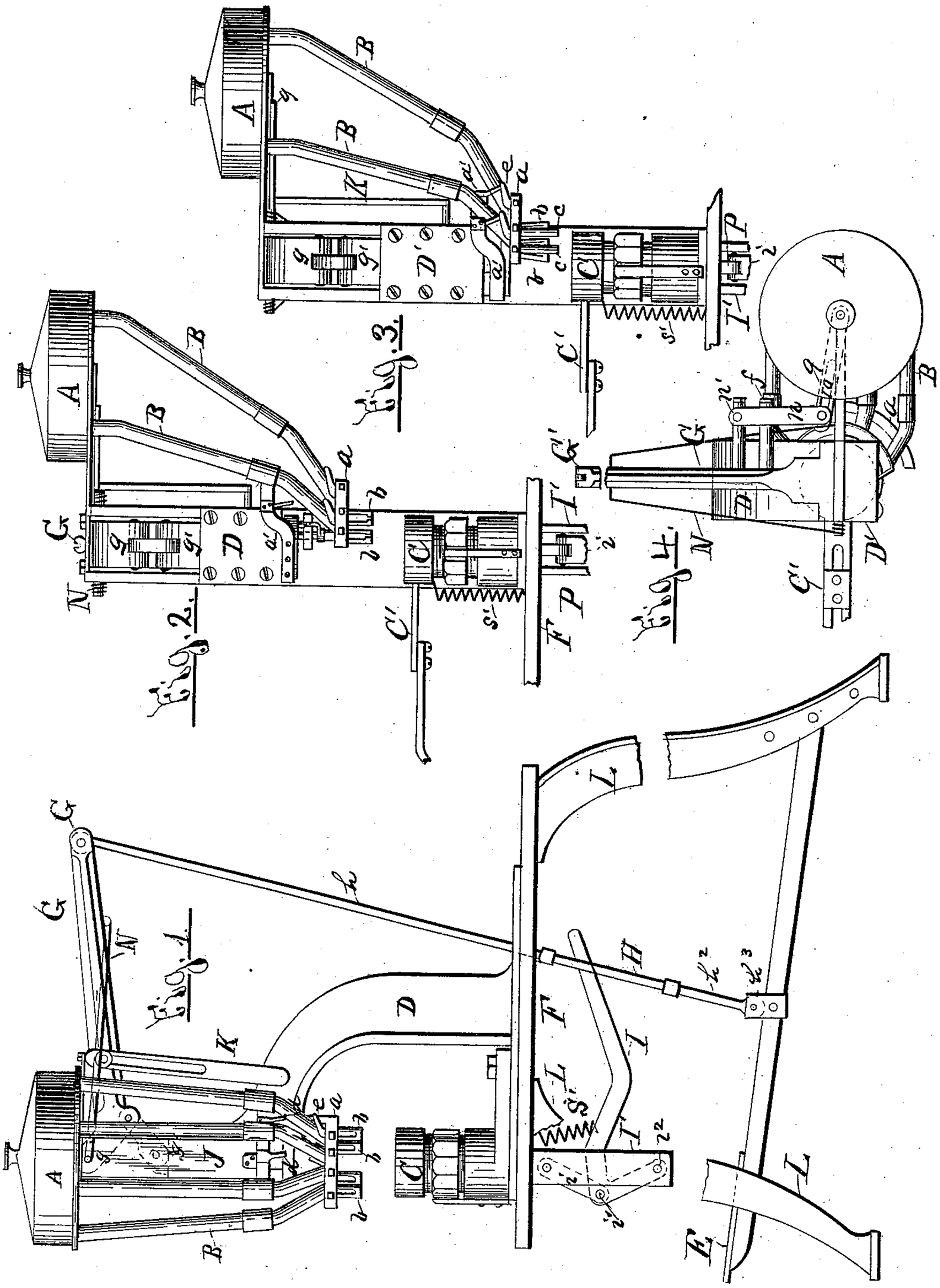
(No Model.)

5 Sheets—Sheet 1.

J. L. THOMSON & J. J. UNBEHEND.

RIVETING MACHINE.

No. 363,921. Patented May 31, 1887.



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BY Hey & Gibbs

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(No Model.) 5 Sheets—Sheet 2.

J. L. THOMSON & J. J. UNBEHEND.

RIVETING MACHINE.

No. 363,921. Patented May 31, 1887.

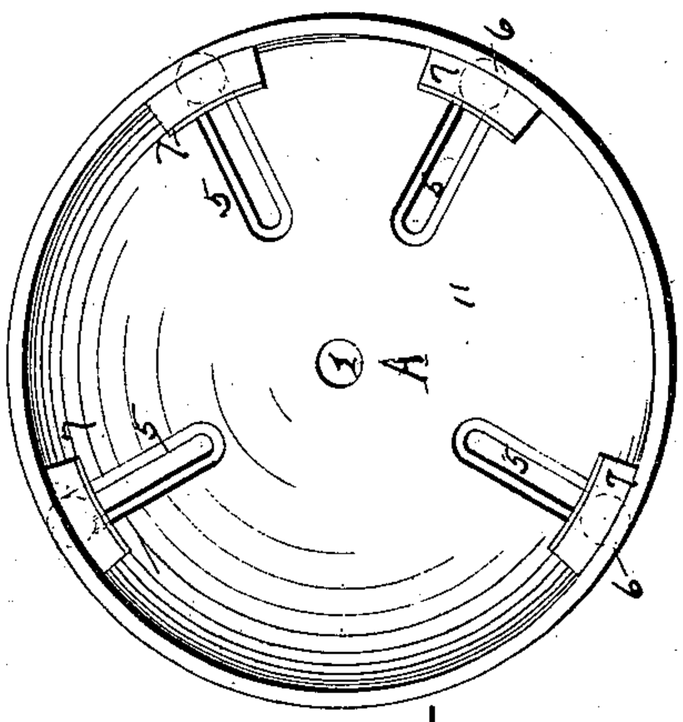

Fig. 7.

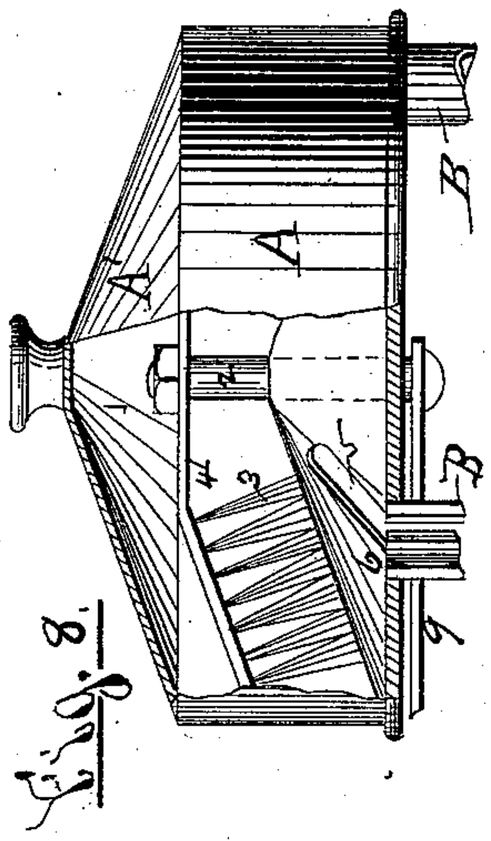

Fig. 8.

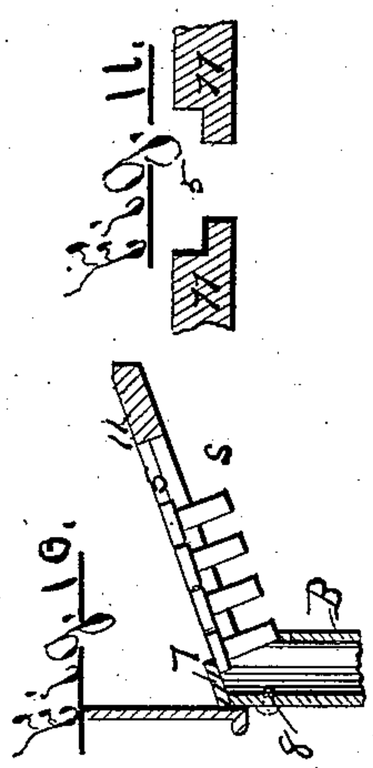

Fig. 10.

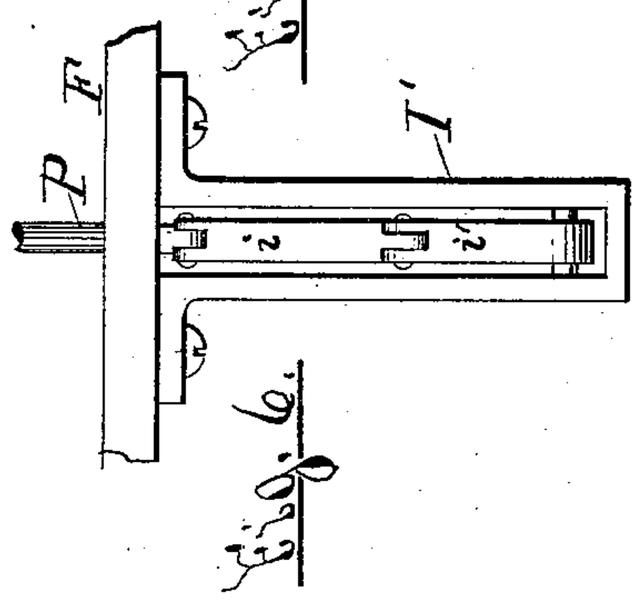

Fig. 6.

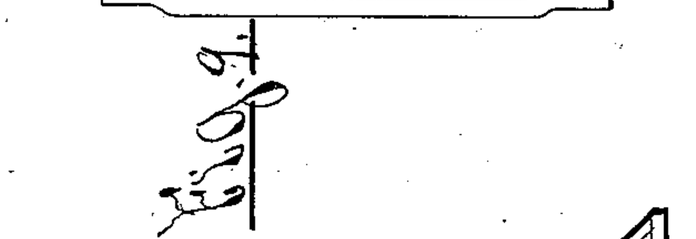

Fig. 9.

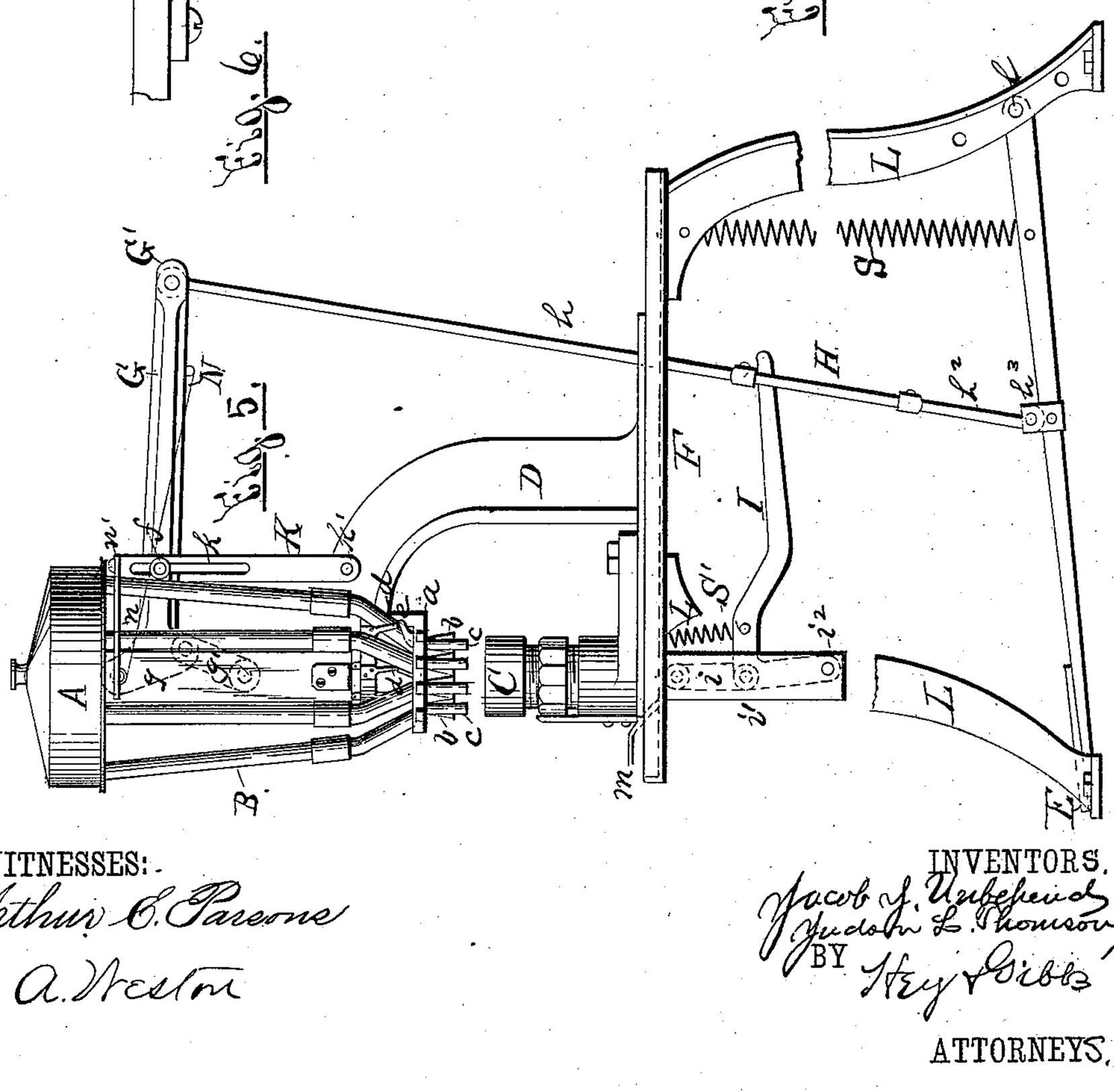

Fig. 5.

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(No Model.) 5 Sheets—Sheet 3.

J. L. THOMSON & J. J. UNBEHEND.

RIVETING MACHINE.

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Fig. 12

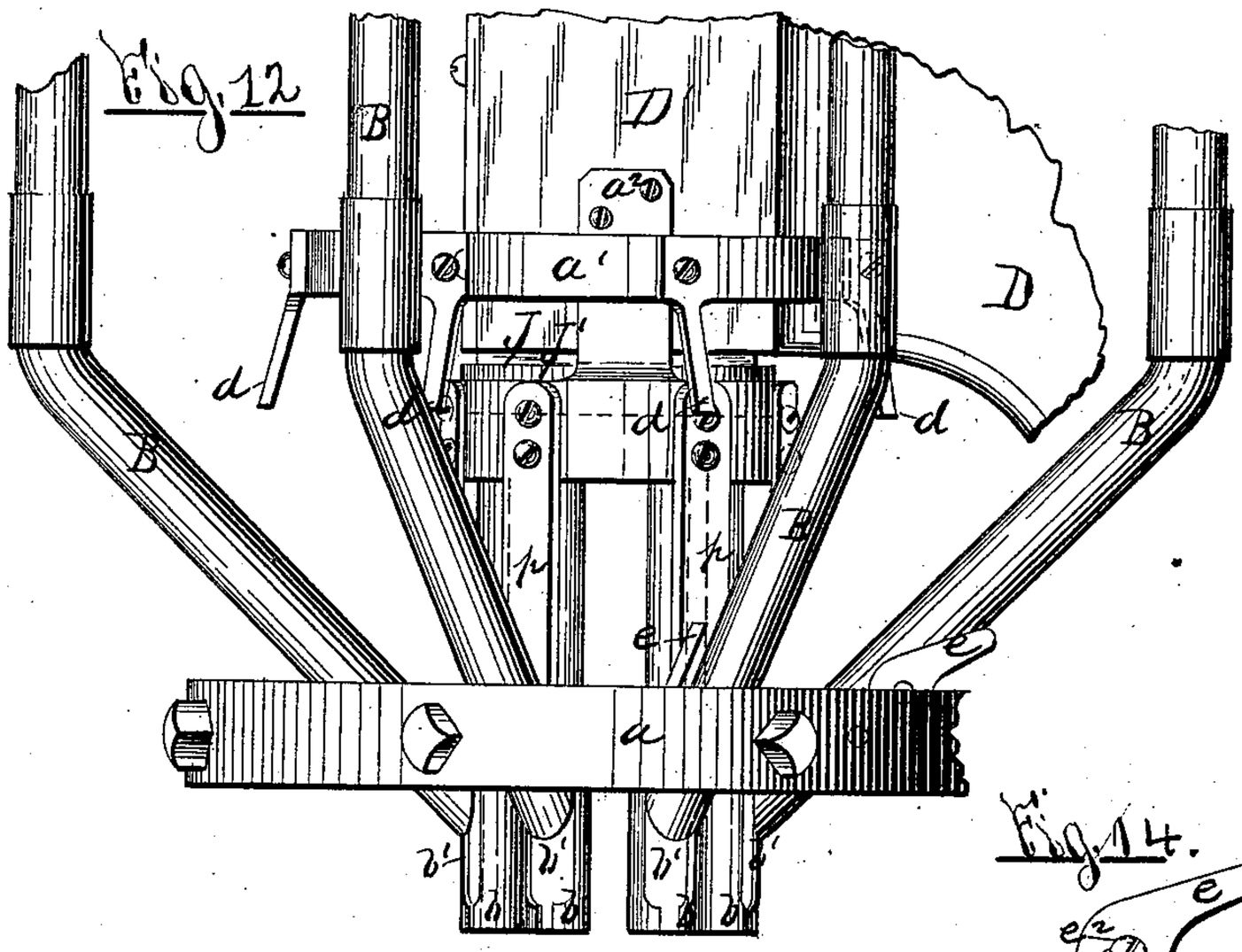


Fig. 14.

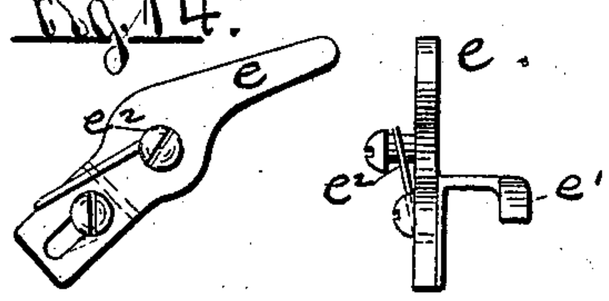
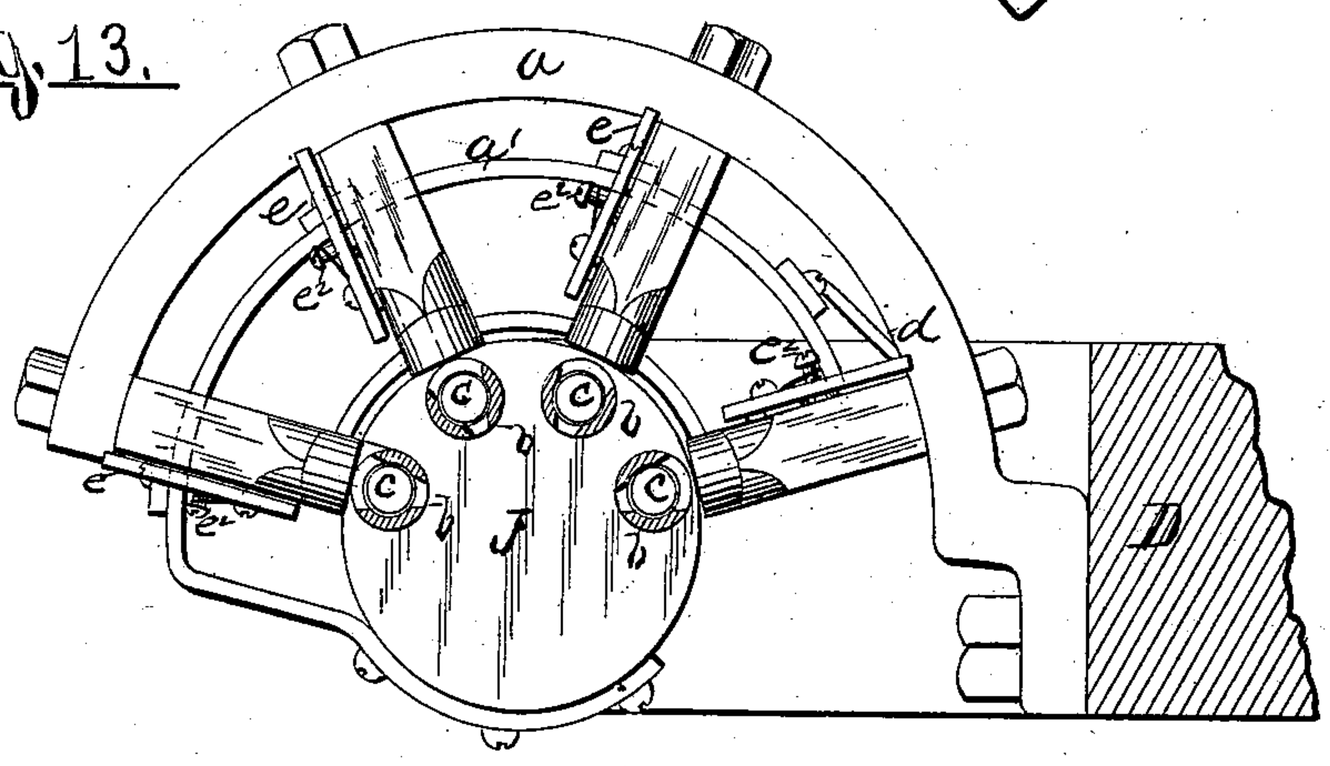


Fig. 13.



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(No Model.) 5 Sheets—Sheet 4.

J. L. THOMSON & J. J. UNBEHEND.

RIVETING MACHINE.

No. 363,921. Patented May 31, 1887.

Fig. 17.

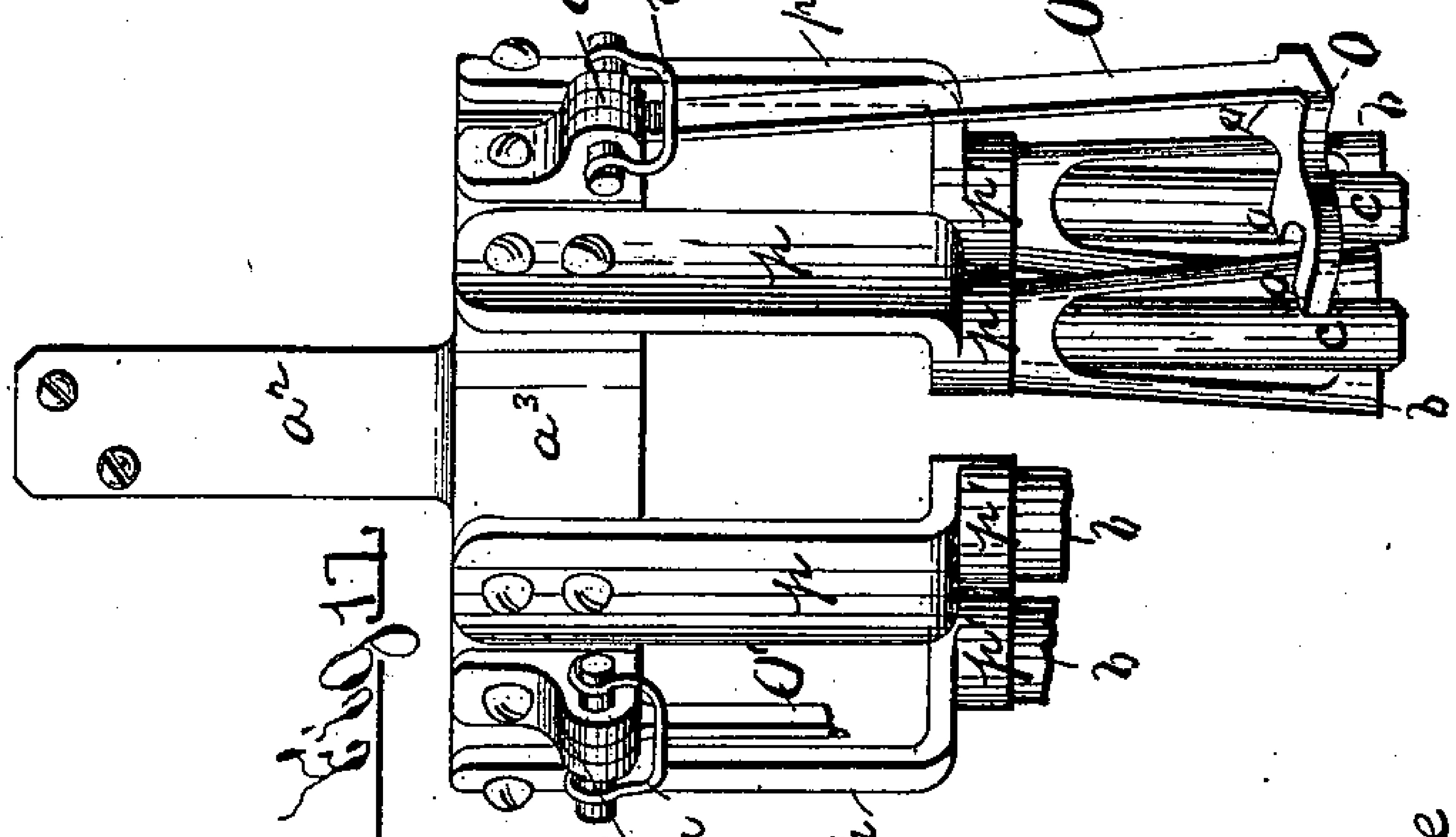


Fig. 18.

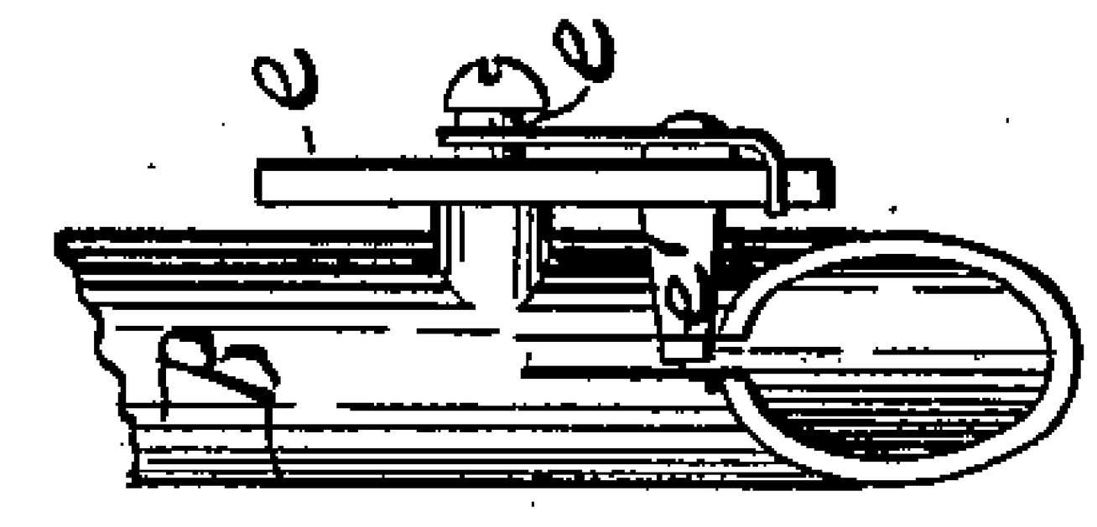


Fig. 16.

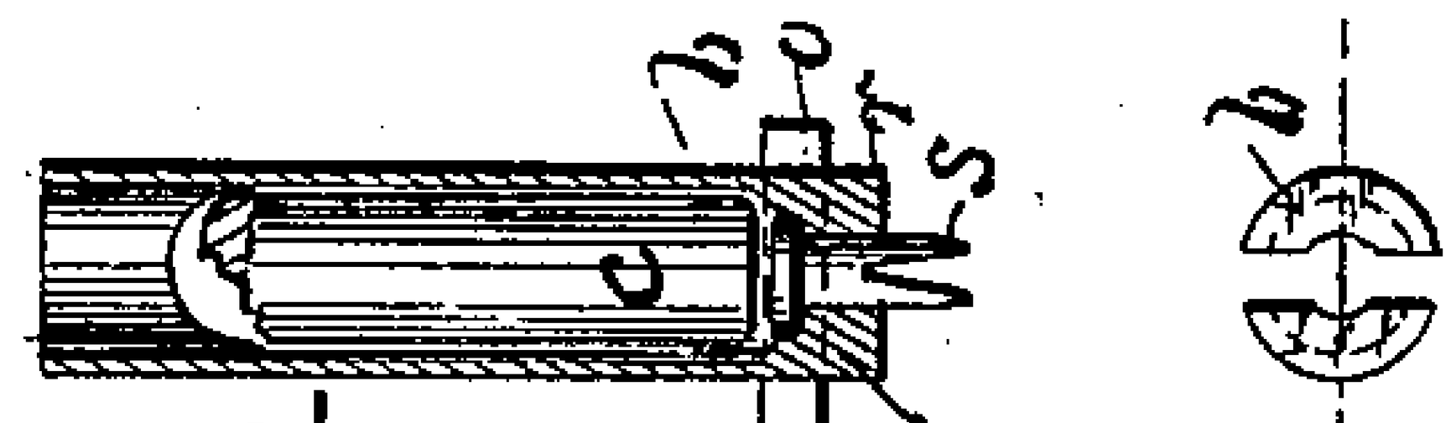
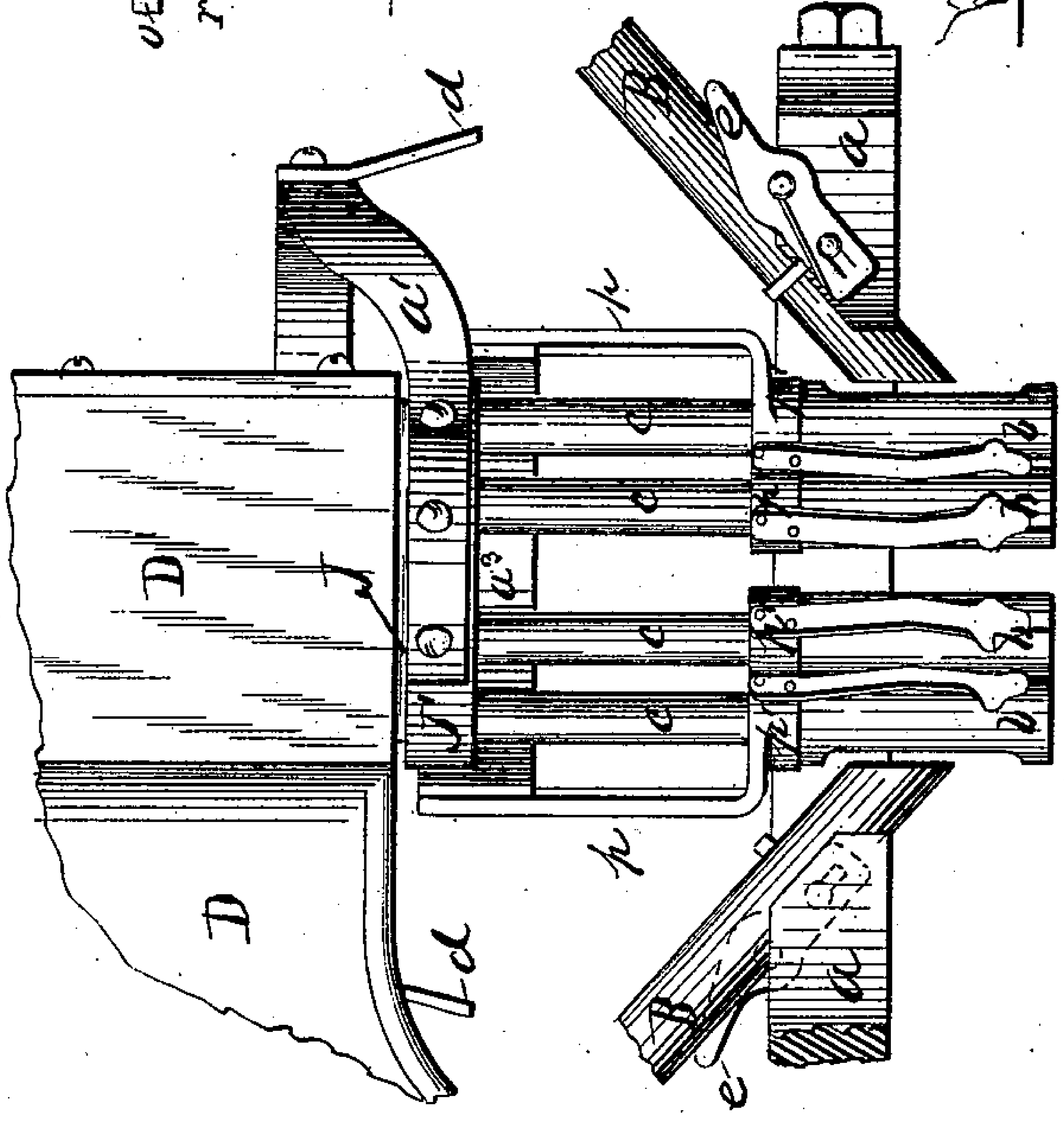


Fig. 15.



WITNESSES:
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(No Model.) 5 Sheets—Sheet 5.

J. L. THOMSON & J. J. UNBEHEND.

RIVETING MACHINE.

No. 363,921. Patented May 31, 1887.

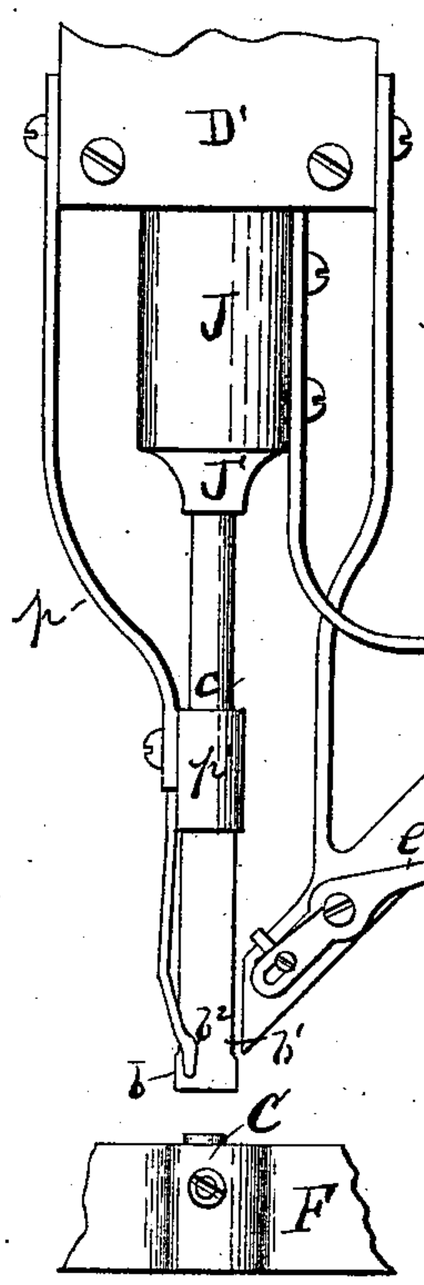

Fig. 19.

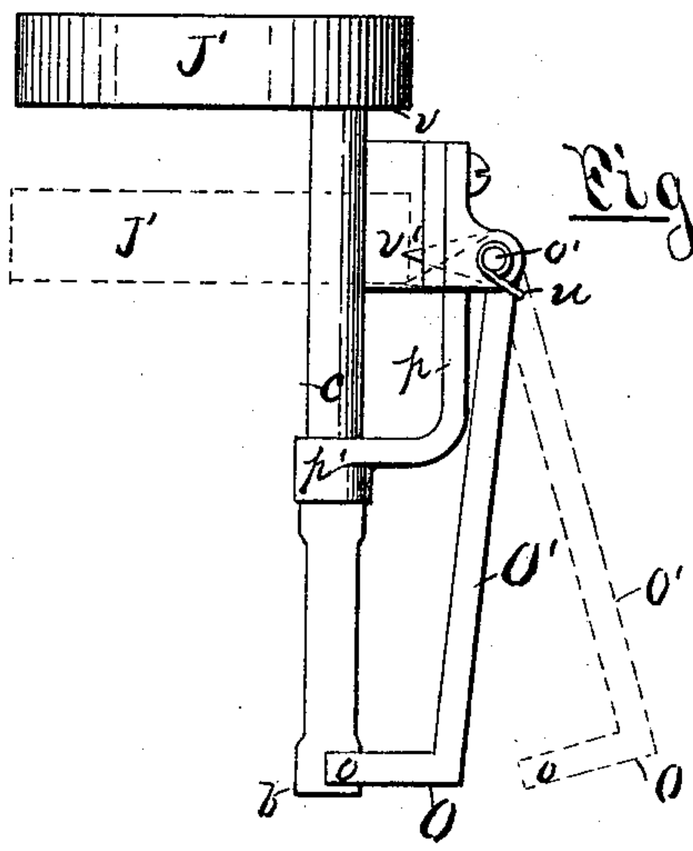

Fig. 20.

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Hey & Gibbs

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JUDSON L. THOMSON AND JACOB J. UNBEHEND, OF SYRACUSE, NEW YORK, ASSIGNORS TO JUDSON L. THOMSON & CO., OF SAME PLACE.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 363,921, dated May 31, 1887.

Application filed December 27, 1886. Serial No. 222,677. (No model.)

To all whom it may concern:

Be it known that we, JUDSON L. THOMSON and JACOB J. UNBEHEND, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Riveting-Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

Our invention has for its object the production of a machine for the insertion of rivets into the heels and toes of the soles of arctics and like overshoes in which the operation of inserting the rivet and clinching or heading the clinching-prongs shall be automatic and continuous by simply securing the overshoe upon a riveting-block and presenting the same to the punches and operating the clinching mechanism and feeding mechanism by the treadle; and to this end the invention consists in a riveting-machine comprising an automatic feed for feeding the rivets to the heading mechanism, mechanism for distributing and arranging the rivets circumferentially on the heel of the arctic or overshoe, and a cut-off for stopping the feed automatically while the rivets are being clinched by the heading mechanism; also, in combining with the automatic feeding mechanism and combined adjustable riveting-block a shoe holder; also, in providing a receptacle or hopper for the feed with discharge openings, and mechanism for forcing the rivets into feeding-tubes shank foremost; also, in providing means at the discharge end or exits of the feeding-tubes to guide the rivet accurately to the work; also, in the detail construction and arrangement of the parts, all as hereinafter more particularly described, and pointed out in the claims.

In specifying our invention reference is had to the accompanying drawings, in which like letters indicate corresponding parts in all the views.

Figure 1 is a side elevation of our improved riveting-machine, illustrating the general construction and arrangement of the parts. Fig. 2 is a front elevation from the top of the frame of the machine upward, illustrating the same in front elevation, showing the inserting device and the combined shoe-holder and riveting-block disengaged or in their normal position before the rivets are forced into the arctic. Fig. 3 is a like view showing the punches for inserting the rivets and the riveting-block and combined shoe-holder raised in the position of forcing the rivets home into the arctic. Fig. 4 is a top plan illustrating more particularly the mechanism for operating the feeding hopper or receptacle and the lever for operating the plunger carrying the forcing-punches and the spring for retracting the same. Fig. 5 is a side elevation of the machine similar to Fig. 1, showing, however, the treadle forced down and the riveting-punches and riveting-block up in the position for forcing the rivets into the arctic. Fig. 6 is an enlarged detached front view of the toggle-levers and plunger for operating the combined riveting-block and shoe-holder. Fig. 7 is an enlarged detached plan view of the interior of the feeding receptacle or hopper. Fig. 8 is an enlarged detached view of the feed receptacle or hopper, a portion of the outer shell being broken away to illustrate the brushes for feeding the rivets into the slots which open into the feed conveying-tubes. Fig. 9 is an enlarged detached view of the slotted guide for the actuating-lever for operating the plunger underneath the combined shoe-holder and riveting-block. Fig. 10 is a section of the feed-receptacle or hopper, illustrating the means for compelling the rivets to drop into the feed conveying-tubes shank foremost. Fig. 11 is a transverse section taken through the discharge-passage or slot in the bottom of the feed-receptacle or hopper, showing the contour thereof in cross-section. Fig. 12 is an enlarged detached view of the feed-conveying tubes at their lower ends where they join with the exits or discharge-valves through which the rivets are forced into the arctic by the punches, and it also illustrates the mechanism for automatically feeding the rivets one by one from the feed conveying-tubes and the general construction and arrangement of the parts in their connection with the frame of the machine. Fig. 13 is an inverted bottom plan of the discharge-valves and feed conveying-tubes and accessories, showing in their arrangement how the rivets

are distributed circumferentially on the toe or heel of an arctic or overshoe and inserted in one operation. Fig. 14 shows, respectively, an edge and side view of the cut-off mechanism for opening and closing the adjustable valves which are located at the exit of the feed conveying-tubes. Fig. 15 is an enlarged detached detail of the punches and discharge-valves, illustrating more particularly the construction and arrangement of the parts in relation to each other, and for this purpose the support for the ends of the discharge-valves is broken away in the figure. Fig. 16 is a transverse section of one of the discharge-valves, showing how the punch forces the rivet through the valve, and also the supporting-guide for regulating the tension of the spring discharge-valve on the rivet to guide it accurately into the overshoe. The detached view underneath Fig. 16, forming a part thereof, shows an enlarged end view of the discharge-valve. Fig. 17 is a detached view, enlarged, of the guides for the punches and which support the spring discharge-valves at the ends of the feed conveying-tubes, and also the pivoted guides for embracing the two sides of the spring-valves to accurately guide the rivet as it is forced down into the arctic. Fig. 18 is an enlarged detached view of the cut-off mechanism in the feed conveying-tubes for regulating the feed to the spring discharge-valves. Fig. 19 is a detached detail of a modification, showing a single-feed conveying-tube machine for inserting rivets in the stay of an arctic or overshoe, and Fig. 20 shows the arrangement of the pivoted guide upon its support whereby the guide is swung off at the right time as the punch descends and forces the rivet into the arctic or overshoe.

A represents the feed receptacle or hopper, and the same is made preferably circular in shape and of sufficient capacity to hold a large number of rivets. The hopper is provided with a hole, 1, for the shaft 2, and the shaft 2 carries the frame 4, from which depend brushes 3, which oscillate on the shaft 2 as a pivot and serve to feed the rivets to the discharge openings or passages 5. The bottom of the hopper or receptacle A is conical in form, as best shown in Fig. 8, and the openings 5 are of the contour in cross-section shown in Fig. 11, and have an enlargement, 6, at their lower extremity, over which we place the plate 7. The said passage or opening comes over feed conveying-tubes B, in which, in close proximity to the upper extremity thereof, as shown in Fig. 10, we place a screw, 8, which serves, in connection with the plate 7, to compel the rivets to fall shank foremost into the feed conveying-tubes B.

It will be observed upon referring to Figs. 7, 8, and 10 of the drawings that the plate 7 is placed over the enlargement 6 of the discharge-openings in the hopper, and that the rivets as they are brushed into the openings pass under the plate into the enlargement and thence into the feed-tubes B. If the rivets enter the openings shank uppermost the shank collides with the edge of the plate and the rivet falls either sidewise or shank foremost into the feed-tubes B. Should it fall sidewise into the feed conveying-tubes it strikes against the screw 8, which is placed near the upper extremity of the tubes B for this purpose, and the contact of the rivet with the screw 8 turns it shank foremost, and in this position it passes through the tube to the exit. The screw 8 is beveled flatwise to a point, as best shown in the sectional view Fig 10, and the collision of the rivet with the screw compels it to fall in the desired position—*i. e.*, shank foremost—thus securing the desired result.

The frames 4, carrying the brushes 3 on the spindle 2, are provided with a solid wing upon one side, which takes the place of one brush and serves to crowd the rivets to and fro, while the brushes serve to sweep them into the discharge-passages.

The feed conveying-tubes B are connected to the discharge-passages 5, as best shown in Figs. 1, 2, 3, and 5, and at their lower extremity they are connected to the semicircular support *a*, as best shown in Figs. 12 and 13, where their lower ends are provided with cut-off mechanism, and the feed-tubes discharge into the spring discharge-valves *b*, secured to the supports *p p*, connected to the support *a'*, which is secured to the upright portion D' of the bracket D.

C C', Figs. 1, 2, and 3, is the combined shoe-holder and riveting-block, and the same is located under the spring discharge-valves *b* on the main frame F of the machine, immediately in front of the bracket D.

The combined shoe-holder and riveting-block C is constructed and arranged to support the shoe or arctic adjustably underneath the rivet-forcing punches, and is operated, by mechanism hereinafter described, to raise the overshoe to the rivet-forcing punches and to head the same; but the detail construction and arrangement of the parts of the combined shoe-holder and riveting-block form the subject-matter of another application to Jacob J. Unbehend for United States Letters Patent, and marked "B," of even date herewith. Hence it is not necessary to describe in this application such detail construction and arrangement; but its operation in connection with our present invention will be presently explained.

D is the curved bracket, mounted on the main frame F, provided with a vertical extension, D', and the same in connection with the vertical extension serves to support the feed-hopper or receptacle and the feed conveying and distributing mechanism, together with the punches for forcing the rivets into the overshoes and their actuating mechanism.

E is the treadle for actuating the various levers, which serve to operate the feed and force the rivets into the arctics or overshoes.

F is the main frame upon which all of the mechanism is supported.

G is the lever which serves to operate the

plunger carrying the punches for forcing the rivets into the shoes, and also the device in the feed-hopper for feeding out the rivets. It accomplishes this through the medium of the toggle-lever g', the lever G being pivoted at g in the lugs provided at the upper extremity of the upright D′ and pivoted to the toggle g', which is connected to the plunger J, carrying the head J′, upon which are mounted the punches *c*. The lever G is retracted to its normal position by means of the yoke or bale-shaped spring N. (Best shown in the top plan view, Fig. 4.)

The brushes in the feed-receptacle A are actuated when the lever G is depressed by the shaft 2, being connected to the lever G through the medium of the slotted lever 9, provided with a slot, 10, which is pinned to the lever *n*, and the lever *n* is pivoted at *n′* to the lever K, which has a slot, *k*, in which the pin *f*, connected to the lever G, rides vertically as the lever G is depressed.

The lever K is pinned at *k′* to the bracket D, and as the lever G is depressed the lever K is oscillated on the pivot *k′*, which in turn oscillates the levers 9 through the connection of the lever *n* with the lever K, and this movement oscillates the shaft 2, carrying with it the frame 4 and the dependent brushes.

The lever G is connected to the treadle E by means of the connection *h* and the slotted guide H. The combined holder and riveting-block C C′ is operated to raise or lower by means of the toggle levers I *i i′*. The toggle-levers *i i′* are pivoted in the yoke I′, which is best shown in the detached view Fig. 6. The yoke I′ is secured beneath the frame F, as best shown in Figs. 1 and 5, directly underneath the combined shoe-holder and riveting-block, and the toggle-levers *i′* across the plunger P, which extends up into the riveting-block and serves to force up the riveting-block in the riveting operation, which will be presently explained.

The lever-arm I of the toggle-lever sets loosely in the slot *h′* of the guide H, as best shown in Fig. 9. The said slot *h′* is of sufficient length to allow the lever G to be depressed to the right point when the rivet is forced into the arctic. When the lever-arm I collides with the upper end of the slot *h′* said arm is carried down with it, straightening the toggles *i i′* and forcing up the plunger P, and with it the riveting-block C, by means of which the rivets are headed or clinched in the arctic or overshoe.

The slotted guide H is secured to the treadle E at h^3 by the connection h^2, and the lever-arm I is retracted to its normal position by means of the spiral S′, and the treadle E is retracted to its normal position by means of the spiral S, and the combined riveting-block and shoe-holder is retracted to its normal position by means of the spiral *s′*, Figs. 2 and 3.

It will be observed that the front leg, L, of the machine is broken away for the purpose of illustrating the yoke.

The lower or discharge ends of the feed conveying-tubes B are arranged in the arc of a circle, and secured on the semicircular bracket-piece *a*, as best shown in Figs. 12 and 13, and their exits come immediately over the spring discharge-valves *b*, there being a spring discharge-valve *b* for each tube, B, and the exit ends of the tubes are so arranged in relation to the spring-valves *b* as to feed the rivets from the hopper into the spring discharge-valve by means of the cut-off mechanism, as previously stated, which cut-off mechanism will be presently explained. The spring discharge-valves are located below the exit ends of the feed-tubes B, and are secured to the sockets *p′* of the dependent arms *p*, which are secured at a^2 to the upright portion D′ of the bracket D.

The spring discharge-valves *b* are made of one piece of spring metal and are bifurcated, the opening extending up far enough to permit the metal arms to spread or spring sufficiently apart to allow the discharge of the rivets, and the discharge end is provided with the enlargements *r r*, Fig. 16, which reduce the size of the exit end or discharge, and serve, in connection with the forked yoke O, to guide the rivet accurately in inserting it into the arctic or overshoe.

The spring discharge-valve *b* has the slots *b′ b′* upon one side, as best shown in Fig. 12, and the exit end of the feed conveying-tubes B discharge into the slot, thus allowing the rivets to enter the discharge-valves *b*. The feeding-tubes B are provided immediately above the exit end *b* with a cut-off valve and mechanism, (best shown in the enlarged detached views, Fig. 14,) in which *e* is the eccentric lever pivoted at e^2 on the side of the feed-tube, and provided with the wing extensions *e′*, which takes in the bore of the tube, and a spring mounted on the pivot-screw e^2 to retract the cut off after the eccentric end *e* has been depressed. The cut-off mechanism is automatically operated to let out one rivet at a time into the spring discharge-valves *b* by means of the fingers *d*, attached to the supporting-piece *a′*, carried on the plunger head J′ of the plunger J, and the cut-off mechanism is timed by the travel of the punches *c c*, which are attached to the head J′ of the plunger J, as best shown at Figs. 15 and 17.

The punches *c c* are cylindrical in form, and are located so as to enter the spring discharge-valves *b*, and are of sufficient length to force the rivets through the discharge-valves and into the arctic or overshoe held on the riveting-block C.

When the treadle E is depressed the toggle-levers *g g′* are actuated by the lever-arm G to force downward the plunger J, carrying with it the head J′ and the punches *c c* attached thereto. In this downward movement the support *a′*, carrying the fingers *d*, causes the fingers *d* to collide with the cut-off mechanism, opening the feed-tubes, and a rivet, which has been fed shank foremost into the tubes from the hopper-receptacle, drops down into

the spring discharge-valve *b* as the punches *c c* rise above the slots *b'*, and the cut-offs *e* immediately close the passage in B, leaving the rivets held in the spring discharge-valves ready to be inserted in the arctic by the descending punches when the treadle is again depressed.

In order to guide the rivet accurately in its downward passage from the spring discharge-valve, we provide the pivoted forked yoke O, having the arms *o-o*, which embrace two sides of the spring discharge-valves *b*, as best shown in Fig. 17, and the yoke O is provided with the arm O', pivoted at *o'*, and having the eccentric or angular lever *v'*, as best shown in Fig. 20.

It will be observed that the angular lever *v'* is substantially at right angles with the arm O' of the pivoted yoke, and that it lies substantially on the line drawn through the pivot *o'* thereof and in the path of the lower edge, *v*, of the head J' of the plunger J when the same descends as the treadle E is depressed.

The object of pivoting the forked yoke O in the manner described, and providing the same with the angular lever *v'*, is to so arrange the pivoted yoke as to throw it out of engagement with the discharge-valve at the right instant to allow the passage of the rivet from the discharge-valve, and this is accomplished by the lower edge, *v*, of the plunger head J' colliding in its descent with the lever *v'* of the pivoted yoke O, which, owing to its relative position with the pivot *o'*, throws the yoke O out of engagement with the spring discharge-valve *b* instantly, and permits the discharge of the rivet from the spring discharge-valve, as stated.

It will be observed that the exit ends of the feed are arranged on the circumference of a circle described through the center of the riveting-block as a center, and the object of so arranging and locating the discharge ends of the spring-valves and feed conveying tubes B is to arrange and distribute the rivets circumferentially on the heel or toe portion of the sole of the arctic or like overshoe, it being borne in mind that the purpose of the invention is to provide an efficient machine which will simultaneously insert all of the rivets which are necessary to insert in the heel or toe of the arctic or overshoe in one operation. It will be apparent that the object can be accomplished by so arranging the mechanism as stated, since if, as illustrated in the example, it is desired to insert four rivets at once, the discharge ends are arranged circumferentially, as shown in Fig. 13, and the necessary fingers *d d* provided to actuate the cut-off valves *e e*, and a like number of punches being employed, it is obvious that the four rivets will be fed downward simultaneously in the spring discharge-valve, and from thence forced into the heel or toe of the arctic or overshoe supported on the combined holder and riveting-block C in one and the same operation.

If it is desired to insert but one rivet into an arctic or overshoe—as, for example, to rivet the stay of an arctic or overshoe—then but one feeding-tube B is necessary, and in this case a single set of the described mechanism can be employed, and at Fig. 19 we have illustrated the mechanism thus arranged.

There is but one cut-off mechanism and one spring discharge-valve, and in this form we preferably make the discharge-valve with an auxiliary spring, b^2, Fig. 19, as it holds the rivet with sufficient firmness to direct the same into the stay of the arctic without becoming displaced in the operation.

We do not restrict ourselves to the exact construction and arrangement of the various parts of the mechanism which we have illustrated in this example of our invention, since the same may be changed at will without departing from the principle of our invention.

The operation of our improved riveting-machine will be readily understood from the foregoing and from a consideration of the drawings.

The hopper or feed-receptacle is filled with rivets and the treadle E is depressed a few times until the discharge-valves *b* are filled with rivets, after which the feed is substantially continuous.

If the series of feed conveying-tubes B are employed, as illustrated in our present example of the machine, each feed-tube is connected to the feed-hopper, as described and shown, and each tube is provided with the spring discharge-valve and the cut-off mechanism herein described.

The overshoe or arctic is secured onto the adjustable combined shoe-holder and riveting-block C with the heel resting over the block C and the toe portion setting over the adjustable arm C', which may be adjusted to any length of arctic or overshoe readily. The treadle E, being depressed, straightens the toggles *g g'*, carrying downward the plunger J and the punches *c*, attached to the head J', and the fingers *d*, attached to the support *a'*, collide in their descent with the cut-off mechanism *e*, thereby opening the passage and allowing another set of rivets to fall into the spring discharge-valves simultaneously with the pushing out of those already occupying the discharge-valves, or rather the rivets fall into the discharge-valve proper when the punches *c* are retracted out of the discharge-valves, and the mechanism is ready for another operation.

It will be understood that the punches force down and out of the discharge-valves the rivets already occupying the valves, and when the guide H strikes the lever-arm I the riveting-block C, carrying the shoe and shoe-holder, is raised up, and the rivets which are forced through the heel of the arctic are clinched or headed by the collision of the punches and riveting-block with the rivet between the two, and that the said punches and riveting-block form what we term herein the "heading mechanism" of the machine.

The riveting-block C may carry any suitable

die and plate for spreading or clinching the rivets.

The springs S S′ retract the treadle and lever-arm I, while the bale-spring N retracts the lever-arm G, while the spiral *s′* retracts the riveting-block C to its normal position. All of the parts are compact and strong, and the machine is very effective and rapid in its operation.

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

1. The herein-described riveting-machine, comprising an automatic feed for feeding the rivets to the heading mechanism, mechanism for distributing and arranging the rivets circumferentially on the heel of the arctic or overshoe, and means, substantially as described, for cutting off the feed automatically while the rivets are being clinched by the heading mechanism, all constructed and operating substantially as and for the purpose set forth.

2. The combination, in a riveting-machine for inserting rivets in the heel of an arctic or overshoe, of feeding mechanism for automatically feeding the rivets to the heading mechanism, mechanism for distributing and arranging the rivets circumferentially on the heel of the overshoe, means, substantially as described, for forcing the rivets into the heel, and a combined adjustable riveting-block and shoe-holder, substantially as and for the purpose set forth.

3. The combination, in an automatic riveting-machine, of a receptacle or hopper for the rivets, having passages or discharge-openings enlarged at their lower ends for the exit of the rivets from the hopper, means, substantially as described, for forcing the rivets to and into the discharge-openings, and means, substantially as described, for compelling the rivets to enter the feeding-tubes shank foremost, substantially as and for the purpose set forth.

4. The combination, in an automatic riveting-machine, of a receptacle or hopper for the rivets, brushes, and a solid wing, all depending from an oscillating frame in the hopper, oscillating overopenings in the bottom of the hopper, said openings being enlarged at one end and covered with a plate for feeding the rivets shank foremost into the feeding-tube, a feeding-tube connected to the receptacle for conveying the rivets to the heading mechanism, and a cut-off in the exit end of the tube, operated by the descent of the rivet-forcing punch, and a rivet-forcing punch for discharging the rivets one at a time and forcing the same into the overshoe, substantially as and for the purpose set forth.

5. In a riveting-machine, an automatic feed for feeding the rivets to the heading mechanism, mechanism for distributing the rivets circumferentially on the toe or heel of the arctic or overshoe, means, substantially as described, for cutting off the feed automatically while the rivets are being clinched by the heading mechanism, and means, substantially as described, for guiding the rivets to enter the washer-plate when forced into the sole or heel of the overshoe, substantially as and for the purpose set forth.

6. The combination of an automatic feeding receptacle or hopper having a conical bottom provided with openings enlarged at their lower ends, said enlargement being covered by a plate, depending oscillating brushes, and a solid wing or sweep oscillating on the bottom of said hopper for feeding the rivets shank foremost into the conveying feed-tubes, a series of conveying feed-tubes connected to the receptacle, and having their exit or discharge ends arranged in the arc of a circle to distribute the rivets circumferentially on the heel or toe of an overshoe, substantially as described.

7. The combination, with an automatic feed receptacle or hopper for feeding the rivets shank foremost into conveying feed-tubes, of a series of conveying feed-tubes connected to the hopper, and a series of punches or plungers, the feed-tubes having their exit or discharge ends arranged in the arc of a circle to distribute the rivets circumferentially on the heel or toe of an overshoe, and the punches or plungers arranged to pass through the discharge ends of the tubes and force the rivets into the heel or toe of the overshoe, substantially as and for the purpose set forth.

8. The combination of a feed-receptacle having in the bottom thereof an elongated opening enlarged at one end, the enlargement being covered by a plate, a feed-tube connected to the opening to receive the rivets, and a screw in the upper end of the tube to turn the rivets shank foremost, substantially as and for the purpose set forth.

9. The combination, with the spring discharge-valve, of a pivoted guide embracing the spring gate or valve, and a punch or plunger for operating to remove the guide as the rivet is forced out of the spring-gate by the plunger in its descent, substantially as and for the purpose set forth.

10. The combination, with the spring gate or exit at the discharge end of the feed conveying-tube, of a guide embracing the said gate to hold the rivet against lateral displacement as it is fed to and forced into the overshoe, substantially as and for the purpose set forth.

11. The receptacle A, having conical bottom 11, discharge-openings 5, with enlargement 6 and plate 7, in combination with the oscillating brushes 3 and conveying-tubes B, substantially as and for the purpose specified.

12. The receptacle A, having discharge-openings 5, plate 7, and screw 8, extended into the path of the rivets as they drop into the conveying-tubes B, in combination with the conveying-tubes B, substantially as and for the purpose set forth.

13. The combination of the receptacle A, having conical bottom 11, openings 5, feed conveying-tubes B, with spindle 2, brushes 3, lever 9, having slot 10, lever *n*, pivoted at *n′* to lever K, and slotted lever K, pivoted to the

bracket D and actuated by the lever G, substantially as and for the purpose set forth.

14. The combination, with the plunger J, carrying the punches *c*, of the toggles *g g'*, lever G, guide H, and the toggles *i i'*, lever I, treadle E, and the connecting-rod *h*, substantially as and for the purpose set forth.

15. The combination of the punches *c* and the combined riveting-block and shoe-holder C C', and means, substantially as described, for returning them to their normal position after the rivets are inserted in an overshoe, substantially as and for the purpose set forth.

16. The spring discharge-valves *b*, made in one piece of spring metal, bifurcated to form spring-arms, elongated and provided with lips *r r* near their exits and secured to the depending arms *p*, substantially as and for the purpose set forth.

17. The spring discharge-valves *b*, made in one piece of spring metal bifurcated to form spring-arms, and having the opening *b'*, substantially as and for the purpose set forth.

18. The combination of the spring discharge-valves *b*, having slot or opening *b'*, with the discharge end of the feed conveying-tube B, having cut-off *e*, substantially as and for the purpose set forth.

19. The combination of the discharge-valves *b*, feed-tubes B, having cut-offs *e*, and the fingers *d*, substantially as and for the purpose set forth.

20. The combination of the fingers *d d*, secured on the support *a'*, carried on the plunger-head J', and the cut-offs *e* in feed conveying-tubes B, supported on the arc-shaped bracket *a*, substantially as and for the purpose set forth.

21. The plunger-head J', having a series of punches, *c c c*, arranged in the arc of a circle thereon and depending therefrom, in combination with a like series of spring discharge-valves, *b*, arranged in the arc of a circle underneath the punches, and a pivoted forked yoke, O, having arms *o o o*, embracing the sides of the spring discharge-valves, substantially as and for the purpose set forth.

22. The combination of the punch *c*, carried on the plunger-head J', with the spring-valve *b* and the forked yoke O, embracing the sides of the valve *b* and pivoted to a support, *a'*, secured to the frame of the machine, the said yoke having the eccentric lever *v'* lying in the path of the edge *v* of the plunger-head J' in its descent, substantially as and for the purpose set forth.

23. The combination of the plunger-head J', punch *c*, spring-valve *b*, and yoke O, substantially as and for the purpose set forth.

In testimony whereof we have hereunto signed our names, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 18th day of December, 1886.

JUDSON L. THOMSON.
JACOB J. UNBEHEND.

Witnesses:
FREDERICK H. GIBBS,
E. C. CANNON.