

(No Model.)

3 Sheets—Sheet 1.

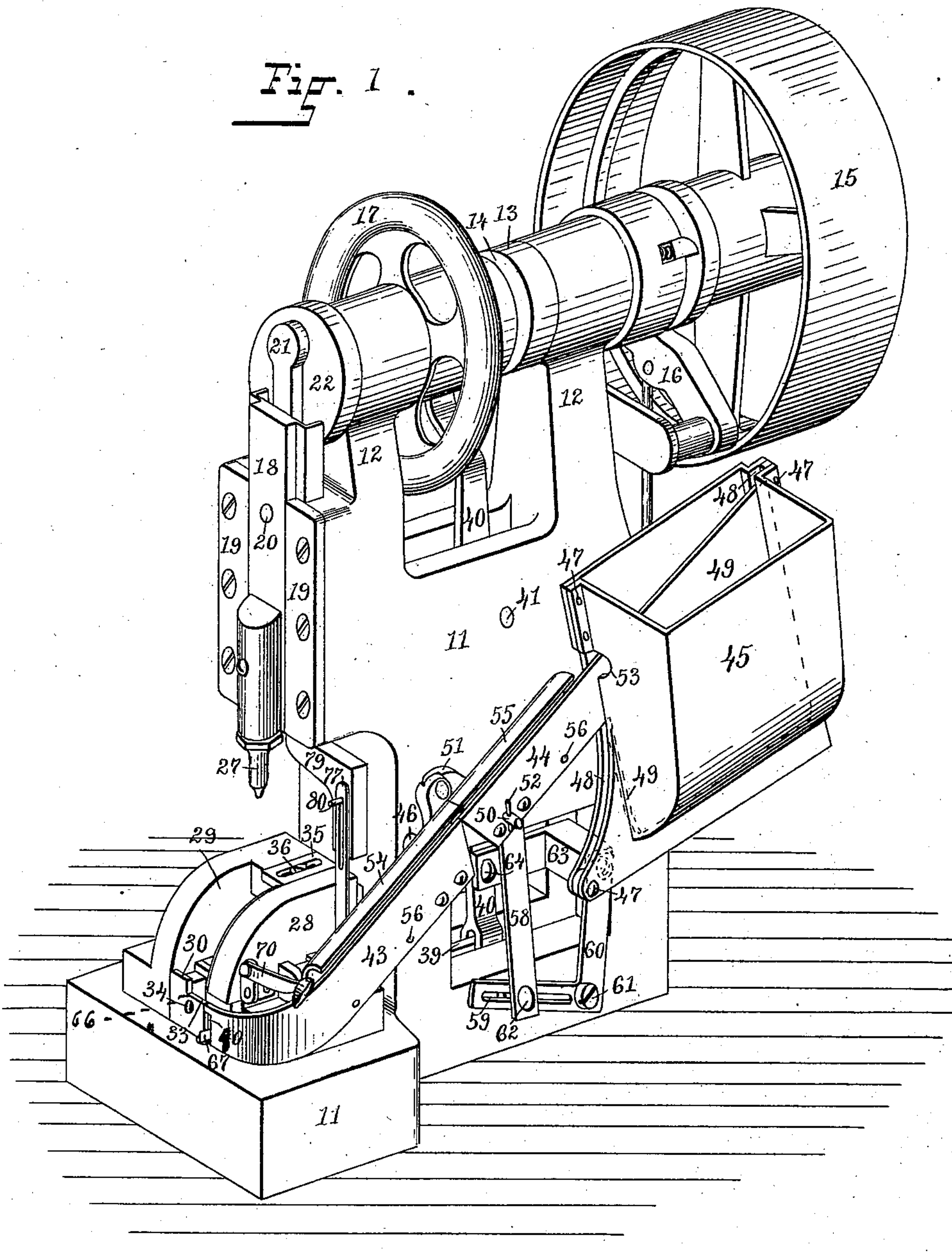
W. HALKYARD.

MACHINE FOR SETTING LACING HOOKS.

No. 364,014.

Patented May 31, 1887.

Fig. 1.



WITNESSES:

Chas. H. Luther Jr.  
Willis Fowler.

INVENTOR:

William Halkyard  
by Joseph A. Miller & Co  
Attys

(No Model.)

3 Sheets—Sheet 2.

W. HALKYARD.

MACHINE FOR SETTING LACING HOOKS.

No. 364,014.

Patented May 31, 1887.

Fig. 3.

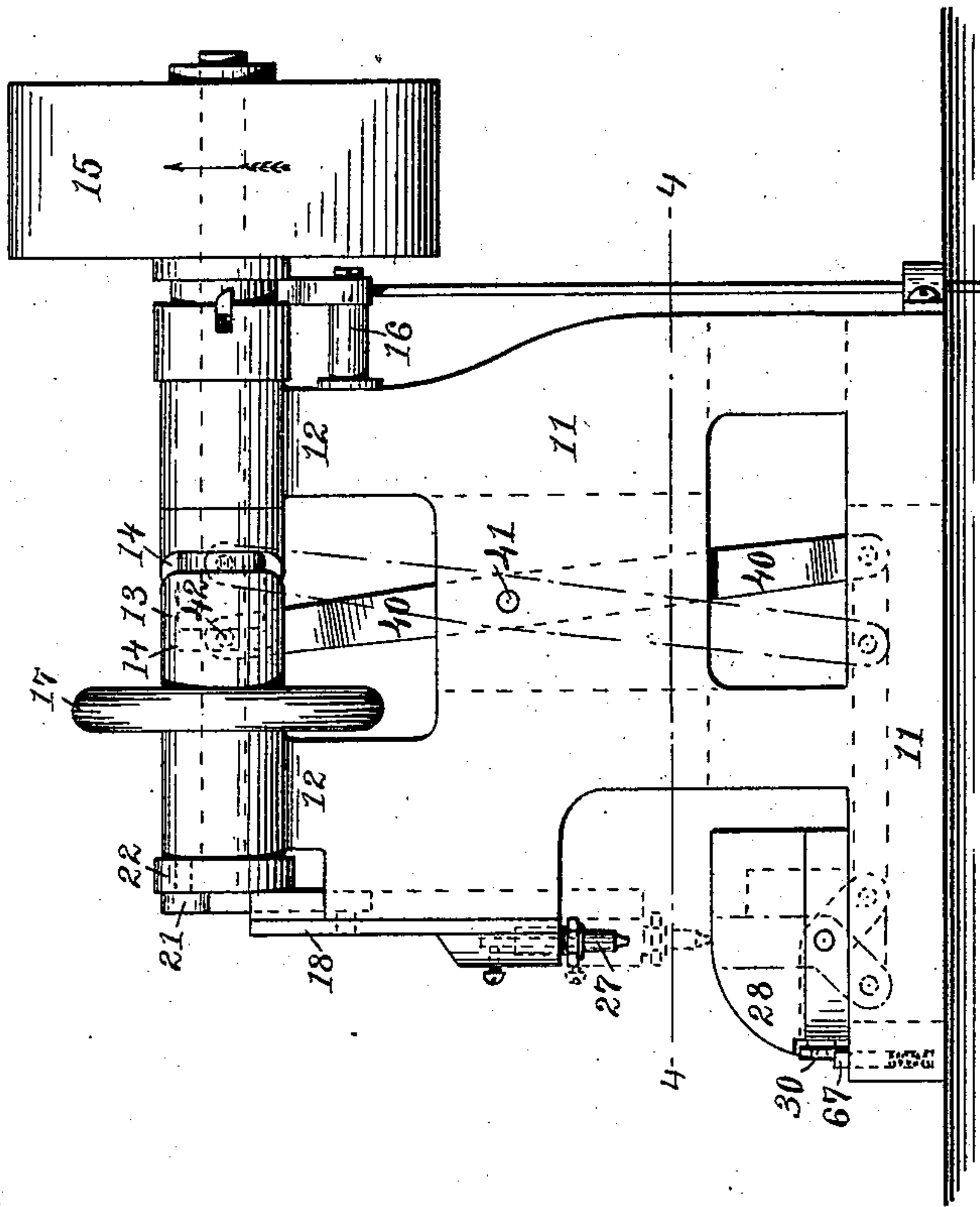
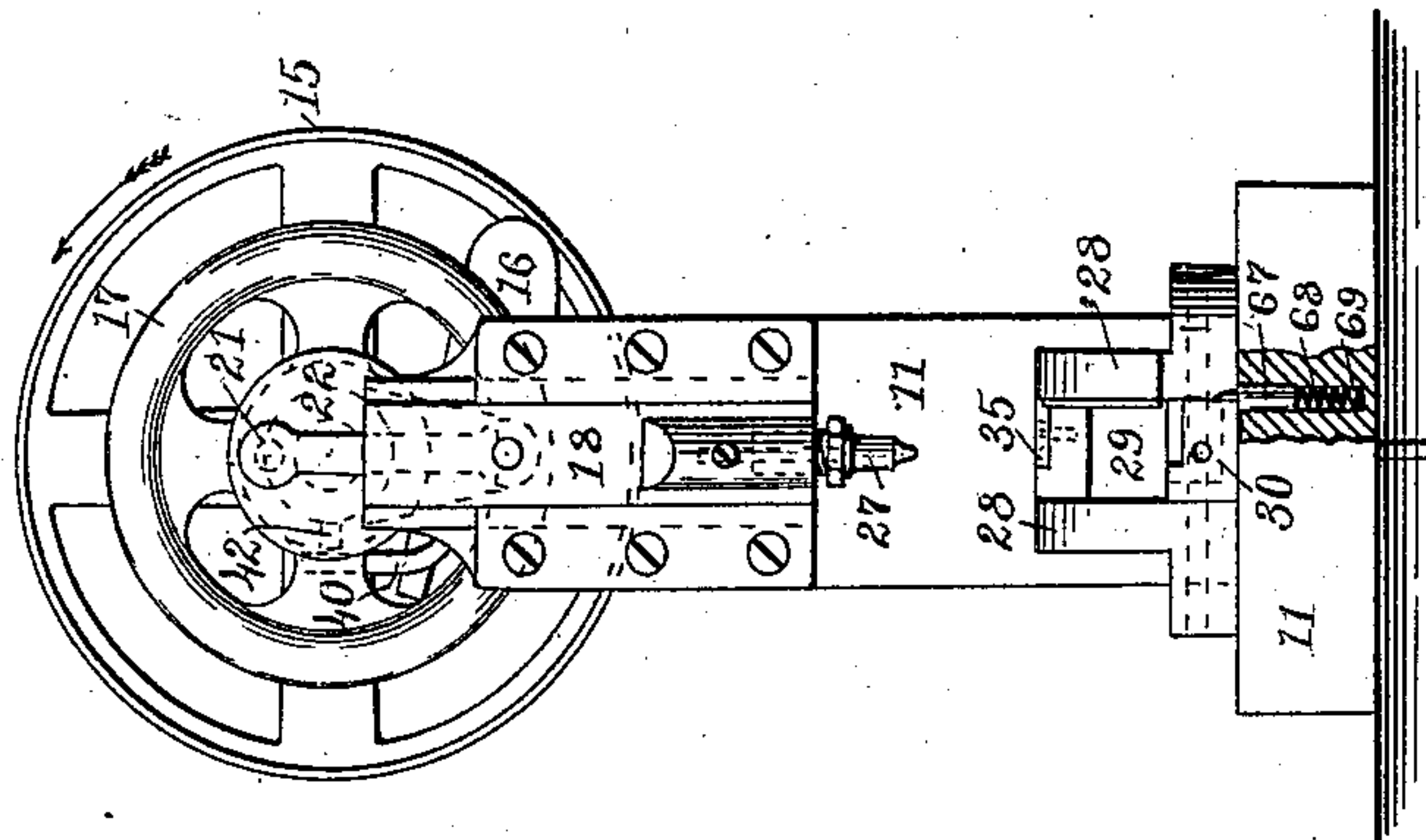


Fig. 2.



WITNESSES:

Chas. H. Luther Jr.  
Willis Fowler.

INVENTOR:

William Halkyard  
by Joseph A. Miller, Esq.  
Att'y

(No Model.)

3 Sheets—Sheet 3.

W. HALKYARD.

MACHINE FOR SETTING LACING HOOKS.

No. 364,014.

Patented May 31, 1887.

Fig. 4.

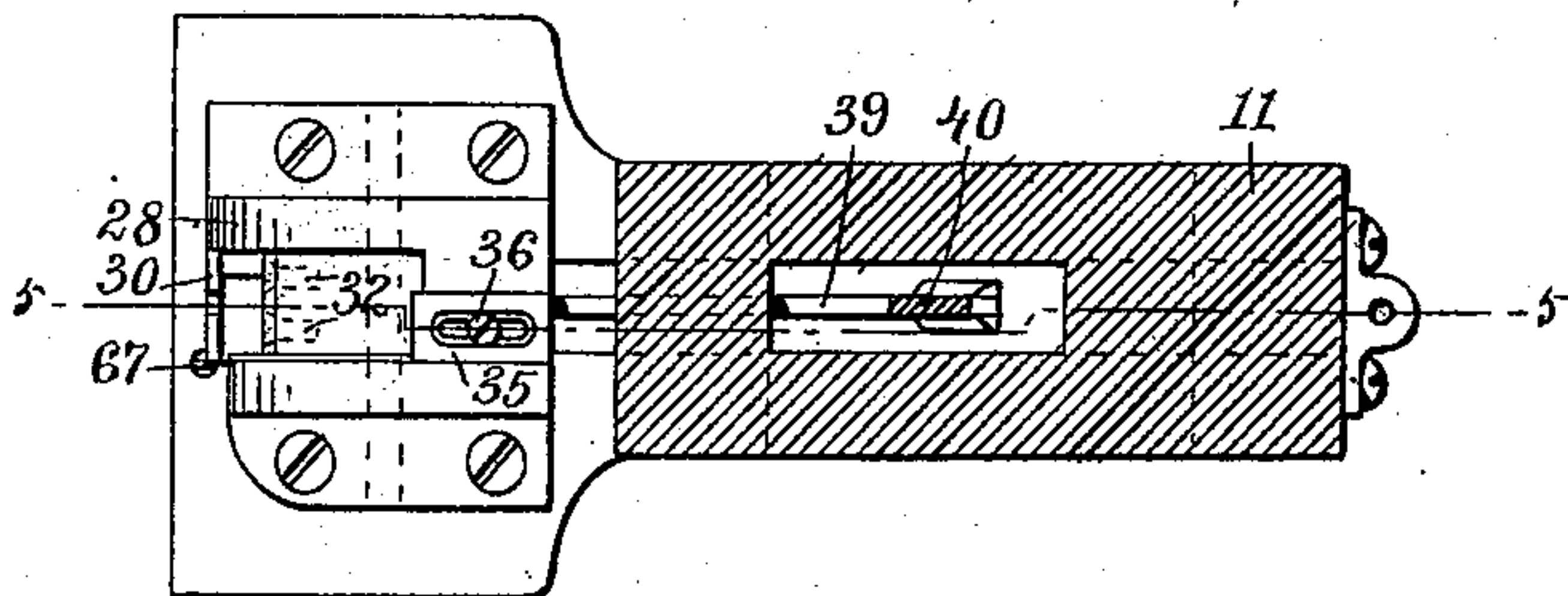


Fig. 5.

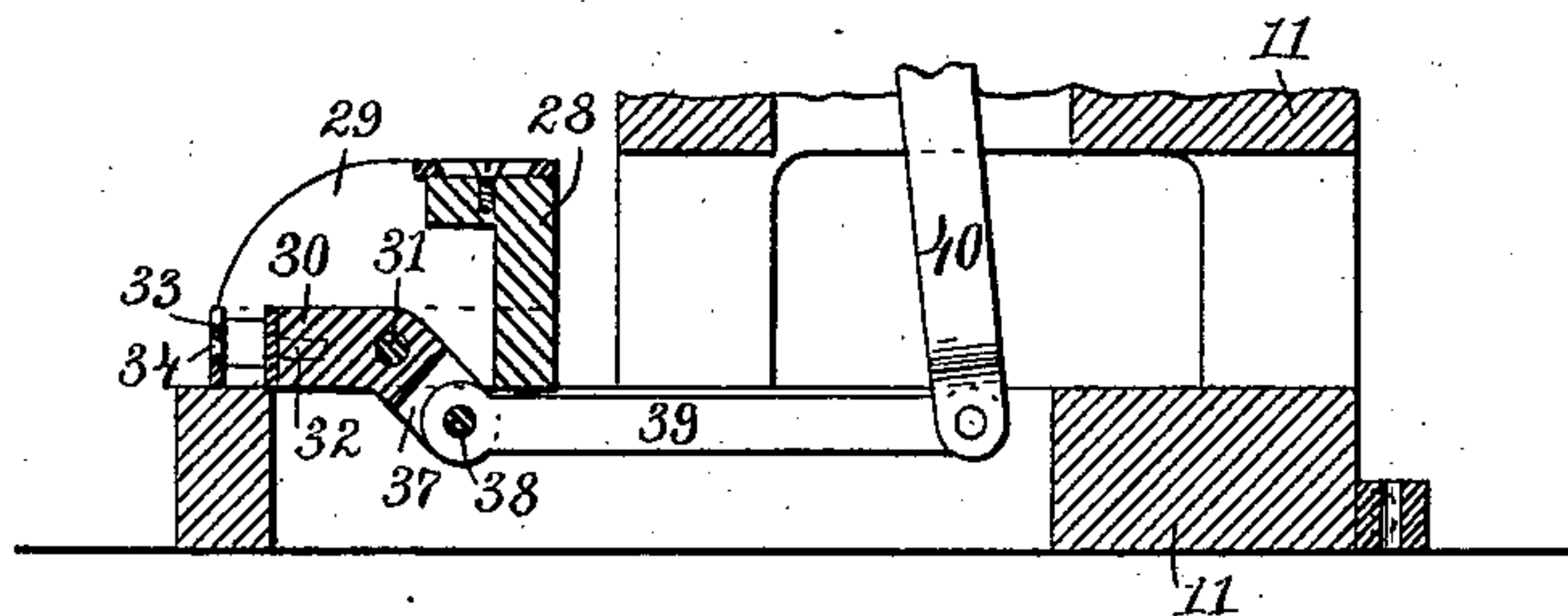


Fig. 6.

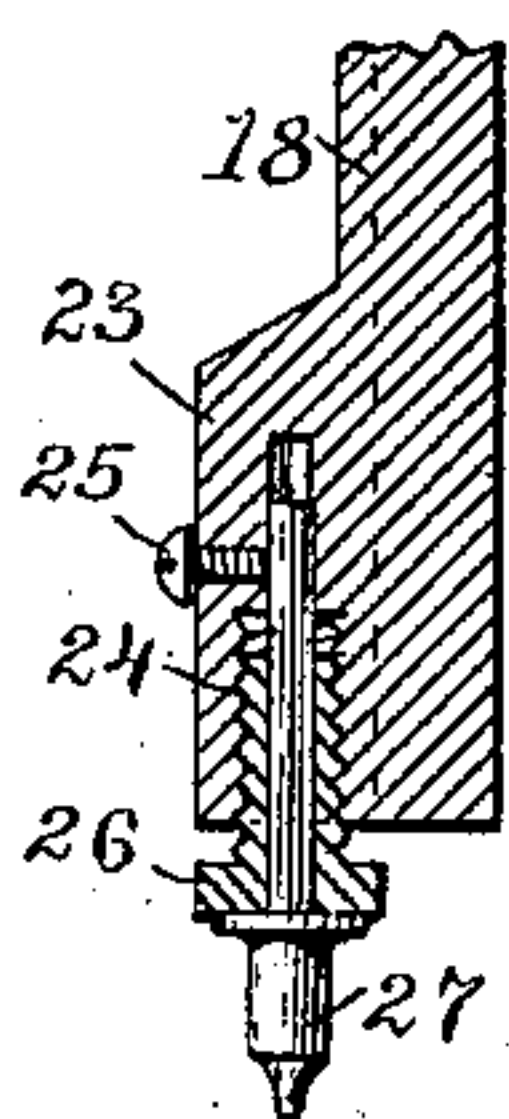


Fig. 7.

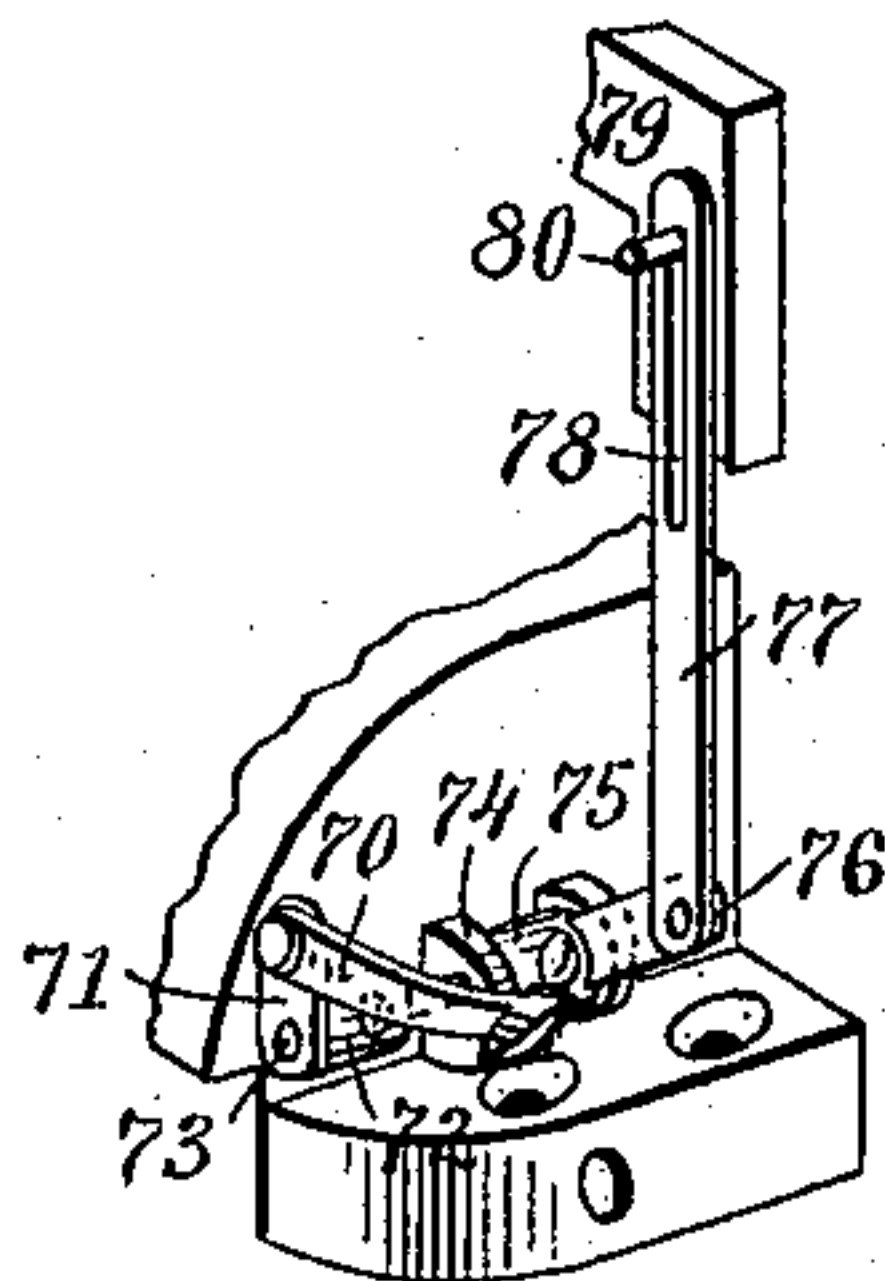


Fig. 8.

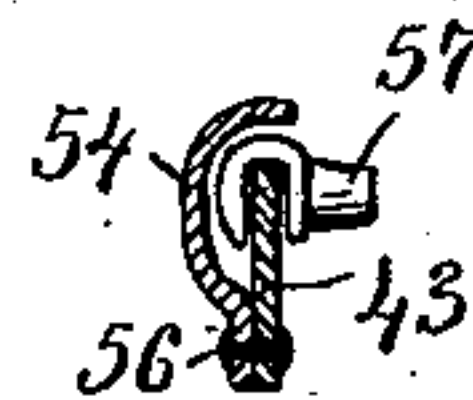
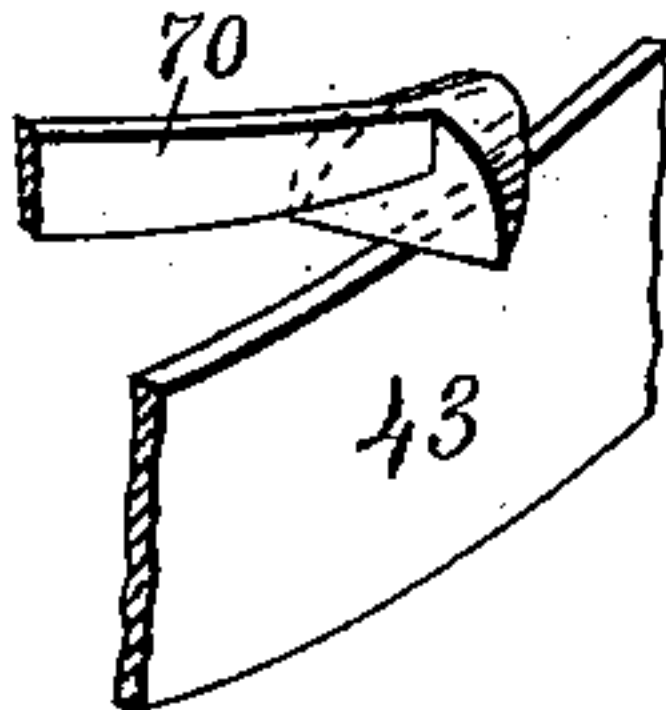


Fig. 9.



WITNESSES:

Chas. H. Luther Jr.  
Willie Fowler.

INVENTOR:

William Halkyard  
by Joseph A. Miller & Co.  
Attorneys



# UNITED STATES PATENT OFFICE.

WILLIAM HALKYARD, OF PROVIDENCE, RHODE ISLAND.

## MACHINE FOR SETTING LACING-HOOKS.

SPECIFICATION forming part of Letters Patent No. 364,014, dated May 31, 1887.

Application filed December 8, 1886. Serial No. 220,953. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HALKYARD, of the city and county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Lacing-Hook-Fastening Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This invention relates to a machine for setting or fastening ordinary metallic lacing-hooks upon leather or any material.

One object of my invention is to construct a movable or rocking pivoted anvil, which will be automatic in its operations of taking a lacing-hook from the feed-track and carrying the hook in adjusted position to the punch, and when the punch has driven the hook into secure position on the leather the anvil will recede from the hook without necessitating the same to be moved, and will return to the feed-track for another hook.

Another object of my invention is to provide a gravity feed-track having a vibrating section and adapted to feed onto the anvil; and, further, to provide a reciprocating stop near the track and a reciprocating feed-finger engaging the feed-track.

Another object of my invention is to periodically operate the feed-finger by means of mechanism connected to the reciprocating punch-carriage.

Another object of my invention is to construct the reciprocating punch-carriage, the oscillating anvil, the reciprocating stop and the reciprocating feed-finger, the vibrating section of the feed-track, so that all of said parts of the apparatus may automatically perform their several functions by the rotation of the main shaft of the machine.

To the above purposes my invention consists in certain combinations, set forth in the claims at the end of this specification, and which are composed of several mechanisms, of which the following are the principal: a pivoted oscillating or rocking anvil, a carrier-flange upon the head of the anvil, a socket or perforation in the carrier-flange, means for oscillating the anvil, a reciprocating stop actuated by the oscillating anvil, a feed-track constructed of a fixed section and a hinged section adapted to vibrate within the hopper and

each section provided with a guard, a reciprocating punch-carriage, a reciprocating feed-finger and mechanism for operating the finger and connected with the punch-carriage, the driving-shaft and the means intermediate of said shaft and the punch-carriage, the anvil, and the hinged section of feed-track.

In order that my invention may be fully understood, I have illustrated by the accompanying drawings, and will proceed to describe, the best form thereof so far devised by me, which form of construction may be variously modified in detail.

In the accompanying drawings, illustrating my invention, Figure 1 represents an enlarged view in isometric perspective of my improved lacing-hook-fastening machine. Fig. 2 represents a front view of my improved machine, partly broken away to show the spring-stop set in the machine-frame, and having the feed-track, the hopper, and the reciprocating feed-finger and its actuating mechanism omitted. Fig. 3 represents a side view of Fig. 2. Fig. 4 represents a horizontal sectional view taken on line 4 4 in Fig. 3. Fig. 5 represents a vertical sectional view of the lower portion of the machine, taken on line 5 5 in Fig. 4. Fig. 6 represents a vertical central sectional view of the lower end of the punch-carriage and the stock, with a punch secured therein. Fig. 7 represents a detached perspective view of portions of the work-table and the arm secured upon the punch-carriage, together with the reciprocating feed-finger and the intermediate mechanism between said finger and arm; also, a portion of the machine-frame is here shown. Fig. 8 represents a transverse sectional view of the feed-track and guard therefor, and shows a lacing-hook as traveling on the track. Fig. 9 represents an enlarged perspective view of a portion of the feed-track and a portion of the feed-finger engaging said track.

In the said drawings like numbers of reference designate corresponding parts throughout.

Referring to the drawings, the machine-frame 11 consists in the main of a single casting hollowed out in the center and formed with the two upright standards 12, which are constructed with journal-sockets, in which sockets is journaled the driving-shaft 13, hav-



ing the peculiarly-formed cam-groove 14 formed therearound. Upon one end of the shaft 13 is a loose band-pulley, 15, for running the machine by steam-power, if desired, and this band-pulley is made fast upon the shaft by means of the ordinary form of clutch, 16. The hand-wheel 17 is keyed on the shaft and is manipulated by the operator to drive the shaft.

In a recess at the front of the machine frame slides the punch-carriage 18, which has two of its long edges rabbeted and is hollowed out upon the back for about half of its length. The carriage 18 is set in position by means of the plates 19, secured to either side thereof to the outside of the frame by means of screws. Near the center of the hollow back of the carriage is connected by means of the pivot 20 the pitman 21, which is attached at the upper end by a pivot to the wrist-plate 22, which is secured to the end of the shaft 13. Upon the lower end of the carriage is the punch-stock 23, which is formed with the socket 24, constructed of two different diameters, of which the outer portion is the larger and is internally screw-threaded, and the inner portion is smaller and is provided with the set-screw 25, let into the side thereof. The sleeve 26 carries the punch 27 and is externally screw-threaded and set into the socket 24, as shown in Fig. 6. The turning of the wrist-plate 22 by the shaft 13 will reciprocate the punch-carriage and punch vertically in an obvious manner.

At the front of the machine-frame 11, and upon an extension thereof, is arranged the work-table 28, consisting of a block having a curved face formed with a large recess, 29, in which the anvil 30 is pivoted by means of the pivot 31, fixed in the table across the recess. The anvil 30 is formed with a separate upper end, which is secured to the body thereof by means of the screws 32, and the head portion or working-face is formed with the carrier-flange 33, provided with a transverse perforation or socket, 34. The anvil is adapted to oscillate from a horizontal position into the vertical and return. In order to regulate the upper limit of oscillation, I provide the upper face of the work-table 28 with the adjusting-block 35, which is slotted and has a set-screw, 36, taking into the table through the slot. This block is adjustable on its length to limit the throw of the anvil, so as to bring the tubular part of the hook into axial alignment with the punch.

In order to oscillate the anvil indirectly by the shaft 13, I provide the following means: The lower part of the anvil is bent and is formed with a slit, 37, across which is fixed the pin 38, as shown in Fig. 5. To the pin 38 is hinged the parallel rod 39, which in turn is hinged to the rock-bar 40, arranged within the hollow interior of the machine-frame and vibrating on the axle 41, fixed across the frame. The upper end of rock-bar 40 is slightly curved

around the shaft 13, and is provided with the fixed cam-stud 42, which is kept in constant engagement with the cam-groove 14. By virtue of this construction the rotation of the shaft will also rock the rock-bar 40 on its axle and will reciprocate the parallel rod and oscillate the anvil on its pivot.

The anvil is kept constantly supplied with lacing-hooks by means of the gravity feed-track 43 44, which leads from the hopper 45 to the side of the anvil. The feed-track comprises a lower fixed section, 43, which is a band curved at the lower end and inclined up the side of the machine-frame, to which it is securely fixed at the upper end by the bar 46. The extreme lower end section, 43, is made of the same dimensions as the carrier flange 33 on the head of the anvil, and is placed so that said carrier comes into perfect alignment therewith at the lower limit of oscillation, whereby a hook may be slid from the track onto the carrier-flange.

The hopper 45 may be secured to the side of frame 11 in any suitable manner, and is composed of two portions secured together by means of rivets 47, and these portions are so spaced from each other as to form a vertical guideway or slit, 48, in the three sides of the hopper. The section 44 of the track is flat in part, like the section 43, and the part lying within the hopper and working in the guideway thereof is enlarged into a plate, 49. (Shown dotted in Fig. 1.)

The lower end of section 44 of the feed-track is undercut or diagonal, and 50 is a pin set through a perforation in the track, to the inner end of which pin is secured one leaf of the hinge 51, the other leaf being secured to the fixed bar 46. This construction admits of the section being vibrated vertically on the hinge 51. The section 44 turns on pin 50 and is held thereon by linchpin 52, and the upper edge of the track is in perfect alignment with the upper edge of the fixed section 43 when at the upper limit of vibration, as shown in Fig. 1. When the hinged section 44 is moved downward, the part within hopper 45 is accordingly lowered to near the bottom of the hopper, and when the section is raised again the broad portion passes through the interior of the hopper, and this movement is repeated as the hinged section of feed-track is vibrated, so that the portion within the hopper will act as a selector for gathering the lacing-hooks from within the hopper and mounting them upon the track in position to slide therealong and be fed to the carrier-flange of the anvil. One side of the hopper 45 is formed with an opening, 53, through which the hooks may pass along the track from out the hopper when the hinged section of track is elevated.

Each section 43 and 44 of the feed-track is provided with a guard, 54 and 55, respectively. The guards are metallic strips bent curved longitudinally on themselves, as shown in cross-section in Fig. 8, and are secured to the respective sections of track by means of rivets



56, and curve up over the upper edge of the track, so that a lacing-hook, as 57, may not be dislodged from the track.

The hinged section of track 44 is vibrated 5 through the link 58, pivoted to pin 50, and having the other end provided with a bolt, 62, working in the slot 59, formed in one arm of the L-shaped rocker 60, which is pivoted at its angle to the frame 11 by means of pivot 10 61. The upper arm of the rocker 60 is pivoted to the L-shaped connecting-rod 63, which is connected to the rock-bar 40 by means of pivot 15 64. By this arrangement the rock-bar 40 serves to reciprocate the connecting-rod 63 and to rock the rocker 60, which in turn reciprocates the link 58 and vibrates the hinged section of track 44 in a vertical plane.

The anvil and vibrating section of the feed-track move, the one up and the other down, at 20 the same time. The vibration of the track within the hopper serves to keep the track filled with lacing-hooks from the hopper, and the hooks gravitate along the track side by side, in the positions shown by hook 57 in 25 Fig. 8, with their heads in toward the machine-frame. The hooks pass from the extreme lower end of the track onto the carrier-flange 33 of anvil 30, and are there checked by the shoulder 66 on the flange and brought 30 into position directly over the socket 34, with the tubular base of the hook projecting out normally from the face of the anvil and the head of the hook taking around the edge of the carrier-flange; and with the hook so ad- 35 justed the anvil is moved into the vertical position to the limit, and brings the tubular base of the hook directly under the punch 27. The perforated leather is now brought over the work-table and then placed down upon 40 the base of the hook, so that the base will project up through a perforation in the leather. When this is accomplished, the punch-carriage descends and drives the punch into the tubular base of the hook and turns the base 45 down upon the leather and so clinches the hook in position. The hook is now securely fastened into the leather and the punch is resting through the base of the hook and in the socket 34 of the anvil. The punch is now 50 raised clear of the work and then the anvil recedes and moves downward to the lower limit of oscillation, thereby withdrawing from the hook, which is left fastened in the leather, and without the operator having to unhook 55 the mounted hook from the anvil, as has heretofore been the case in lacing-hook fasteners.

In order to check the run of hooks from off the track when the anvil moves from the lower limit, I provide the spring-stop 67, as shown in 60 detail in Fig. 2, which consists of a stop-piece set down in a socket, 68, in the frame, and in the bottom of the socket is placed a spiral spring, 69, which keeps the stop normally forced out to the limit. The stop 67 is formed 65 with a shoulder, which is engaged by the anvil when the latter moves to the low limit of

oscillation, and thereby depresses the stop, which will allow a hook to pass over it from the track to the carrier-flange, the stop being located at the juncture of the track and anvil, 70 and the track being cut away, as at 90.

In order to insure the constant feeding of the hooks onto the anvil, I have provided a reciprocating gravity feed-finger, 70, which has a wedge shaped head which engages the 75 edge of the feed-track with its edge. This feed-finger is reciprocated by means of the following connections, which are operated by the punch-carriage: The finger 70 is pivoted to the projection 71 on the adjustable sleeve 72, 80 which is provided with a set-screw and mounted on the rock-shaft 73, journaled in the bracket 74, which is fixed to the machine-frame, as shown clearly in Fig. 7. Upon the bar 73 is mounted another sleeve, 75, having a set- 85 screw and provided with an arm, 76, to which is pivoted the link 77, formed with a slot, 78. To the lower end of the punch-carriage 18 is secured a downwardly-projecting arm, 79, provided with a fixed pin, 80, which works 90 in the slot of the link 77. When the punch-carriage descends, the arm 79 moves downward and the pin 80 travels along to the lower end of the slot in link 77, and then the link is forced downward, and this turns the rock- 95 shaft 73 and moves the feed-finger on its length. The upstroke of the carriage moves the finger back again, and in this way the finger is reciprocated on the track. When the track is filled with hooks, the feed-finger in its opera- 100 tion serves to trip over the backs of the hooks and to drag them down toward the anvil with a raking action.

From the foregoing description of the machine the following operation of the same will 105 be readily understood: When the shaft rotates, the punch descends, the anvil moves into vertical position, the spring-stop is raised to check the hooks, the feed-finger is forced up the track over the back of the next down- 110 coming hook, and the hinged section of feed-track descends. Then the several parts move back into normal position, as shown in Fig. 1, the punch being clear of the work before the anvil moves downward, and the feed-finger 115 being drawn in toward the frame, thereby drawing down all the hooks between it and the anvil and assisting to slide the next hook upon the carrier of the anvil.

My improved machine is compact in form 120 and is efficient in operation. By the employment of a pivoted oscillating anvil the operator does not have to disengage the hook from the anvil after it is fastened upon the leather, but the anvil recedes and leaves the hook un- 125 obstructed, so that the work may be moved across the work-table to bring the next perforation over the tubular base of the next hook to be fastened, which hook has been in the meantime brought from the feed-track into 130 position by the anvil.

I am unaware of the heretofore use of a piv-



oted oscillating or rocking anvil which is adapted to receive and carry a lacing-hook, and which disengages itself from the work, and I therefore broadly claim such a construction in a lacing-hook or rivet-fastener.

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

1. In a machine for setting lacing-hooks or the like, the combination, with a punch, of a pivoted rocking anvil provided with a carrier-flange and means for actuating the anvil, and a feed-track or means for conveying the lacing-hooks adapted to feed the hooks onto the carrier-flange, substantially as herein described.

2. In a machine for setting lacing-hooks or the like, the combination, with a punch, of a pivoted rocking anvil provided with a carrier-flange having a socket therein and means for actuating the anvil, and a feed-track adapted to feed onto the carrier-flange, substantially as herein described.

3. In a machine for setting lacing-hooks or the like, the combination, with a punch, of a pivoted rocking or oscillating anvil provided with a carrier-flange, means for actuating the anvil, a feed-track adapted to feed onto the carrier-flange at one limit of oscillation of the anvil, and a movable stop for detaining the hooks on the feed-track when the anvil is away from the said feeding-point of oscillation, said stop actuated by the anvil, substantially as herein described.

4. In a machine for setting lacing-hooks or the like, the combination, with a punch, of a work-table and an anvil pivoted to rock therein, and an adjusting-block adjustably secured upon the work-table for adjusting the throw of the rocking anvil, substantially as and for the purpose herein described.

5. In a machine for setting lacing-hooks or the like, the combination as hereinbefore set forth, with a work-table, of an anvil provided with a carrier-flange and pivoted to rock or oscillate in the table, and means for rocking the anvil, substantially as and for the purpose described.

6. In a machine for setting lacing-hooks or the like, the combination, with a feed-track, of a pivoted gravity feed-finger provided with a wedge-shaped head resting across the feed-track, and the finger adapted to reciprocate on its line of length obliquely to the track, and means for reciprocating said feed-finger, substantially as herein described, whereby the feed-finger may draw a lacing-hook down the track and then be moved over the back of the next down-coming hook to between the same and the adjacent or third hook, and so in turn draw down the track for said next down-coming hook.

7. In a machine for setting lacing-hooks or the like, the combination, with an anvil and a reciprocating punch-carriage provided with a punch, of a feed-track for the anvil, a pivoted feed-finger having a head disposed across said feed-track and the finger adapted to reciprocate on its length obliquely to the trend

of the feed-track, and connections intermediate of the punch-carriage and the feed-finger for reciprocating said feed-finger through the motion of said punch-carriage, substantially as herein described, whereby the feed-finger may have a raking action imparted thereto to rake the lacing-hooks down the track one by one, as described.

8. The combination, with a punch, of a pivoted oscillating or rocking anvil provided with a carrier-flange upon the head thereof, a hopper having a feed-track extending therefrom to one side of said anvil, said track adapted to feed onto the carrier-flange, and means for actuating the anvil, substantially as described.

9. The combination, with a punch, of an oscillating pivoted anvil provided with a carrier-flange and means for oscillating the anvil, and a hopper having a feed-track extending therefrom to one side of the anvil at a point of the oscillation of the anvil, said track in alignment with the carrier-flange at said point of oscillation and adapted to feed onto said carrier-flange, substantially as herein described.

10. The combination, with a punch, of an oscillating anvil, and means, substantially as described, for oscillating the anvil, a carrier-flange upon the head of the anvil, a hopper and a feed-track extending therefrom to one side of the anvil and to a point of the oscillation of the anvil and feeding onto the carrier, and a movable stop disposed between the feed-track and the anvil and near the said point of oscillation, so as to be engaged by the anvil at said point of oscillation, substantially as and for the purpose herein described.

11. The combination, with a punch, of an oscillating or rocking pivoted anvil having a carrier-flange upon the head thereof provided with a socket on the working-face of the anvil, a hopper and a gravity feed-track consisting of a fixed section near the anvil adapted to feed onto the carrier-flange, and a hinged vibrating section of track working partly within the hopper and provided with means substantially as described, a movable stop disposed between one end of the feed-track and the anvil and operated by the latter, and a reciprocating feed-finger having reciprocating means, substantially as described, and adapted to engage with the feed-track, substantially as and for the purpose herein described.

12. The combination, with a reciprocating punch and means for reciprocating the punch, of an anvil pivoted on the machine-frame and oscillating or rocking on the pivotal axis, means for oscillating the anvil, a carrier-flange upon the head of the anvil, a hopper, and a gravity feed-track extending from the hopper to the anvil and comprising a fixed and a vibrating section of track, and a spring-stop disposed between the end of the feed-track and the anvil and engaged by the anvil, substantially as and for the purpose herein described.

13. The combination, with the work-table, of the anvil pivoted in the work-table and pro-



vided with a carrier-flange upon the head having a socket therein, a hopper and a gravity feed-track extending from within said hopper to the anvil and comprising a fixed section of track near the anvil, and a hinged vibrating section lying partly within the hopper, and means for oscillating the anvil and vibrating the hinged section of the feed-track simultaneously, substantially as and for the purpose herein described.

14. The combination, with the machine-frame, of a reciprocating punch-carriage and the punch, a shaft mounted in the frame and provided with a cam-groove, a wrist-plate fixed to the shaft, and a pitman connected with said wrist-plate and the punch-carriage for reciprocating the carriage, a work-table arranged upon the machine-frame, and an oscillating anvil pivoted in the table, a parallel rod pivoted by one end to the anvil, and a rock-bar pivoted to the machine-frame and provided upon one end with a cam-stud adapted to engage with the cam-groove of the shaft, the other end of the rock-bar hinged to the parallel rod, substantially as described, whereby the rotation of the shaft may indirectly oscillate the anvil and reciprocate the punch-carriage and punch.

15. The combination, with the machine-frame, of a work-table, an oscillating anvil pivoted in the table and provided with a carrier-flange, a hopper formed with a guideway, a gravity feed-track extending between the hopper and anvil and consisting of a fixed and a vibrating section, the fixed section inclined, with the lower end placed at one side of the anvil, so as to be in alignment with the carrier-flange at one point of the oscillation of the anvil, the vibrating section of said track disposed normally inclined, with the lower end thereof undercut and hinged to the machine-frame and abutting against the upper end of the fixed section and in alignment therewith, the upper end of the hinged section of track enlarged and like a plate and working in the guideway of the hopper so as to select the hooks from the hopper, a pivoted rock-bar provided with a cam-stud adapted to engage with the cam-groove of the shaft, a parallel rod pivoted to the rock-bar and pivoted to the anvil, a connecting-rod hinged to the rock-bar, a pivoted rocker having one arm slotted and the other arm pivoted to the connecting-rod, and a link pivoted in the slot of the rocker and pivoted to the hinged section of the feed-track, substantially as herein described, whereby the rotation of the shaft may oscillate the anvil and vibrate the hinged section of feed-track.

16. The combination, with the machine-frame, of a work-table and an oscillating anvil pivoted in the table and having a carrier-flange, a hopper provided with a guideway, a feed-track constructed of a fixed and a hinged section, substantially as described, and the hinged section working partly within the guideway of the hopper, a reciprocating punch-

carriage carrying the punch, a shaft mounted in the frame and provided with a cam-groove and having a wrist-plate upon one end thereof, a pitman intermediate of the punch-carriage and wrist-plate, a pivoted rock-bar provided with a cam-stud engaging the cam-groove, a parallel rod connecting the rock-bar and pivoted anvil, a connecting-rod hinged to the rock-bar, a pivoted rocker having one arm pivoted to the connecting-rod, and a link connecting the hinged section of feed-track and the rocker, substantially as herein described, whereby the rotation of the shaft may reciprocate the punch-carriage and oscillate the anvil and vibrate the hinged section of feed-track within the hopper, all as and for the purpose described.

17. The combination, with the feed-track, of the reciprocating punch-carriage, an arm provided with a pin and secured to the carriage, a rock-shaft mounted in a bracket, an extension adjustably mounted on said rock-shaft, a slotted link hinged to said extension and the pin on said arm working in said slot, a projection on said rock-shaft, and a gravity feed-finger pivoted to said projection and adapted to engage with its head the feed-track, substantially as described, whereby the reciprocation of the punch-carriage may reciprocate the feed-finger upon the feed-track, as and for the purpose herein described.

18. The combination, with the machine-frame, of a work-table and an anvil pivoted to rock therein and provided with a carrier-flange, a hopper formed with a guideway, a feed-track constructed of a fixed and a hinged section, substantially as described, and extending within the hopper to the anvil, a spring-stop between said track and anvil and engaged by the latter, a reciprocating punch-carriage carrying the punch, the reciprocating gravity feed-finger, and means intermediate of said carriage and feed-finger, substantially as described, for reciprocating the feed-finger, a shaft mounted in the frame, and the connections between said shaft and the carriage and the shaft and the anvil and the hinged section of feed-track, substantially as described, whereby the rotation of the shaft may reciprocate the punch-carriage and the gravity feed-finger upon the feed-track, and may oscillate the anvil and vibrate the hinged section of feed-track, substantially as and for the purpose herein described.

19. The combination, with the oscillating or rocking anvil, of the hopper formed with a guideway, a feed-track constructed of a fixed section near the anvil, and a hinged section partly within the hopper, and means for vibrating said hinged section, both said sections provided each with a guard secured upon one side of the track and curved outwardly and over the head or upper edge of the track, substantially as and for the purpose herein described.

20. The combination, with the reciprocating



punch-carriage, of the stock fixed to the carriage and formed with the socket having two different diameters and screw-threaded in the larger portion thereof, a set-screw let into the  
5 socket, and an externally screw-threaded sleeve having a bore to receive the punch, substantially as and for the purpose herein described.

21. The combination, with the machine-frame and a punch, of the pivoted anvil 30,  
10 substantially as and for the purpose described.

22. The combination, with the machine-frame and the shaft 13, of the wrist-plate 22, the pitman 21, provided with pivot 20, and the  
15 punch-carriage 18, provided with the punch-stock 23, having the punch, substantially as and for the purpose described.

23. The combination of the work-table 28, the anvil 30, pivoted in said table, and means for oscillating the anvil, substantially as and  
20 for the purpose herein described.

24. The combination of the work-table 28, the pivoted anvil 30, the feed-track 43 44, the

hopper 45, and means for vibrating the section of track 44, substantially as and for the purpose herein described. 25

25. The combination of the work-table 28 and the pivoted anvil 30, the spring-stop 67, the feed-track 43 44, the hopper 45, and means for vibrating a section of said track, substantially as and for the purpose herein described. 30

26. The combination of the work-table 28, the pivoted rocking anvil 30, the stop 67, the feed-track 43 44, the hopper 45, the means, substantially as described, for vibrating the section of the track, the gravity feed-finger 70, 35 and means for reciprocating said finger, substantially as and for the purpose herein described.

In witness whereof I have hereunto set my hand.

WILLIAM HALKYARD.

Witnesses:

J. A. MILLER, Jr.,  
M. F. BLIGH.