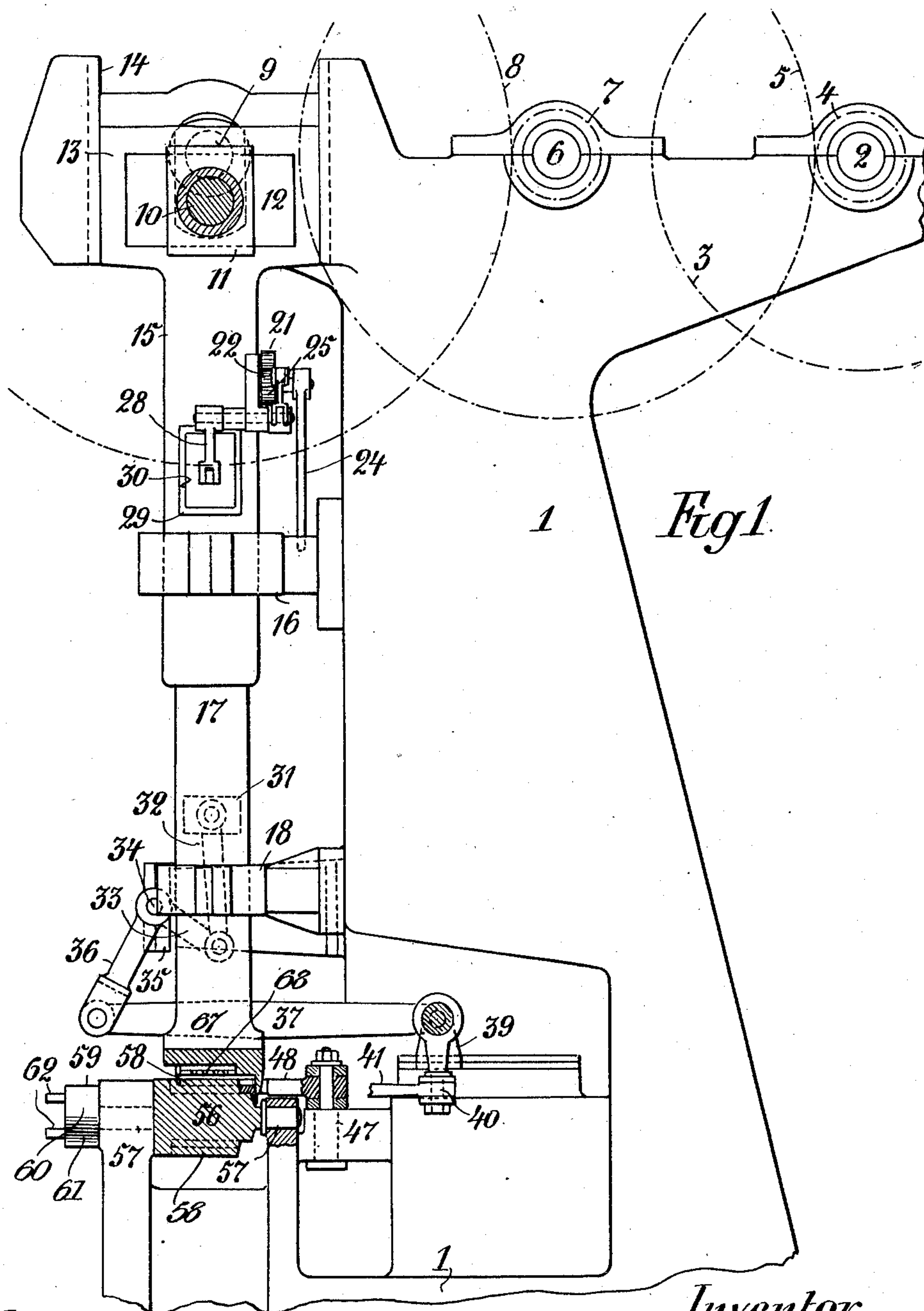


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MACHINE FOR MAKING HORSESHOES.  
APPLICATION FILED MAR. 8, 1910.

998,287.

Patented July 18, 1911.

3 SHEETS—SHEET 1.



Witnesses  
F. Kasper.  
L. Hayman.

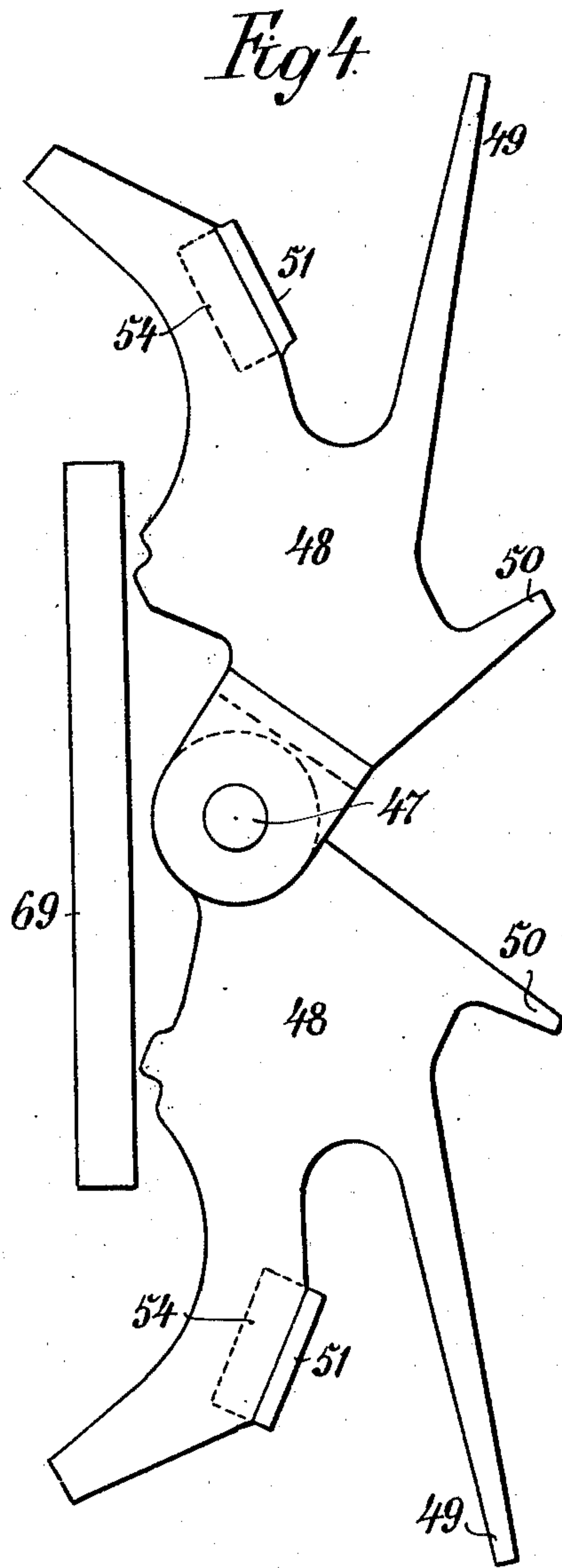
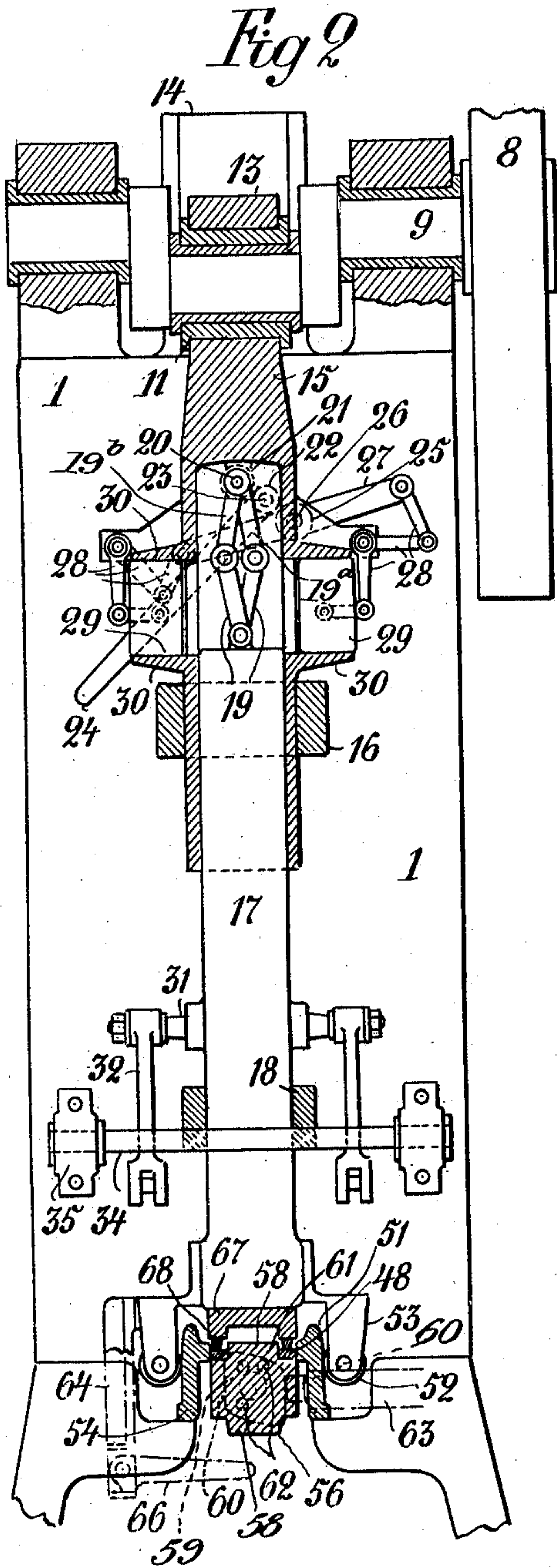
Inventor  
Ernst Valdemar Gandil.  
by B. Singer.  
Attorney.

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3 SHEETS—SHEET 2.



Witnesses  
F. Kasper.  
G. Hayman.

Inventor  
Ernst Valdemar Gandil  
by B. Singer.  
Attorney.

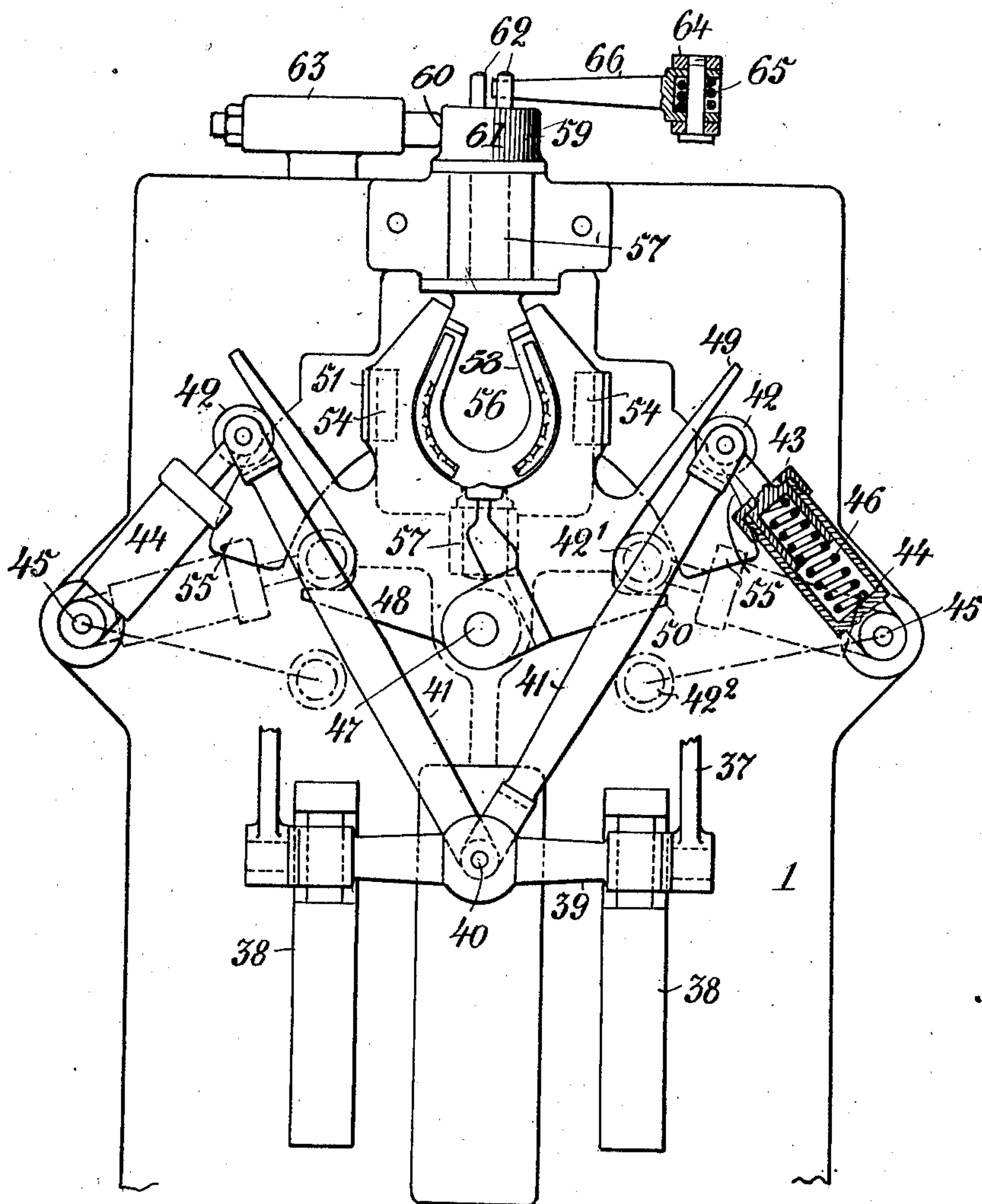
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3 SHEETS—SHEET 3.

*Fig 3.*



Witnesses  
F. Kasper.  
G. Hageman.

Inventor  
Ernst Valdemar Gandil  
By B. Singer  
Attorney



# UNITED STATES PATENT OFFICE.

ERNST VALDEMAR GANDIL, OF COPENHAGEN, DENMARK.

MACHINE FOR MAKING HORSESHOES.

998,287.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed March 8, 1910. Serial No. 547,962.

*To all whom it may concern:*

Be it known that I, ERNST VALDEMAR GANDIL, engineer, a subject of the King of Denmark, residing at Hobrogade 2, Copenhagen, Denmark, have invented a new and useful Improvement in Machines for Making Horseshoes; and I do hereby declare the following to be a full, clear, and exact description of the same.

Machines for making horse-shoes of a straight, red hot iron-rod are known, consisting of a number of single working devices, each of which performs a certain work (profiling of the rod, pressing of nail-groove and nail-holes, oval bending of the rod, etc.). Between the single devices are found means for carrying the rod from one device to the other. Such machines are of a much complicated and expensive construction, they are unhandy and work slowly, as by the conveyance of the rod or the material from one device to the other much time is lost, and sometimes it is necessary to heat the rod between the different operations.

The present invention relates to a machine, in which the rods are bent into the shape of a horse-shoe by means of the known movable jaws or tongs moved by the swage which punches the nail-holes, etc., and it is characterized by simple construction, handiness and great productivity.

The invention essentially consists in the jaws, the swages which press the nail-groove and the nail-holes and which completely finish the horse-shoe, and the bottom swage of the same being formed and mutually arranged in such a manner so as to enable the machine by one single stroke and in one and the same place to make of the straight rod a ready horse-shoe of suitably varying cross-section and of any oval shape wanted.

The machine is shown in the drawing, in which—

Figure 1 shows a partial vertical sectional side view of the machine, Fig. 2 a partial vertical sectional front view of the same, Fig. 3 a top view of the same, the upper part of the machine being removed, and a detail, being shown in horizontal section, Fig. 4 a top view of a detail.

The machine-frame is designated by 1; at top it carries bearings for the driving-shaft 2 carrying the pulley 3 and a small pinion 4 meshing with the gear 5 on the shaft 6, the latter likewise carrying a pinion 7 mesh-

ing with the gear 8 on the shaft 9. The shaft 9 carries in the middle a crank 10 journaled in a block 11, which is horizontally displaceable in a rectangular slot 12 in the cross-head 13, which is guided in its vertical movement by the guides 14 in the frame 1. The cross-head is integral with the rod 15, which has its guiding in the bracket 16. The rod 15 will thus by the turning of the driving-shaft having imparted thereto a continued up- and downward guided movement. The lower part of the rod 15 is hollow and in this cavity a rod 17, guided by the bracket 18, can be displaced and retained. The means whereby the rods 15 and 17 may be rigidly held together or released, as hereafter to be described, permits the machine to be thrown in and out of operation without stopping the main drive of the machine. The rod 17 transmitting the motion to the parts used in forming the shoes can telescope into the rod 15 so that the length of the two rods is diminished, thus enabling the machine to continue going without performing any work. The rods 15 and 17 are with a view to this feature connected by the toggle-levers 19; one of the members 19<sup>a</sup> of which is secured to the upper shaft 20 the other member 19<sup>b</sup> bearing loosely thereon. The shaft 20 is journaled in the rod 15 and carries a pinion 21, in which is meshing the gear 22 arranged on a shaft 23 journaled in the rod 15, which shaft also carries a lever 24. The gear 22 further meshes with a gear 25, which is firmly connected with a two-armed lever 27, which is rotatably mounted on the support 26 projecting from the rod 15, both ends of the lever 27 being by the links 28 connected with the blocks 29. These blocks are guided in flanges 30 on the rod 15, which flanges surround openings to the cavity in the rod 15. When the lever 24 is carried upward from the position shown in Fig. 2, thus turning in the same direction as the hands of a watch, the toggle-levers 19 will depart from each other thereby drawing the rod 17 into the cavity of the rod 15. However the lever 27 will first turn in the opposite direction of that of the hands of a watch and draw outward the blocks 29, the upper surfaces of which rest against the flanges 30 at top and the lower surfaces against the upper surface of the rod 17, until assuming the position shown in Fig. 2, thus enabling the rod 17 to move upward.



The rods 15 and 17 are now able to move upward and downward without reaching down to the bottom-swage. When the work is to be recommenced, the lever 24 is carried downward (into the opposite direction of that of the hands of the watch) until assuming the position shown in Fig. 2, whereby the toggle-levers 19 are straightened and the rod 17 is pushed down so as to assume the position according to Fig. 2; by further movement of the lever 24 in the same direction the blocks 29 will pass through the openings into the cavity of the rod 15, so that the lower surface of the blocks will rest on the upper surface of the rod 17, the rods 15 and 17 being thus brought into firm connection with each other.

The rod 17 carries bearings 31 for levers 32, which by the links 33, Fig. 1, (not shown in Fig. 2) are connected with a shaft 34 turning in bearings 35 on the frame 1 and carrying levers 36 (Fig. 1). The levers 33 and 36 are firmly connected with the shaft 34, to which by the up- and downward movements of the rod 17 is imparted a rocking movement, so that the ends of the levers 36 thus get an oscillating movement. The levers 36 are pivoted on connection-rods 37 (Figs. 1 and 3), which are connected with a cross-head 39 guided in guides 38 in the frame, to which cross-head by the downward movement of the rod 17 is imparted a forward movement (to the left in Fig. 1), while by the upward movement of the rod 17 it moves backward. The cross-head 39 carries in the middle a vertical pivot 40, on which turn two levers 41, the free ends of each of which are provided with a roller 42 and pivoted on one end of a hollow cylinder 43 sliding in another hollow cylinder 44, which turns around a bolt 45 in the frame; the two cylinders 43 and 44 are kept in the position, in which they are most separated from each other, by a helical spring 46 arranged inside the same.

In the frame is arranged a vertical pivot 47 on which turn two jaws 48, the shape of which appears from Fig. 4. The jaws 48 have guide-lists 49 for the rollers 42 and a pressure-arm 50 for the same. Inside the jaws have a shape exactly-corresponding to the outside shape of the half of a horseshoe. At top the jaws have wedge-shaped pressure-surfaces 51 for rollers 52 arranged at foot on the downward pointing arms 53 on the rod 17, and at foot the jaws carry guide-blocks 54 sliding in guide-grooves 55 in the frame 1. When the cross-head 39 moves backward the rollers 42 will first assume the position 42<sup>1</sup>, where they strike the pressure-arms 50; by the further movement of the cross-head the rollers 42 will move back to the position 42<sup>2</sup>, opening the jaws 48 so as to cause the same to assume the position shown in Fig. 4. When thereafter the cross-head 39

advances, the rods 41 actuated by the spring-boxes 43, 44 are carried toward each other; the rollers 42 slide on the guide-lists 49 and press together the jaws 48. At the end of this closing movement the rollers 52 move down along the wedge shaped surfaces 51 thereby completing the compression.

In front below in the frame 1 is shown the die or form 56; it is turnable on the pivots 57 in bearings in the frame 1. The die or form has two exactly similar surfaces, one at top and one at foot, corresponding to the shape of the upper surface of a horseshoe; these surfaces of the die are formed by projections 58, the outside circumference of which corresponds to the inside form of the horseshoe as seen in Fig. 3. In front the die or form carries a thickening 59 of a section as shown in dotted line in Fig. 2 consisting of two parallel plane surfaces 60 and two similar arched surfaces 61. In front the thickening 59 carries two trunnions 62. For retaining the die or form 56 in its working position a spring-box 63 of similar construction to the above mentioned spring-boxes 43, 44 is arranged in front on the frame. The inward pointing end of the spring-box 63 presses on one of the plane surfaces 60 thereby retaining the bottom-swage in position. The rod 17 carries a downward pointing arm 64, the free end of which carries an arm 66, acted upon by a spring 65. The spring tends to turn the arm 66 downward to the horizontal position shown in Fig. 2, which it cannot pass. When the rod 17 moves upward the arm 66 will strike the lower of the pivots 62 thereby turning the die or form about 180° against the resistance of the box 63; the last part of the turning is effected by the spring-box 63; thereby the surface of the die or form which has hitherto turned upward will now be turned downward and the finished shoe ejected. When the rod 17 again moves downward, the arm 66 will slide over the pivots 62 without altering the position of the die or form.

The rod 17 carries at foot a swage 67, the shape of which corresponds to the lower surface of a horse-shoe, and which is provided with small swages 68 for making nail-holes and nail-grooves.

The machine works in the following manner: When the rod 17 has moved upward the rod 69 is put in front of the jaws 48 in a place arranged for this purpose. By the downward movement of the rod 17 the jaws 48 and the rod 69 are carried against the projection 58. The jaws 48 then in the manner described bend the rod around the projection 58, whereupon the swage 67 presses the rod between itself and the die or form 56, thereby finishing the horse-shoe. The rod 17 moves upward, the jaws 48 open



and the die or form 56 turns 180°; the finished horse-shoe falls out at foot, new rod is put in and so on. In this way about 15 shoes a minute can be made.

5 By giving the swage and die or form suitable shapes horse-shoes of any shape wanted can be produced.

10 Having now particularly described and ascertained the nature of the said invention what I claim and desire to secure by Letters Patent of U. S. America is:

1. In a machine for making horse shoes the combination with a die for the strip, jaws pivoted at a stationary point to bend the strip about said die and a former co-acting with said die to form the shoes, of arms slidably mounted and acting upon said jaws to alternately open and close the same, a stem carrying said former, and link mechanism pivoted to said stem and operatively connected to said arms whereby they are actuated upon movement of the stem.

2. A machine for making horse shoes comprising in combination, a former, stem members extensible with respect to each other and one of said members carrying said former, mechanism supporting one member from the other for extending and contracting said members, and engaging means, actuated upon operation of said mechanism to extend the members, to hold the stem members in an extended position.

3. A machine for making horse shoes comprising in combination, a former, stem members extensible with respect to each other and one of said members carrying said former, toggles connecting said members and adapted to extend and contract the same, and stops slidably mounted in one of said

members actuated upon operation of the toggles to extend said members, and serving to hold the latter in an extended position. 40

4. A machine for making horse shoes comprising in combination, a pivoted element having a plurality of die or forming faces, means for bending a strip about a die of the said element, a former co-acting with said die to form the shoe, and means operatively connected with said former to alternately present the said die or forming faces of said element in operative relation to said bending means and former. 45 50

5. A machine for making horse shoes comprising in combination, a revoluble element having oppositely disposed die faces, means for bending the strip about a die of said element, a former co-acting with said die to form a shoe, means operatively connected with said former to revolve said element to discharge the finished shoe, and means for holding the next adjacent die face in operative relation to said bending and forming means. 55 60

6. A machine for making horse-shoes comprising in combination, a former, a telescoping stem carrying the former comprising separate stem members, toggles connecting said members, devices for locking said members, and means for operating said toggles and said devices. 65 70

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ERNST VALDEMAR GANDIL.

Witnesses:

VIGGO BLOM,  
C. V. SCHON.