C. A. ELTON.

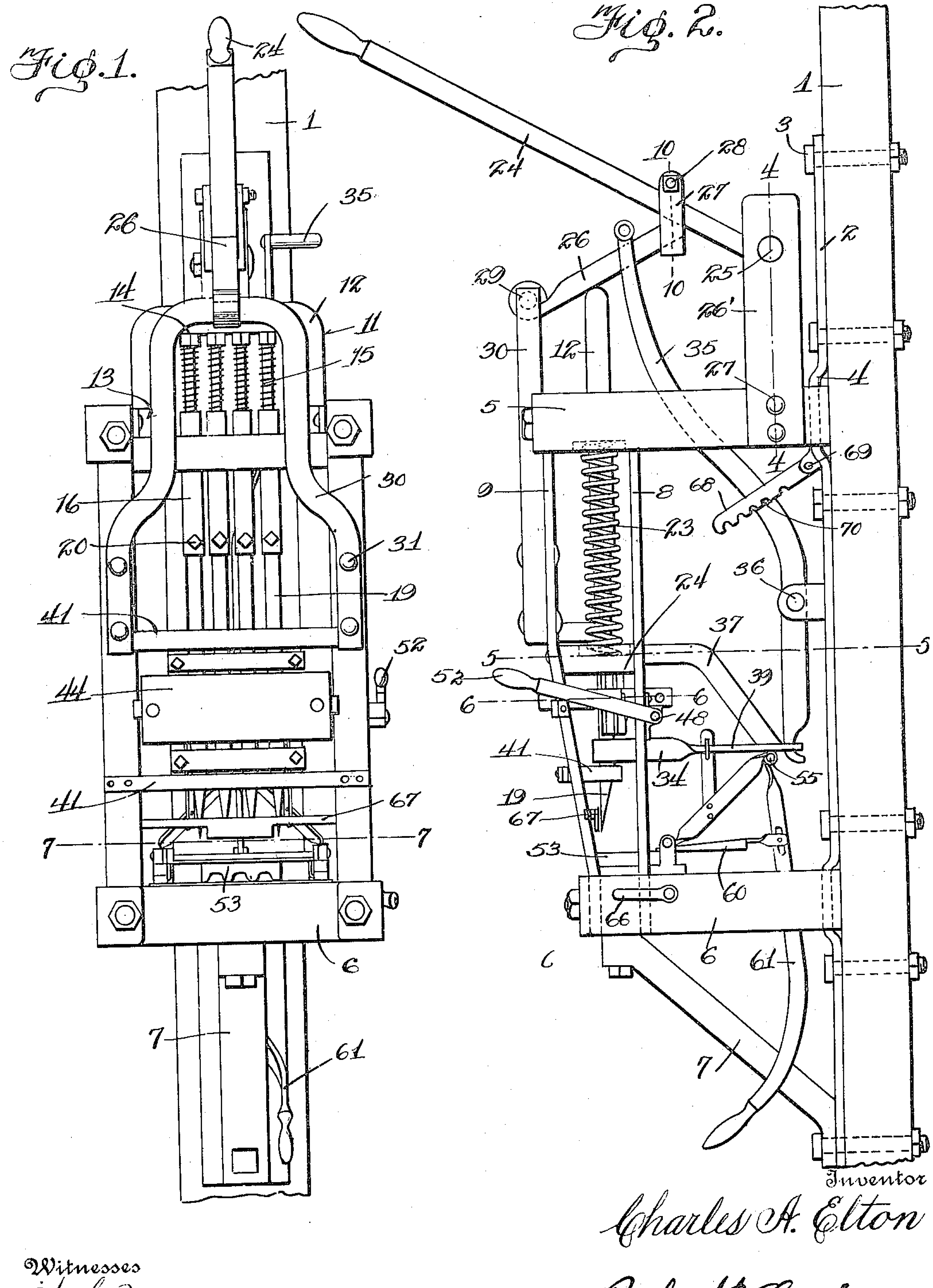
PUNCHING MACHINE.

APPLICATION FILED SEPT. 21, 1914.

1,154,621.

Patented Sept. 28, 1915.

4 SHEETS—SHEET 1.



Witnesses

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4 SHEETS—SHEET 2.

Fig. 3

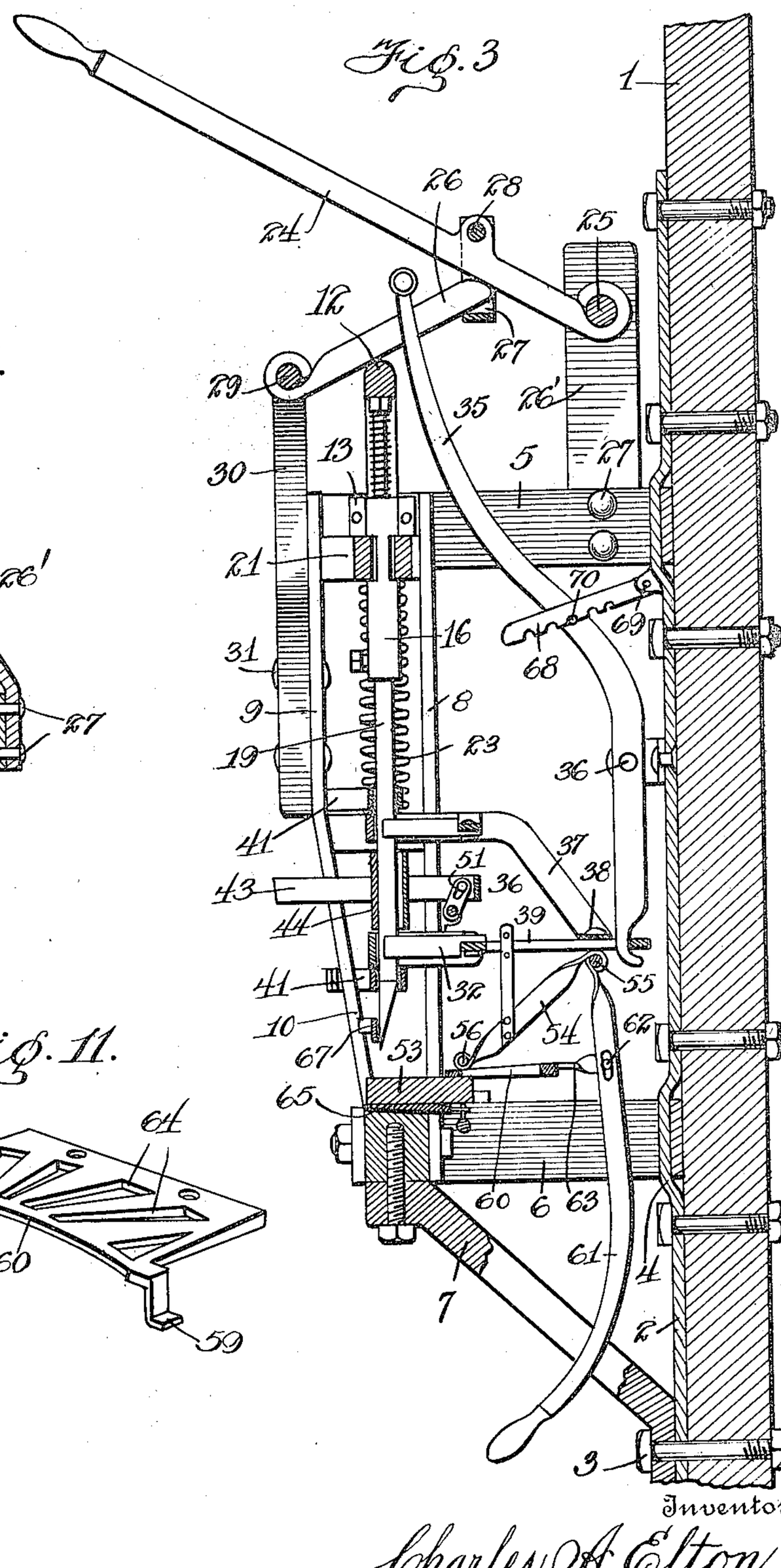

Fig. 4.

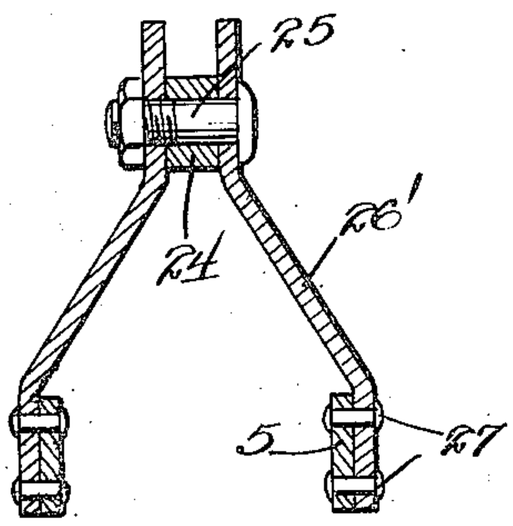

Fig. 11.

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4 SHEETS—SHEET 3.

Fig. 5

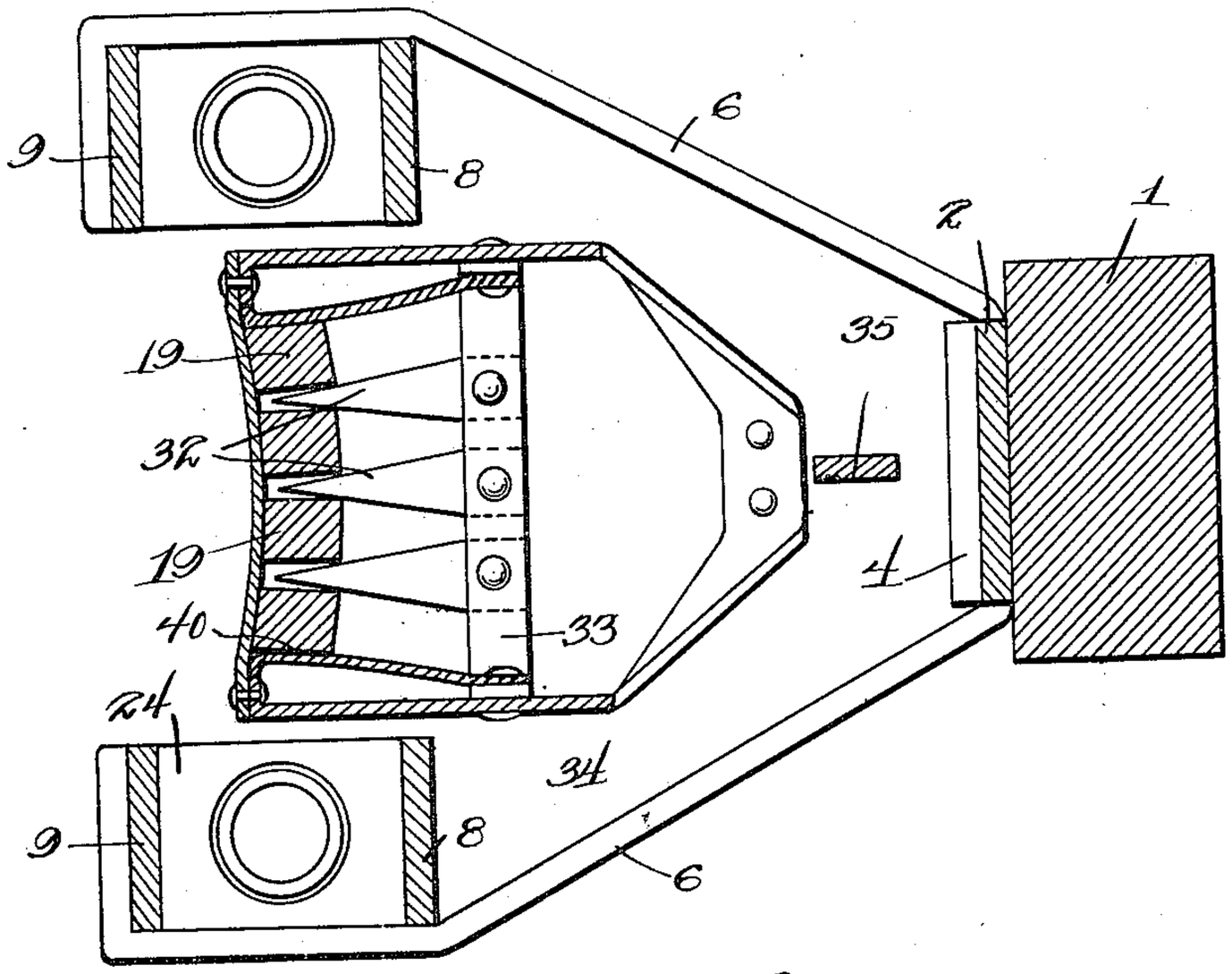
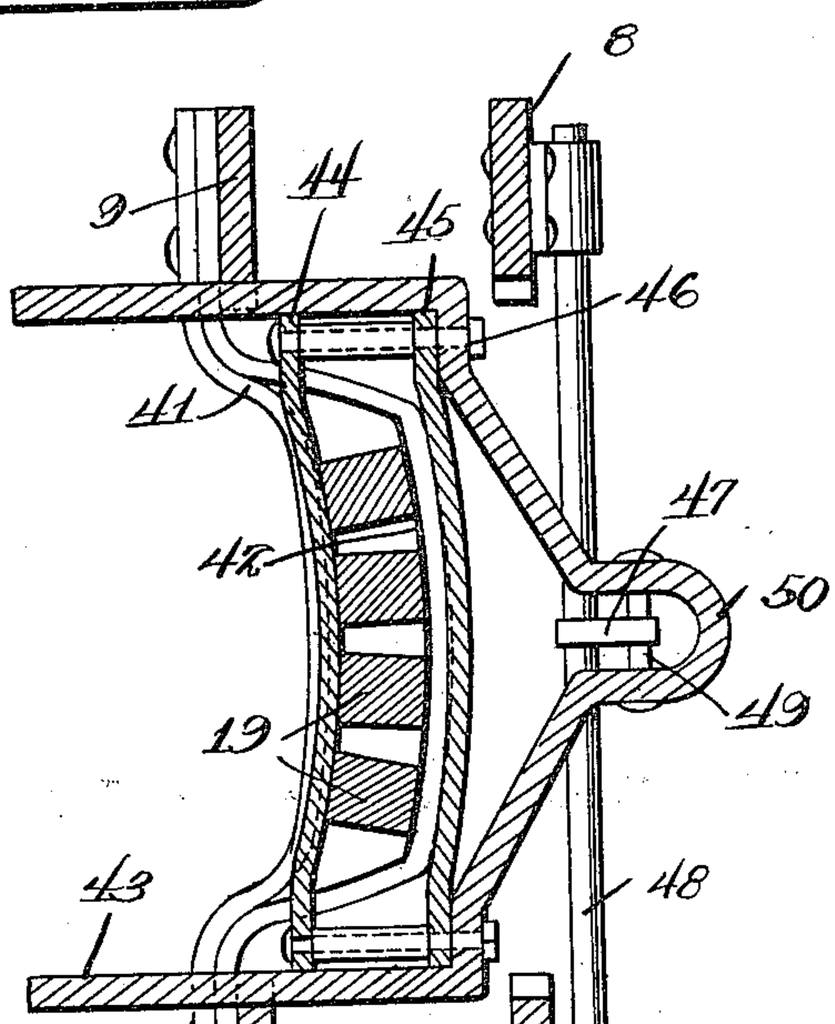


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7

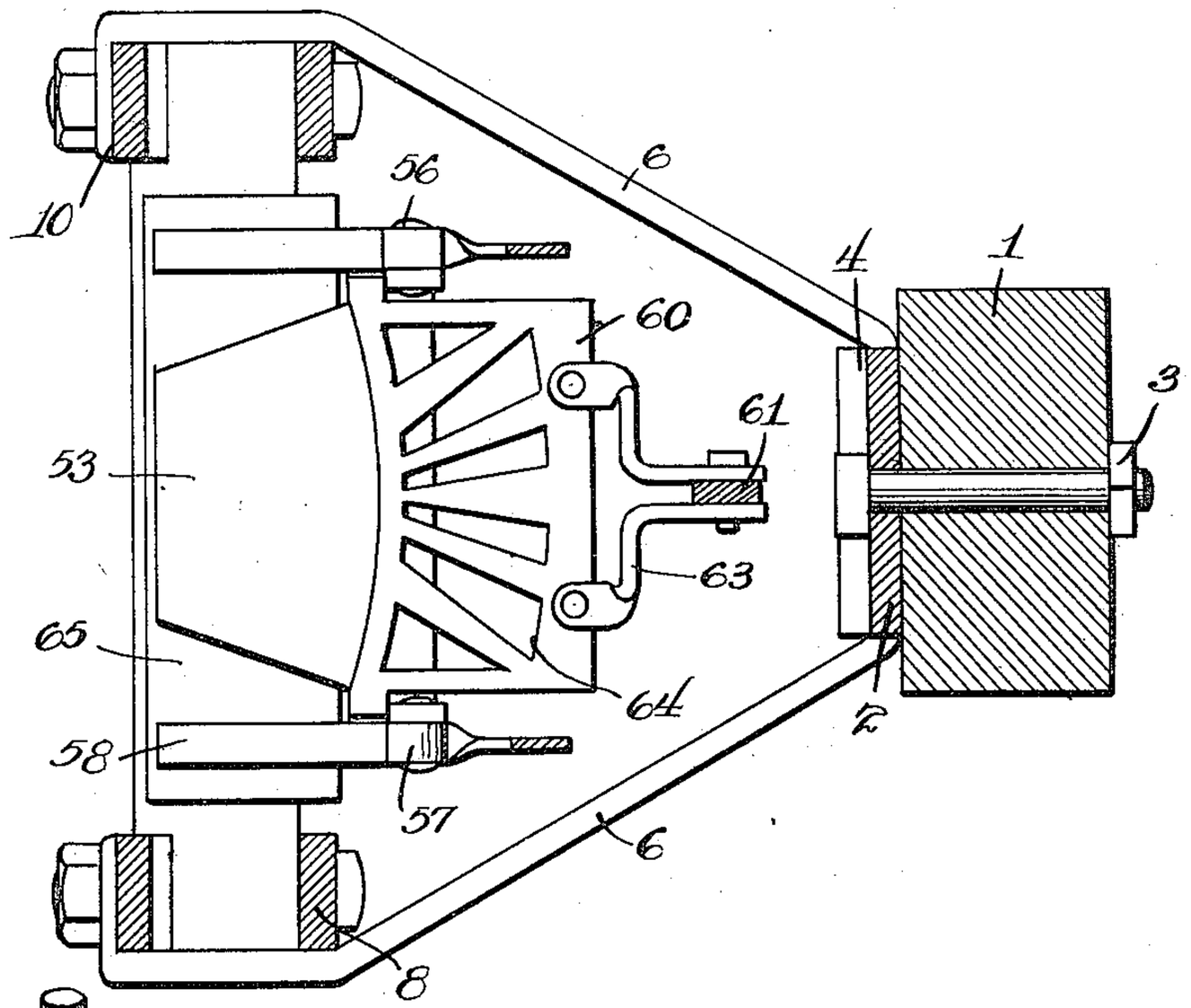


Fig. 8.

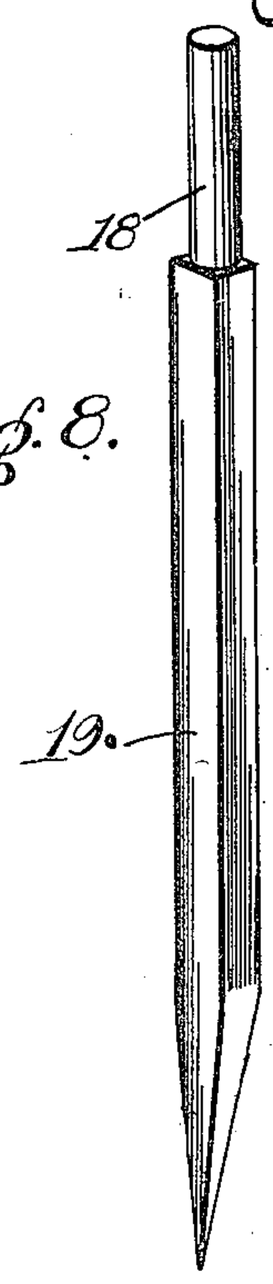


Fig. 9

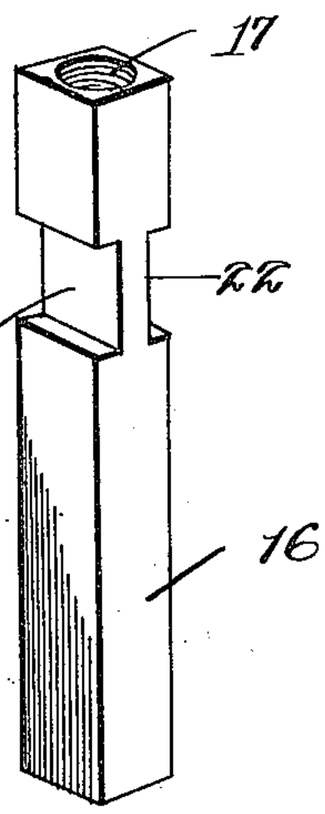
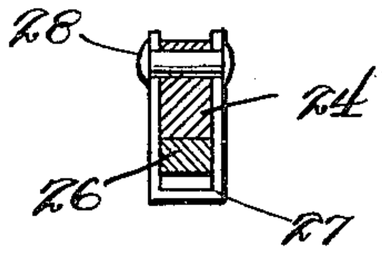


Fig. 10.



Witnesses

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PUNCHING-MACHINE.

1,154,621. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed September 21, 1914. Serial No. 862,776.

To all whom it may concern:

Be it known that I, CHARLES A. ELTON, a citizen of the United States, residing at Moodys, in the county of Cherokee and State of Oklahoma, have invented certain new and useful Improvements in Punching-Machines, of which the following is a specification.

My invention relates to an improved apparatus or machine for punching nail holes in horse shoes varying in size.

In describing my invention in detail reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a front elevation of a punching machine constructed in accordance with the present invention; Fig. 2 is a side elevation of the machine or apparatus as illustrated in Fig. 1; Fig. 3 is a longitudinal sectional view of the machine; Fig. 4 is a section on the line 4—4 of Fig. 2; Fig. 5 is an enlarged section on the line 5—5 of Fig. 2; Fig. 6 is an enlarged section on the line 6—6 of Fig. 2; Fig. 7 is an enlarged section on the line 7—7 of Fig. 1; Fig. 8 is a detail perspective view of one of the punch bars; Fig. 9 is a detail perspective view of one of the punch bar supports; Fig. 10 is an enlarged section on the line 10—10 of Fig. 2; and Fig. 11 is a detail perspective view of the auxiliary bed plate.

Referring now to the drawings by numerals, 1 designates a suitable supporting structure to which the attaching plate 2 is fixedly secured as at 3. Said plate 2 is offset as indicated at 4 at points intermediate its ends, the offset portion 4 serving as a support means for the respective horizontal frame sections 5 and 6, the latter being at the base or foot of the machine, and braced as indicated at 7. Frame sections 5 and 6 are joined by the guide plates 8 and 9, the former extending parallel with the attaching plate 2, and the latter in spaced relation to the plate 8, parallel thereto, throughout a portion of its length, but diverging as indicated at 10 as shown to advantage in Fig. 3 of the drawings.

The punch head, designated as an entirety by the numeral 11 is movable vertically relatively to the machine frame, the said head consisting of an arched frame 12 arranged with its respective longitudinal edges engaging the frame section 5, the said arched frame being supported in a vertical position through the medium of brackets 13 affixed to the frame, the brackets serving as guides for the extensions of the arched frame upon vertical movement thereof.

Frame 12 has adjustably secured thereto as at 14 a plurality of screw rods 15, the said rods being arranged in parallel spaced relation, each rod supporting a punch bar carrier or support member 16, square in cross section, each bar support being recessed at one end as indicated at 17 to provide for the reception of its associated screw rod 15. The bars 16 are also recessed at their lower extremity to provide for the reception of an extension 18 formed upon each punch bar 19, the extensions being held in the desired adjusted position and immovable relatively to the members 16 by means of set screws 20 carried by the said members and engaging the bars. By the above arrangement, it is evident that the several punch bars may be individually adjusted and when set, are movable simultaneously through movement of the arched frame 12, such movement of the bars 19 providing for the punching operation in a manner to be hereinafter fully disclosed.

In order that the several support members 16 be maintained in proper alinement, I provide a retaining block 21 adapted for engagement with the respective guide plates 8 and 9, the said retaining block being movable with the punch bars by reason of its engagement therewith in the manner shown to advantage in Fig. 3. It will be noted that each support member is cut away as indicated at 22, the shoulders formed by that portion cut away being engageable with the spacing block 21. As a means whereby the arched frame 12 and the mechanism movable therewith, may be normally maintained in its uppermost position, I provide helical springs 23, arranged one upon each side of the punch bars 19, the said springs abutting at one terminal the spacing block 21, and at their opposite terminal a stationary block 24′ affixed to the guide plates 8 and 9.

The operating means for the arched frame 12 and punch bars 19 carried thereby, consists of a lever 24 pivoted as at 25 between angle plates 26′ made rigid as at 27 with the frame section 5, the arrangement of the angle plates relatively to the machine frame being illustrated to advantage in Fig. 4. A second lever 26 is adapted for engagement with the under side of the lever 24, the lever

26 being held in such engagement by means of a substantially U-shaped bracket 27 pivoted as at 28 to the lever 24, both the said lever 24 and the lever 26 operating between the extensions of the bracket. Lever 26 is pivoted as at 29 to a supporting arched member 30 secured as at 31 to the forward guide plate 9, the said arched plate 30 being immovable relatively to the machine frame. Upon reference to Figs. 2 and 3, it is apparent that the lever 26 is so positioned relatively to the arched frame 12 as to engage the top thereof, and when actuated through movement of lever 24 is adapted to exert sufficient pressure thereon to provide for the punching operation necessary to the formation of nail holes in either iron or steel shoes. By the arrangement of the levers as above set forth, the leverage attained is of exceeding force.

In order that the punching bars 19 may be moved or adjusted laterally relatively to each other, I provide two series or sets of spacing irons 32, each set of irons being the same in construction and engageable with the punch bars in a manner alike. The spacing irons 32 (the ensuing description has reference to the upper set or series) are affixed to a bridge plate 33, in turn affixed to a carriage 34 movable backward and forward in a horizontal plane through manipulation of a lever 35 fulcrumed as at 36 to the attaching plate 2, the said lever at one end being engageable with an extension 37 of the carriage 34. The other or second set of spacing irons 32 are movable simultaneously with the set just referred to in detail, also through actuation of the lever 35, this simultaneous movement being made possible by the connection 38 joining the extension 37 with the carriage 39 supporting the said second set of irons. A spacing iron 32 is seated between each punch rod or bar, the respective irons being of such formation as to separate the bars when moved forwardly through operation of lever 35. Resilient guide plates 40 are mounted upon each carriage, the said guide plates being engageable with the outermost of the said punch bars in order that the latter, during movement, may automatically adjust themselves in the desired spaced relation.

It is a well known fact that front shoes are smaller than the rear shoes, and that therefore the arc of a circle upon which the nail holes are punched must necessarily be greater in punching the said rear shoes than the arc of a circle when punching the front. To provide for this variation, curved plates, stationary relatively to the frame, have been provided, one of the said plates 41 being curved in the arc of a circle greater in diameter than the arc of the circle upon which the other of the said plates 42 is described. These plates 41 and 42 are arranged in the required spaced relation to provide for bodily movement of the punch bars into and out of engagement therewith. The punch bars when in engagement with the plate 41 will be positioned in the proper arc of a circle to punch nail holes in rear horse shoes and when in engagement with the plate 42 will be positioned in the arc of a circle to effectually punch nail holes in front horse shoes. If desired, two sets of plates may be provided, this arrangement being preferred, as shown to advantage in Fig. 3.

Now in order that the punch bars may be bodily moved into engagement with the respective plates 41 and 42, a movable carriage 43 has been provided, the said carriage also supporting curved plates 44 and 45, the former being described in the arc of a circle the same as that of the plate 42, and the latter in the arc of a circle the same as that of the plate 41, such arrangement, as shown to advantage in Fig. 6, causing the said punch bars to be held immovable, upon proper adjustment of the carriage 43, that is, when the carriage is moved forwardly, plate 45 will move the punch bars into engagement with the plate 41 and, the said two plates 41 and 45 being described in the arc of a circle the same in diameter, it is evident that the punch bars will be properly and effectually held. The plates 44 and 45 are secured to the carriage as indicated at 46.

The operating means for bodily moving the carriage 43 consists of a link 47 rigid at one end with a shaft 48 and at its opposite end loosely connected to a pin 49 seated in an extension 50 of the carriage 43. Link 47 is provided with a slot 51 through which the pin 49 extends, this arrangement providing for bodily movement of the carriage 43 upon rotation of the shaft. A handle 52 is affixed to the shaft to facilitate rotation thereof.

Passing on now to the description of the support means for the horse shoes acted upon, 53 designates a movable bed plate arranged for sliding movement upon the lower frame section 6. Said bed plate is movable simultaneously with the spacing iron 32, such movement being made possible by the connection shown at 54, such connection consisting of a link secured as at 55 to the carriage 39 and as at 56 to the upstanding lugs 57 rigid with the bed plate 53. At each side of the bed plate 53 and integral therewith, is an extension 58, each extension being longitudinally grooved to receive a lug or projection 59 integral with an auxiliary bed plate 60, the latter being slidable upon and relatively to the bed plate 53. The engagement between the extensions 59 and the bed plate 53 limits sliding movement of the auxiliary plate 60 in one direction. To provide for adjustment of the said plate 60, I provide a lever 61 pivoted at the point 55 above referred to and connected as at 62 to

arms 63 in turn affixed to the plates. Movement of the lever will provide for a like movement of the plate, and the arrangement, if desired of the said plate beneath the punch bars 19. Plate 60 is apertured as indicated at 64 in order that when in use, the points of the several punch bars 19 may not come in contact therewith. The plate 60 is to be used in punching horse shoes, calks up, while the said plate 53 is to be used in punching horse shoes, calks down. When it is desired that the size of the nail holes be enlarged, bed plate 53 is slightly raised through movement of a beveled lifting plate 65, the said plate being arranged beneath the bed plate and actuatable therebeneath through the movement of a lever 66 to raise or elevate the plate.

From the foregoing, taken in connection with the accompanying drawings it is evident that when punching horse shoes, calks up, the pointed extremities of the several punch bars will, after passing through the metal of the shoe, enter the apertures 64 of the auxiliary plate 60; that while punching horse shoes, calks down, the calks will support the shoe slightly above the bed plate 53, thus obviating the necessity of an apertured plate; and that by slightly elevating the plate 53, the stroke of the punch bars being unchanged, a larger nail hole is made in the shoe.

A stationary abutment 67 is rigid with that portion 10 of the guide plate 9, the abutment acting as a means whereby the shoes, subsequent to being punched, are withdrawn or forced out of engagement with the punch bars.

An adjusting means has been provided for locking the spacing irons 32 immovable when adjusted, said means consisting of a notched bar 68 pivoted as at 69 to the attaching plate 2, the notches of the bar being engageable with a pin 70 carried by the lever 35.

A brief description of the operation is as follows: The horse shoes to be punched are first placed upon bed plate 53, calks down, and the punch bars 19 adjusted to accommodate the curvature of the shoe to be punched. Such adjustment is effected through manipulation of lever 35 and handle 52. Subsequent to adjustment, lever 35 is locked in its adjusted position by reason of the engagement of pin 70 therewith. The punch bars having been properly adjusted, operating lever 24 is pulled down, causing lever 26 to exert sufficient pressure upon arched frame 12 to carry the punch bars 19 through the metal of the shoe. Lever 24 having been sufficiently moved to execute a full stroke of the punch bars 19, is then released, allowing the punch bars to be again raised by the pressure exerted upon retaining block 21 by springs 23. As the punch bars recede or return to their normal raised position, the shoe acted upon comes in contact with the abutment 67, the latter causing the said shoe to be automatically removed from engagement with the punches and to fall upon the bed plate 53 where it is finally removed. When punching horse shoes, calks up, the operation is the same as that just set forth, except that the auxiliary bed plate 60 is first positioned beneath the punch bars through manipulation of lever 61.

In reduction to practice, I have found that the form of my invention, illustrated in the drawings and referred to in the above description, as the preferred embodiment, is the most efficient and practical; yet realizing that the conditions concurrent with the adoption of my device will necessarily vary, I desire to emphasize the fact that various minor changes in details of construction, proportion and arrangement of parts may be resorted to, when required, without sacrificing any of the advantages of my invention, as defined in the appended claims.

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

1. A machine for punching nail holes in horse shoes including a movable support for the horse shoes acted upon, a plurality of punch bars having tapering ends, means for operating the bars, and means for elevating the support to vary the size of the holes punched.

2. A machine for punching nail holes in horse shoes including a plurality of reciprocable punch bars, support means for the several bars, a first lever directly engaging the said support means, and a second lever engaging the first lever, the said second lever being actuatable to operate the first lever, as and for the purpose set forth.

3. A machine for punching nail holes in horse shoes including a plurality of movable punch bars, support means for the several bars, spring means normally maintaining the support means in its uppermost position, a plurality of levers actuatable to move the said support means against tension of said spring means, and an adjustable shoe support arranged beneath said punch bars, as and for the purpose set forth.

4. A machine for punching nail holes in horse shoes including a plurality of punch bars, means engageable with and movable relatively to the punch bars for moving the latter relatively to each other, means for actuating the several bars, and support means for the horse shoes acted upon, said support means being bodily movable in a horizontal plane and adjustable vertically relatively to the punch bars, as and for the purpose set forth.

5. A machine for punching nail holes in horse shoes including a plurality of punch

bars, a supporting plate for the horse shoes acted upon, an auxiliary supporting plate movable relatively to the said first mentioned supporting plate, and means for moving the punch bars relatively to the respective plates, as and for the purpose set forth.

6. A machine for punching nail holes in horse shoes including a plurality of reciprocable punch bars, means actuatable to spread the bars, means actuatable to arrange the bars in such position relatively to each other as to conform to the curvature of the horse shoe acted upon, and movable means supporting the horse shoe in a position directly beneath the several bars, as and for the purpose set forth.

7. A machine for punching nail holes in horse shoes including a plurality of punch bars, means including a pair of curved plates between which the bars extend, the said bars being movable relatively to the plates, the plates operating to position the bars relatively to each other whereby to conform with the curvature of the horse shoe acted upon, and adjustable support means for the horse shoe acted upon operable between the punch bars, as and for the purpose set forth.

8. A machine for punching nail holes in horse shoes including a plurality of punch bars, means actuatable to vary the space between the respective nail holes, and means including a pair of curved plates with which the bars are engageable, the plates being shaped to arrange the bars when in engagement therewith in a position whereby to conform to the configuration or curvature of the horse shoe acted upon, as and for the purpose set forth.

9. A machine for punching nail holes including a plurality of punch bars, means for reciprocating the bars simultaneously, means for spreading the bars, means including a pair of curved plates between which the bars extend, said bars being bodily movable into and out of engagement with the respective plates to provide for arrangement of the respective bars in a position to conform to the curvature of the horse shoe acted upon, a bed plate for supporting the horse shoe acted upon, and means for adjusting the bed plate relatively to the punch bars, as and for the purpose set forth.

10. A machine for punching nail holes in horse shoes including a plurality of punch bars, means engageable with and movable relatively to the bars for spreading the latter apart, a bed plate for the horse shoes acted upon, means actuatable to move the spreading means and the bed plate simultaneously, and an auxiliary bed plate movable relatively to the said first mentioned bed plate, as and for the purpose set forth.

11. A machine for punching nail holes in horse shoes including a plurality of punch bars, a bed plate movable beneath the punch bars, a plate member movable beneath the bed plate for adjusting the latter vertically relatively to the punch bars, a perforate auxiliary bed plate movable relatively to the bed plate, and means for moving the said auxiliary plate either into or out of an operative position relatively to the punch bars, as and for the purpose set forth.

12. A machine for punching nail holes in horse shoes including a plurality of punch bars, a bed plate, means reciprocating the punch bars relatively to the bed plate, the said bed plate acting as a support for the horse shoes acted upon, a perforate auxiliary bed plate movable relatively to the said first mentioned bed plate, said auxiliary plate being normally maintained in an inoperative position, and means actuatable to move the said auxiliary plate upon the said bed plate and into an operative position, as and for the purpose set forth.

13. A machine for punching nail holes in horse shoes including a plurality of punch bars, a pair of curved plates between which the punch bars extend, a pair of stationary curved plates between which the punch bars extend, and a movable frame supporting the first mentioned curved plates, the said frame being movable to bodily move the punch bars into and out of engagement with the respective stationary curved plates, as and for the purpose set forth.

14. A machine for punching nail holes in horse shoes including a plurality of punch bars, means actuatable to spread the said punch bars apart, means actuatable to position the punch bars in such relation to the horse shoe acted upon as to conform to the curvature thereof, support means for the horse shoes acted upon, means for adjusting the said support means relatively to the punch bars, said spreading means and said support means being bodily movable simultaneously, and means for locking the said support means and the said spreading means when adjusted, as and for the purpose set forth.

15. A machine for punching nail holes in horse shoes including a plurality of reciprocable punch bars, a frame supporting the several bars, a pivoted lever engaging the frame, an operating lever adapted for engagement with the free end of the first mentioned lever, said operating lever being actuatable to reciprocate the punch bars, as and for the purpose set forth.

16. A machine for punching nail holes in horse shoes including a reciprocable frame, a plurality of punch bars carried by the said frame, means for reciprocating the frame, spring means normally maintaining the frame in its uppermost position, means engageable with and movable relatively to the punch bars for spreading the latter

apart, a plurality of stationary curved plates between which the punch bars extend, a plurality of movable curved plates between which the punch bars extend, means for actuating the said movable plate to position the bars in the arc of a circle approximately that of the horse shoe acted upon, a movable bed plate arranged beneath the punch bars, means for adjusting the said bed plate vertically, means operable to move the spreading means and the said plate simultaneously, an auxiliary bed plate movable relatively to the said first mentioned bed plate, means for moving the said auxiliary plate either into or out of an operative position, and means for locking the spreading means and the said plate in an operative position, as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

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Witnesses:

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