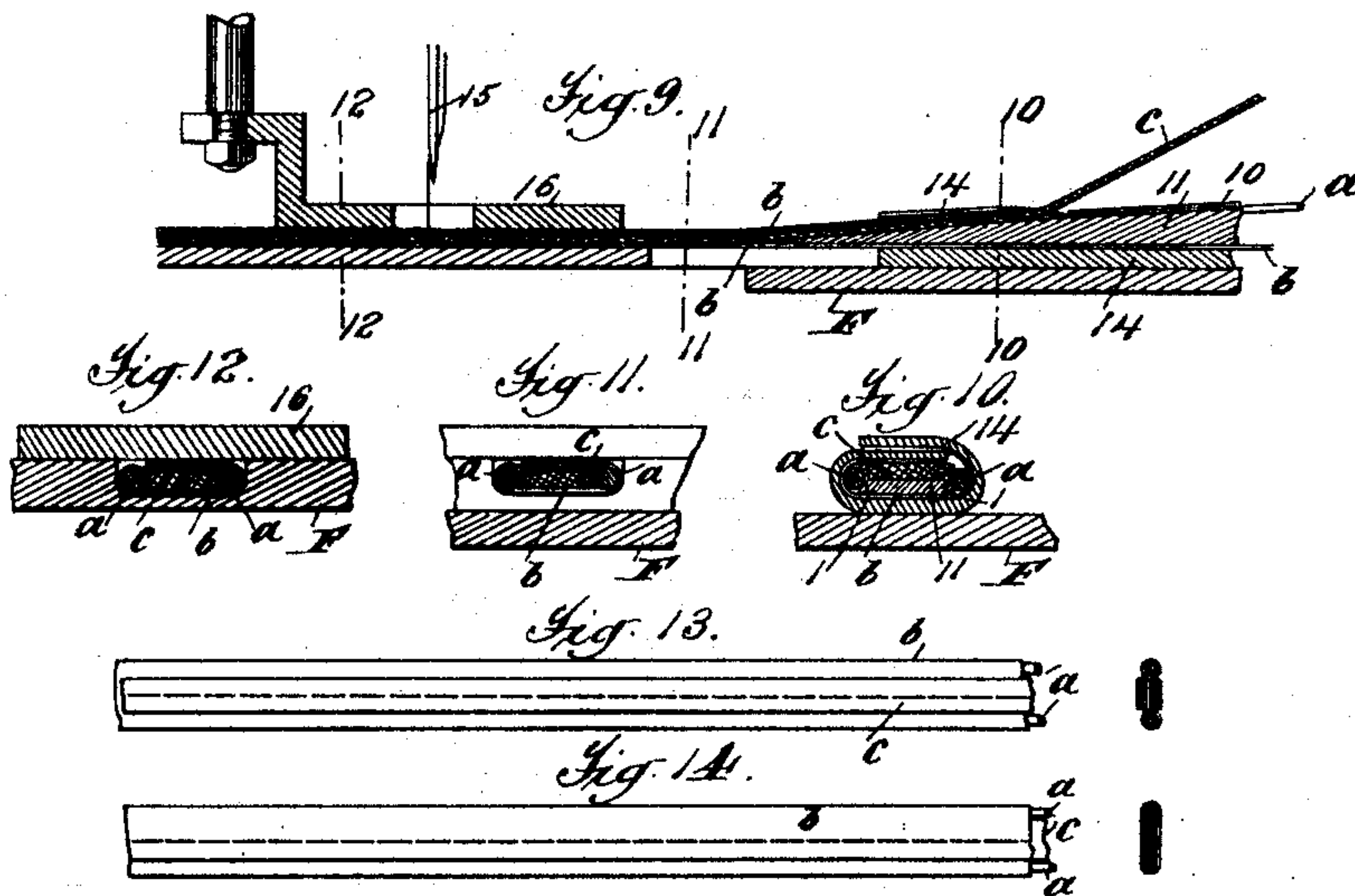
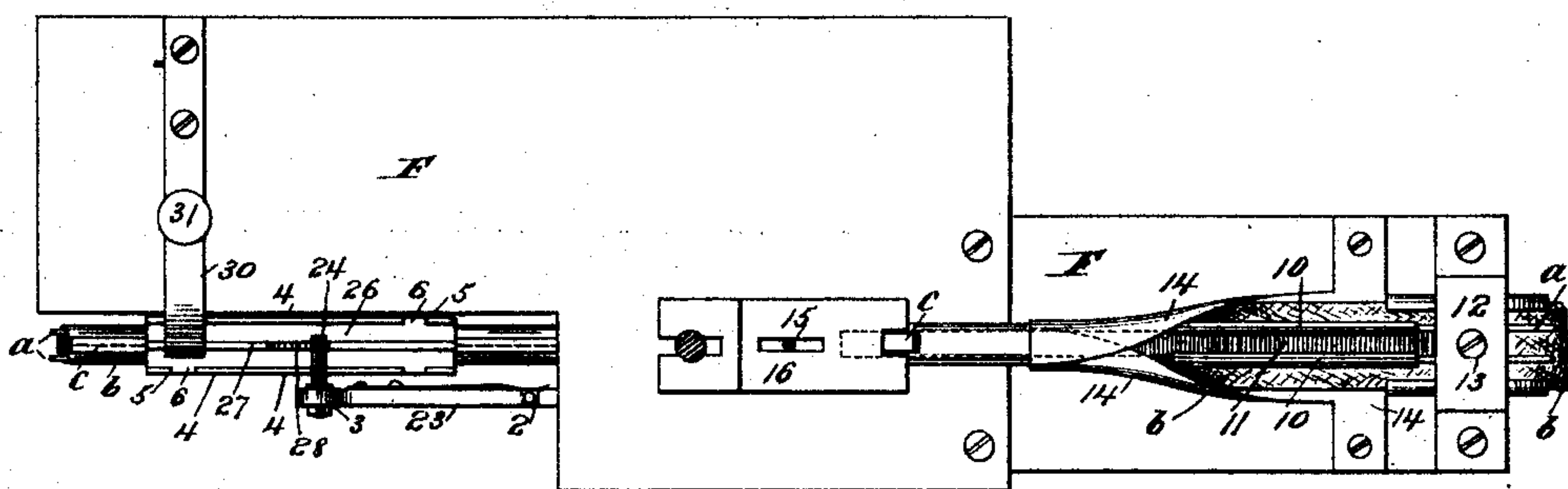


Fig. 3.



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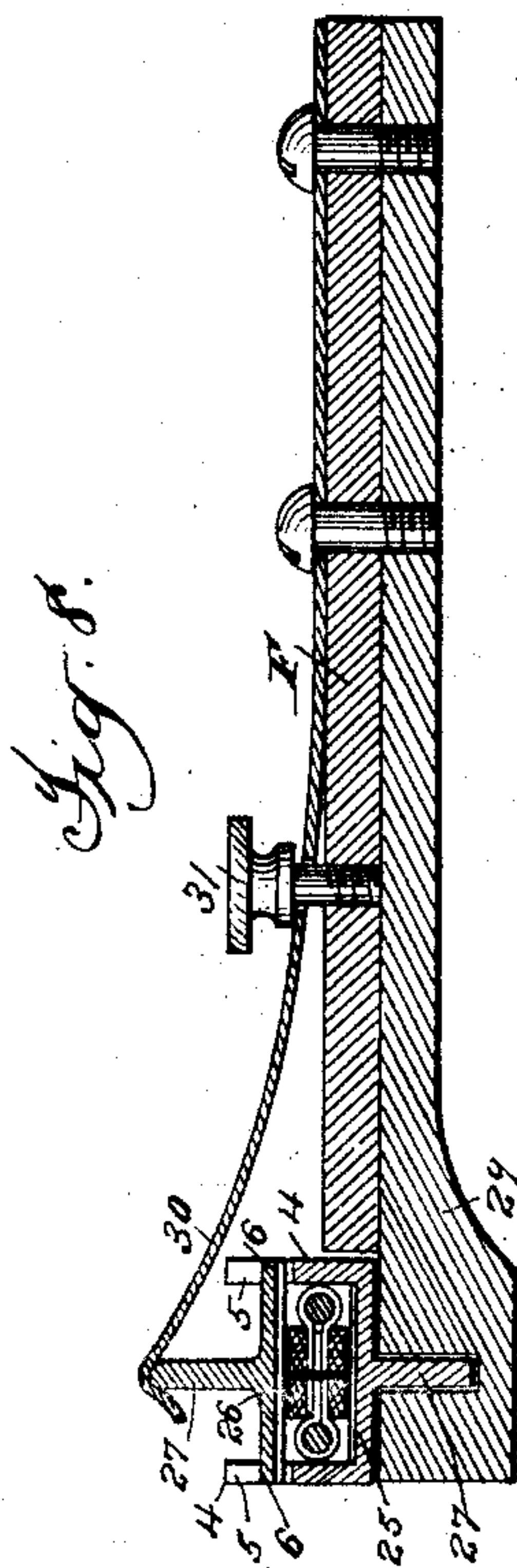
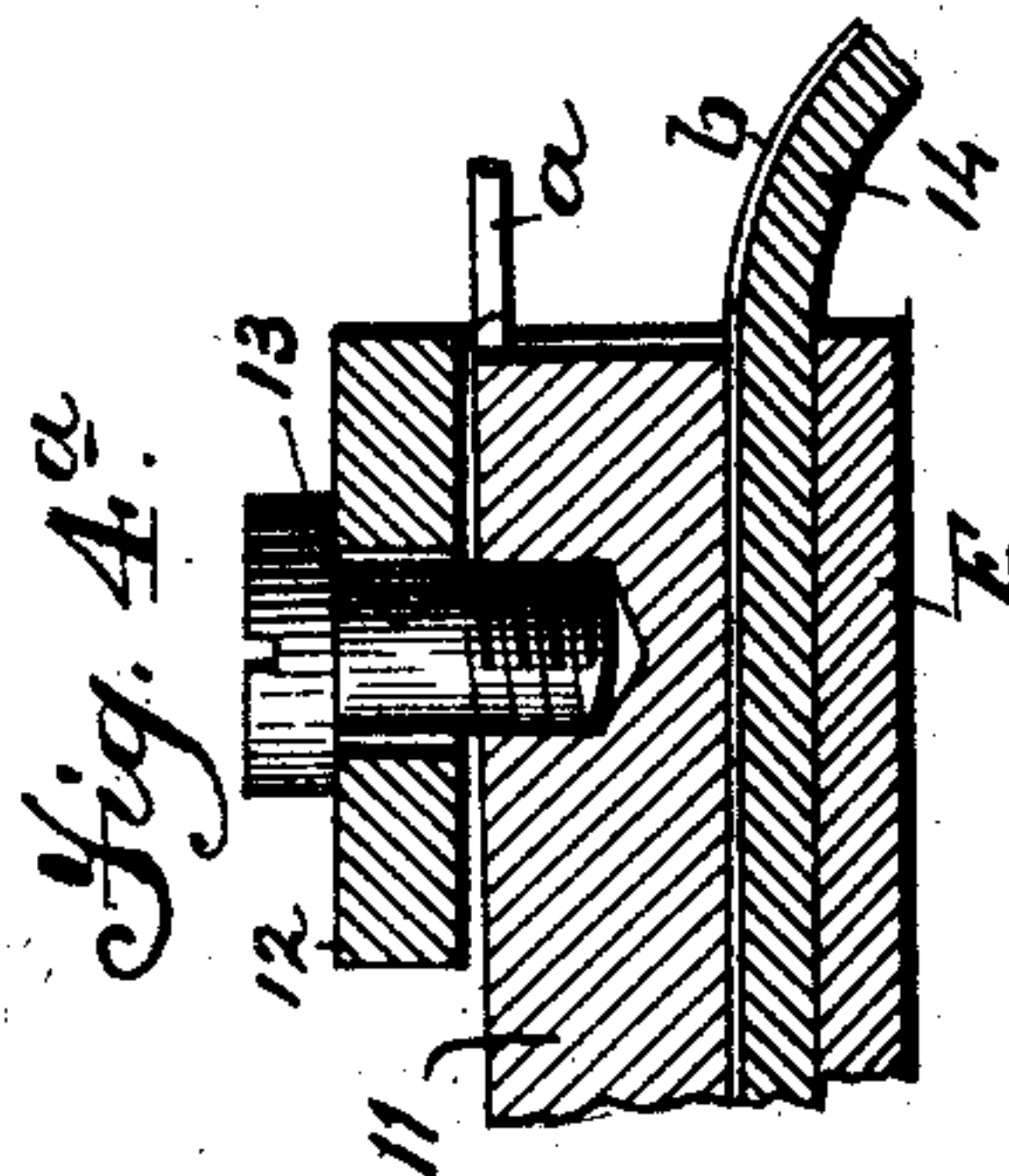
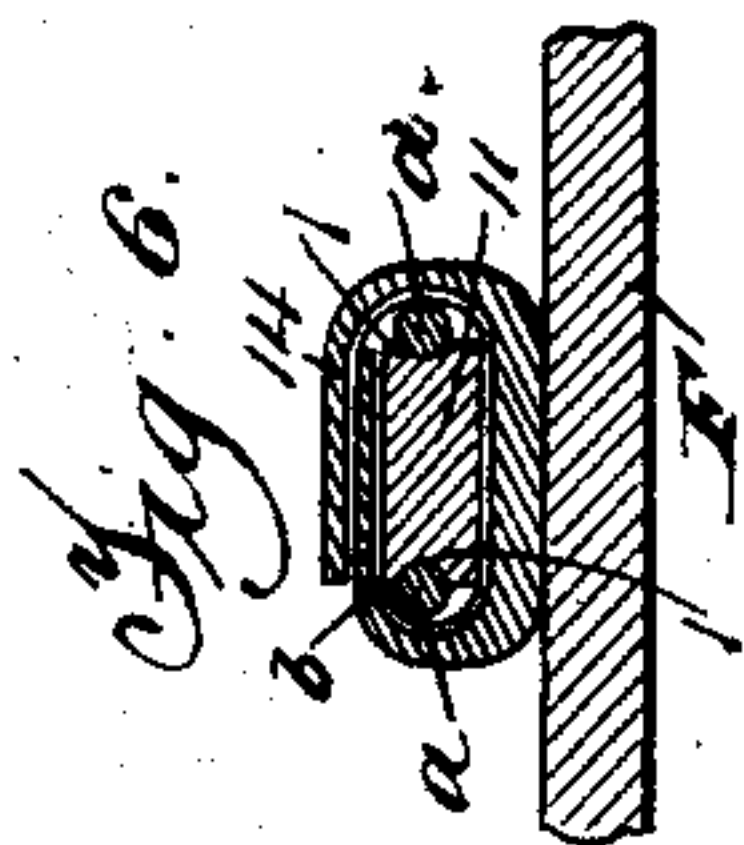
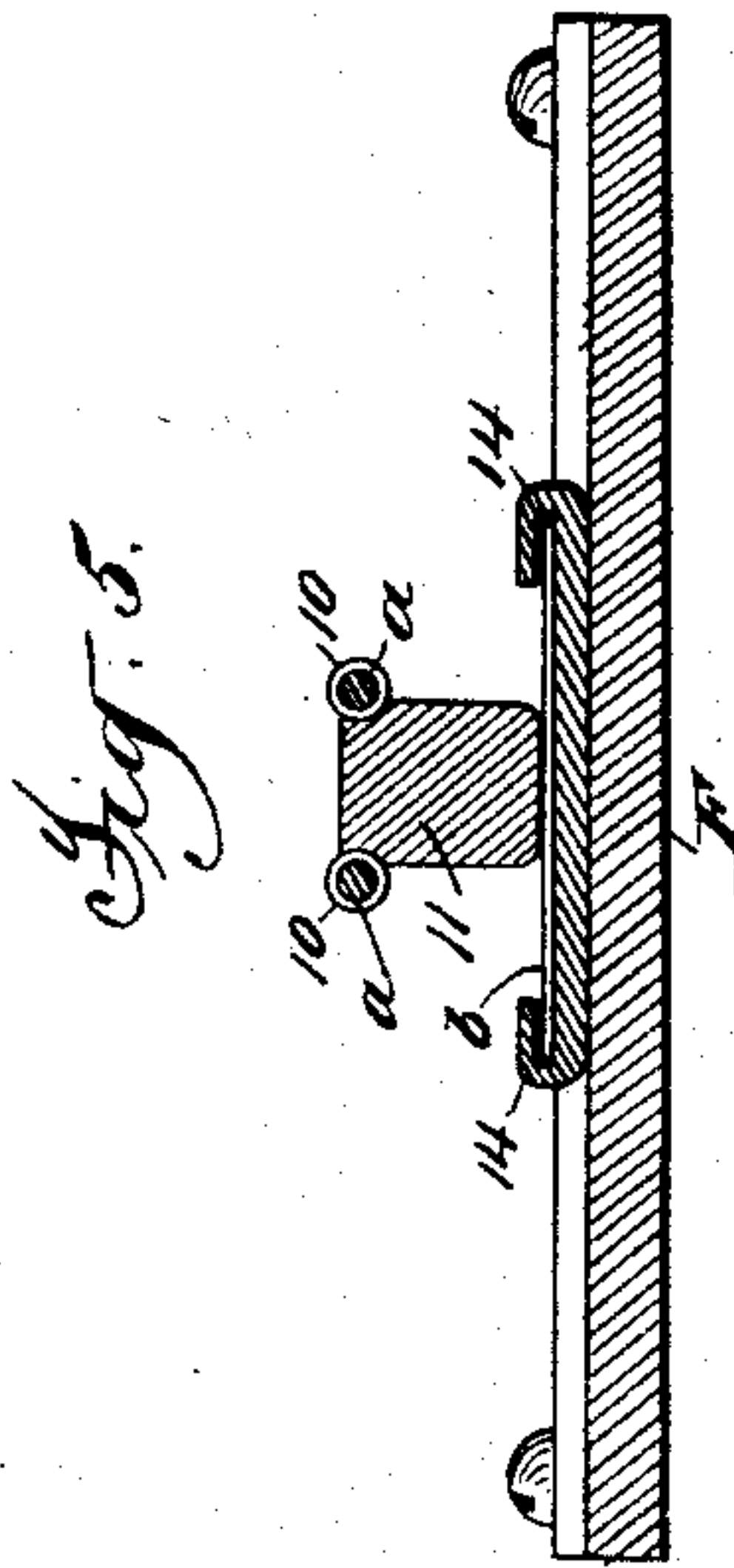
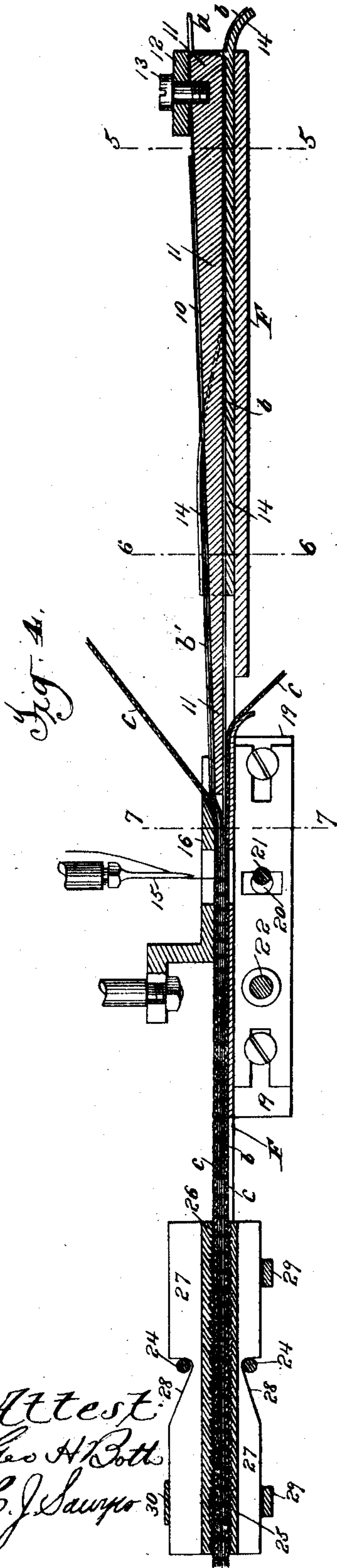
(No Model.)

3 Sheets—Sheet 3.

J. A. BARRETT.  
MACHINE FOR COVERING WIRES.

No. 505,379.

Patented Sept. 19, 1893.



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# UNITED STATES PATENT OFFICE.

JOHN A. BARRETT, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE STANDARD UNDERGROUND CABLE COMPANY, OF PITTSBURG, PENNSYLVANIA.

## MACHINE FOR COVERING WIRES.

SPECIFICATION forming part of Letters Patent No. 505,379, dated September 19, 1893.

Application filed March 29, 1892. Serial No. 426,869. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN A. BARRETT, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Machines for Covering Wires, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 The object of the present invention is to provide a simple, efficient and rapid machine for covering a plurality of separated electric conductors simultaneously in such a manner that the conductors are held rigidly at the required distance apart.

15 In my Patent No. 482,151 I have described and claimed an article termed therein an electric circuit consisting of a pair of conductors having a covering consisting of one or more strips of paper or similar insulating material wrapped about both conductors and secured together between the conductors to hold them in place, one or more binding strips separate from the wrapping being preferably applied 25 between the conductors to stiffen the construction, such strip or strips being placed either outside or inside the wrapper. The present invention has been made in connection with a machine devised for the purpose of making a spiral circuit of this class, and the invention will be illustrated and described as embodied in such a machine, but it will be understood that certain features of the invention are applicable also in other machines 35 for covering electric conductors.

40 In connection with the construction of the machine and the general invention, also, I have devised certain improvements in feeding and folding devices not dependent upon the special form of other parts of the machine, but applicable generally where similar feeding or folding action is desired.

45 For a full understanding of my invention a detailed description of a complete machine embodying the invention in its preferred form, will now be given in connection with the accompanying drawings forming part of this specification, and the features forming the invention specifically pointed out in the claims.

In the accompanying drawings—Figure 1 is a side elevation of the complete machine for covering the conductors and spiraling the circuit. Fig. 2 is a side elevation on an enlarged scale of the mechanism for covering the conductors. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 is a horizontal section taken centrally through the circuit in the process of construction, the parts being shown about twice full size. Fig. 4<sup>a</sup> is an enlarged detail hereinafter referred to. Figs. 5, 6 and 7 are sections on respectively the lines 5, 6, and 7 of Fig. 4, looking to the left. Fig. 8 is a cross section taken through the feeding devices. Fig. 9 is a partial section, similar to Fig. 4, showing a modification. Figs. 10, 11 and 12 are sections on respectively the lines 10, 11, and 12 of Fig. 9, looking to the left; and Figs. 13 and 14 show the different products in plan and cross section.

Referring now particularly to Figs. 1 to 8, it will be seen from an inspection of Fig. 1 that the machine is divided into two parts, in one of which the conductors are covered and secured to form the circuit and in the other the circuit is twisted to the spiral form used in the telephone construction and wound in this form upon a reel from which it is drawn directly in forming cables or other use of the circuit.

The mechanism for making the circuit will first be described. A, A are rolls from which the conductors *a, a* to be covered are drawn, B the roll of the wrapper *b* of paper or other similar flexible material, and C, C, the rolls of the binding strips *c*, of which two are used in the construction shown in Figs. 1 to 8, these reels being placed upon opposite sides of the path of the conductors so that a binding strip is applied to each side of the wrapper between the conductors. The rolls are supported in any suitable manner on the frame E of the machine and the mechanism for covering the conductors is all mounted upon a table F supported on the top of said frame. The conductors are guided and held at fixed distances apart as they are drawn forward and the wrapper folded about them, by tubular guides 10 carried by a tongue supported from above by a bracket 12 on the table F. The tongue may be held rigidly in



position, but this requires careful adjustment to avoid cramping the paper, and I prefer to support the tongue pivotally so as to permit it to swing vertically or horizontally to accommodate the paper wrapper which is rigidly guided after it leaves the tongue, and I have shown the tongue as supported in bracket 12 by a screw 13 slightly smaller than the opening in the bracket 12, as shown in Fig. 4<sup>a</sup>, so as to permit the tongue to swing as required. Any other suitable pivotal connection may be used for this purpose. The tubular guides 10 extend forward to approximately the point where the wrapper is closed about the conductors and beyond this point the conductors are guided and held apart as positioned until the binding strips are applied, by grooves 1 in the sides of the tongue 11, the tongue being made tapering so as to gradually decrease in thickness and bring the opposite layers of the wrapper together between the conductors as the wrapper is fed forward through the folder, until the binding strips are applied where the tongue ends. The wrapper *b* is led from the roll B into the machine below the tongue 11 and between it and the folder 14, which is formed of a plate secured to the table F and constructed to fold the edges of the wrapper gradually over the conductors *a* and the tongue 11, the wrapper being of sufficient width and the folder 14 constructed so that the edges of the wrapper are overlapped as the conductors and wrapper are fed forward and the wrapper drawn tightly about the tongue and conductors, which are then supported and held in position by the tongue between them, as previously described and as shown in Fig. 6, and the binding strips *c* are led in outside and on opposite sides of the wrapper as the wrapper and conductors pass the end of tongue 11.

The wrapper and binding strips are preferably secured together by sewing and for this purpose any suitable sewing mechanism may be used, a common form of machine being shown, having the reciprocating needle 15, presser foot 16, and rotating hook 17. The binding strips and wrapper are pressed together at once on passing the end of tongue 11, so as to hold the conductors firmly in place, by the presser foot 16 engaging the upper strip *c* between the conductors and pressing downward against the table F, on which the lower strip *c* rests, the table F and presser foot 16 being recessed, so as to hold the circuit in place between them, the recesses, as shown in Fig. 7, being of such form as to receive and form guides for the strips *c* on opposite sides of the wrapper, so that they are positively guided in proper position between the conductors, and the recesses are of such depth that the parts of the circuit are pressed together sufficiently to hold the conductors in place while permitting the circuit to be fed forward. The presser foot will preferably be spring-pressed as usual in sewing

machine construction, to accommodate any unevenness in the circuit, and a constant pressure may be exerted thereby upon the circuit sufficient to hold it in place without interfering materially with the feed, or the presser foot may be raised by the mechanism of the sewing machine as usual in such constructions, so as to remove all pressure during the feeding operation, the conductors being held in position while the foot is raised, by the tongue 11 on one side of the presser foot and by being secured in the completed circuit on the other side. As the parts forming the circuit are brought together and held by the presser foot 16 the stitches are formed through the wrapper and binding strips by the needle 15 and hook 17 as usual in such constructions.

It is evident that the feeding mechanism for advancing the conductors, wrapper and binding strips should give an intermittent feed to accommodate the sewing mechanism and that the grip upon the circuit should be very strong and positive in its action, and while other feeding mechanism may be used, I have devised a novel construction of such mechanism which I prefer to use and which in itself forms a part of my invention. In this construction a sliding plate 18 is mounted below the table F, being supported on a depending bracket 19 thereon by a slot and screw connection, as shown, or in any other suitable manner so as to permit a reciprocating movement, this plate 18 being reciprocated preferably by a cam 20 carried by the hook shaft 21 of the machine, although it will be understood that this plate may be reciprocated by any other suitable means. The plate 18 has a stud 22 which carries a bar 23 extending forward in the line of the feed and preferably formed in two parts connected by a knife blade joint 2, so that the end of the bar may be swung outward horizontally. The bar 23 carries two studs 24 extending transversely to the circuit and respectively above and below the same, these studs 24 being preferably made adjustable vertically by a slot and bolt construction 3, as shown, so as to vary the distance between them. Two plates 25, 26 are mounted respectively below and above the circuit and toothed so as to grip the circuit on opposite sides to advance the latter during the feeding movement, these plates being provided with vertically extending central ribs 27 having notches 28 which are placed opposite each other and constructed with an incline on the forward side and with square shoulders on the rear side, so that the studs 24, which lie within these notches, shall press the plates 25, 26 together to grip the circuit as the bar 23 and studs are carried forward on the feeding movement and shall release the plates and allow them to separate on the return movement of the plates, which is accomplished by the engagement of the studs 24 with the shoulders on the rear side of the notches. It is evident that the amount of feed will de-



pend upon the distance between the studs 24, as this determines the point at which the studs will engage the plates in their forward movement, and the amount of feed may readily be adjusted by varying the positions of the studs 24 in the bar 23 relatively to each other. The lower plate 25 slides upon and is supported by arms 29 secured on the under side of the table F, these arms being grooved to receive the rib 27 of this plate so as to hold the plate in position and guide it properly while at the same time permitting it to be readily withdrawn. The plate 25 is provided with upwardly-extending flanges 4 at each edge by which the plate 26 is held in position on opposite sides and these flanges 4 are provided with notches 5 into which extend arms 6 formed on the edges of the plate 26 so that the two plates 25, 26 move together, and at the same time the plates may be pressed together during the feeding movement to grip the circuit.

The plate 26 is firmly pressed downward so as to be held in proper position by a spring 30 hooked over the rib 27, this spring being preferably made adjustable by screw 31, as shown, or in any other suitable manner, so as to secure the proper tension to hold the plate 26 properly. By this hooked spring and rib construction the plate 26 is not only pressed downward but held yieldingly against tipping sidewise, while at the same time the plate 26 may readily be removed by lifting the spring 30, the arm 23 having been swung outward horizontally so as to carry the studs 24 out of the notches 28.

The operation of the construction will be understood from a brief description. The conductors *a*, wrapper *b* and binding strips *c* are all fed forward intermittently by the feeding mechanism just described, the toothed plates 25, 26 being pressed together to grip the completed circuit during the feeding movement by the action of the studs 24 on the inclined surfaces of the notches 28 in ribs 27. As the conductors and wrapper are fed forward, the conductors are held in position by the tubular guides 10 and grooves 1 on tongue 11 and the wrapper *b* is folded about the conductors by the folder 14, the binding strips *c* being then fed in and the parts pressed together by the presser foot 16 and a row of stitches taken through the binding strips and wrapper between the conductors, so that the latter are secured in place and the circuit stiffened against folding transversely, the complete circuit thus formed being shown in full size in Fig. 13.

While I have shown and described binding strips as applied on both sides of the wrapper and I prefer this construction, it is evident that one of the strips may be omitted. It is evident also that instead of applying the binding strip or strips *c* outside the wrapper, one or more binding strips may be placed between the conductors before the wrapper

is folded about them, so as to be inclosed within the wrapper which is folded about them and the conductors, and in Figs. 9 to 12 I have shown details of such a modified form of machine, the other parts remaining as shown in Figs. 1 to 8 previously described. In this construction, a single binding strip *c* is led in inside the folder 14 just before it closes the edges of the wrapper *b* over the conductors, the tongue 11 being grooved on the upper side, as shown in Fig. 10, so as to permit the strip to be brought into position between the conductors and form a guide for the strip, and the tongue 11 terminating just after the strip has been brought into position, as shown in Fig. 11, the wrapper being then pressed down upon the binding strip between the conductors by the presser foot 16. In this construction the presser foot is shown as not cut away to receive the circuit and the upper binding strip as before, but the circuit is inclosed within a recess in the table F and the presser foot 16 simply covers the recess and presses the strip down, as shown in Fig. 12, but it will be understood that this change is not essential. The circuit formed by this modified machine with the strip inside the wrapper is shown in full size in Fig. 14.

The circuit formed by this machine may be used flat or may be spiraled in an independent machine, but I prefer to combine with the mechanism for making the circuit a spiraling and reeling mechanism so that the circuit is covered, spiraled, and reeled ready for use, in a single machine and continuously.

Any suitable mechanism may be used for spiraling and reeling the circuit, but I have shown a simple mechanism which I have found efficient for this purpose and prefer to use. This spiraling and reeling mechanism is as follows: A frame H is mounted to rotate transversely to the line of feed of the circuit and actuated by a pulley 34, and the reel I is removably mounted in its supports in the frame, as usual, so that it may be transferred to and used in a machine for laying cables, and is driven by a belt 35 passing around the driving pulley of the reel and over a double pulley 36 in the frame H and around a fixed pulley 37 carried by a stud 38 in the frame work of the machine, on which the frame H rotates. The circuit is led from the sewing mechanism over a pulley 39 and under take-up roller pulley 40 carried upon swinging arm 41 and held pressed against the strip by spring 42, and thence through a guiding sleeve 43 and a traverse 44 to the reel I. The traverse 44 is screw-threaded on a shaft 45 mounted in the frame H and rotated a quarter revolution to each rotation of the reel driving pulley by a pin 48 carried by the latter and engaging one arm of a star wheel 47 carried by a shaft 45, which shaft is provided with double screw threads, as shown, so that traverse 44 is reciprocated on shaft 45



as the latter rotates, and the circuit thus wound evenly upon the reel I.

The operation of this part of the machine will be understood from a brief description.

5 As the frame H rotates with the reel I, the circuit is twisted by the rotation of the frame and at the same time the reel I is rotated by the belt 35 so as to reel up the twisted circuit, the tension upon the reel I being regulated by the tension of belt 35, which upon  
10 any undue strain slips upon pulley 37 so as to allow the reel I to stop, preventing breakage, and slowing up the reel as the size of the body of circuit wound on the reel and  
15 consequently the surface speed increases. This construction may be used with an intermittent feeding mechanism and the slip of the belt 35 acts to stop the reel between the feeding movements, but it is preferable that  
20 the reeling operation be continuous to give large capacity without high speed. For this purpose, it is necessary that the intermittent feeding mechanism advance the circuit at each movement a distance equal to the length  
25 of circuit to be taken up by the reel before the next feeding movement, while at the same time it is necessary that the circuit be held under tension so as to wind tightly. I accomplish this by the construction employing  
30 the spring-pressed take-up roll 40 previously described. The excess of circuit fed forward by the feeding mechanism is taken up by the spring-pressed roll 40 as the intermittent feed is made, so as to prevent slack, and as the in-  
35 termittent feed ceases, the reel I takes up the circuit against the tension of the spring-pressed roll 40, which is raised until another intermittent feed takes place.

While I have shown a sewing mechanism  
40 for securing the wrapper and binding strip or strips together between the conductors so as to bind the parts of the circuit together and hold the conductors firmly in place, it will be understood that I am not to be limited thereto, but that any other suitable  
45 mechanism may be used for this purpose. The sewing mechanism is preferable, however, especially in making spiraled circuits on account of the flexibility of the circuit  
50 formed thereby.

While I have shown and described a binding strip or strips as applied to the wrapper to stiffen the circuit, it is evident that the machine may be used to cover circuits not thus  
55 stiffened, the binding strips being omitted. It is evident also that my invention is not limited to a machine for covering two conductors to form a single strand circuit but it may be embodied in a machine for covering any number of conductors simultaneously, and various  
60 modifications may be made in the specific construction shown without departing from my invention.

What I claim is—

65 1. The combination with mechanism for advancing a plurality of wires and covering

therefor and holding the wires at a fixed distance apart, of a folder for folding a wrapper strip about the wires, and means for securing the layers of said wrapper together between  
70 the wires, substantially as described.

2. The combination with mechanism for advancing a plurality of wires and covering therefor and holding the wires at a fixed distance apart, of a folder for folding a wrapper  
75 strip about the wires, means for securing the layers of said wrapper together between the wires to hold them in place, and a spiraling and reeling mechanism, substantially as described.  
80

3. The combination with mechanism for advancing a plurality of wires and covering therefor and holding the wires at a fixed distance apart, of a folder for folding a wrapper  
85 strip about the wires, guides by which one or more binding strips are applied between the wires, and means for securing the wrapper and binding strip or strips together between the wires, substantially as described.

4. The combination with mechanism for advancing a plurality of wires and covering therefor and holding the wires at a fixed distance apart, of a folder for folding a wrapper  
90 strip about the wires, and a sewing mechanism arranged to sew the layers of wrapper together between said wires, substantially as described.  
95

5. The combination with feeding mechanism for advancing a plurality of wires and covering therefor, of a folder for folding a  
100 wrapper strip about the wires, guides by which one or more binding strips are applied between the wires, and a sewing mechanism for sewing the layers of wrapper and binding strips together between said wires, substantially  
105 as described.

6. The combination with mechanism for advancing a plurality of wires and covering therefor and holding the wires at a fixed distance apart, of a folder for folding a wrapper  
110 strip about the wires, a sewing mechanism for sewing the layers of said wrapper together between said wires, and a spiraling and reeling mechanism, substantially as described.  
115

7. The combination with feeding mechanism for advancing a plurality of wires and covering therefor, of guides for holding the wires at a fixed distance apart, a folder for  
120 folding a wrapper strip about the wires, and means for securing the layers of wrapper together between the wires, substantially as described.

8. The combination with feeding mechanism for advancing a plurality of wires and covering therefor, of a tongue forming a guide holding the wires at a fixed distance apart, a  
125 folder for folding a wrapper strip about the wires and tongue, and means for securing the layers of wrapper together between the wires, substantially as described.  
130

9. The combination with feeding mechanism



ism for advancing a plurality of wires and covering therefor, of a tapering tongue forming a guide holding the wires at a fixed distance apart, a folder for folding a wrapper strip about the wires and tongue, and means for securing together the layers of wrapper between the wires, substantially as described.

10. The combination with feeding mechanism for advancing a plurality of wires and covering therefor, of a tapering tongue forming a guide holding the wires at a fixed distance apart, a folder for folding a wrapper strip about the wires and a tongue, a presser foot holding the parts in position after they have passed the tongue, and sewing mechanism arranged to sew the layers of wrapper together between the wires, substantially as described.

11. The combination with feeding mechanism for advancing a plurality of wires, a wrapper strip and one or more binding strips applied between the wires at a point in the feeding movement of said wires and strip, of a tapering tongue between the wires extending to the point where the binding strip or strips are applied, a folder constructed to fold the wrapper strip about the wires and tongue, and means for securing the wrapper and binding strip or strips together between the wires, substantially as described.

12. The combination with feeding mechanism for advancing a plurality of wires and covering therefor, of a tapering tongue between the wires, guides for applying one or more binding strips between the wires at the end of the tongue, a folder constructed to fold a wrapper strip about the wires and tongue, and means for securing the wrapper and binding strips together between the wires, substantially as described.

13. The combination with tube forming folder 14, of tongue 11 inclosed by said folder and tapering in the direction of movement of the strip to be folded, substantially as described.

14. The combination with tube forming folder 14, of pivotally mounted tongue 11 inclosed by said folder, substantially as described.

15. The combination with tube forming folder 14, of tongue 11 inclosed by said folder and having grooves 1 on opposite sides extending longitudinally of the folder.

16. The combination with tube forming

folder 14, of tongue 11 inclosed by said folder and tapering in the line of direction of movement of the strip to be folded and having grooves 1 on opposite sides extending longitudinally of the folder, substantially as described.

17. The combination with tube forming folder 14, of tongue 11 inclosed by said folder and tapering in the direction of movement of the strip to be folded, and presser foot 16, substantially as described.

18. The combination with tube forming folder 14, of tongue 11 inclosed by said folder and tapering in the direction of movement of the strip to be folded, presser foot 16 and table F, recessed to form guides for one or more strips, substantially as described.

19. The combination with two plates forming a grip and provided with notches having inclined surfaces at their forward sides, of reciprocating studs entering said notches, substantially as described.

20. The combination with two plates forming a grip and provided with notches having inclined surfaces at their forward sides, of reciprocating studs entering said notches and adjustable to vary the distance between them, substantially as described.

21. The combination with plates 25, 26 having ribs 27 provided with notches 28 with inclined surfaces at the forward side and shoulders at the rear side, of reciprocating studs 24 entering said notches, substantially as described.

22. The combination with plates 25, 26, having ribs 27 provided with notches 28 with inclined surfaces at the forward side and shoulders at the rear side, of reciprocating hinged arm 23 carrying studs 24 entering said notches, substantially as described.

23. The combination with plates 25, 26, having ribs 27 provided with notches 28 and held to move longitudinally while free to be separated transversely, of hooked spring 30 engaging the rib 27 on plate 26 to hold it in place, and reciprocating studs 24 entering said notches, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN A. BARRETT.

Witnesses:

T. F. KEHOE,  
C. J. SAWYER.