

(Model.)

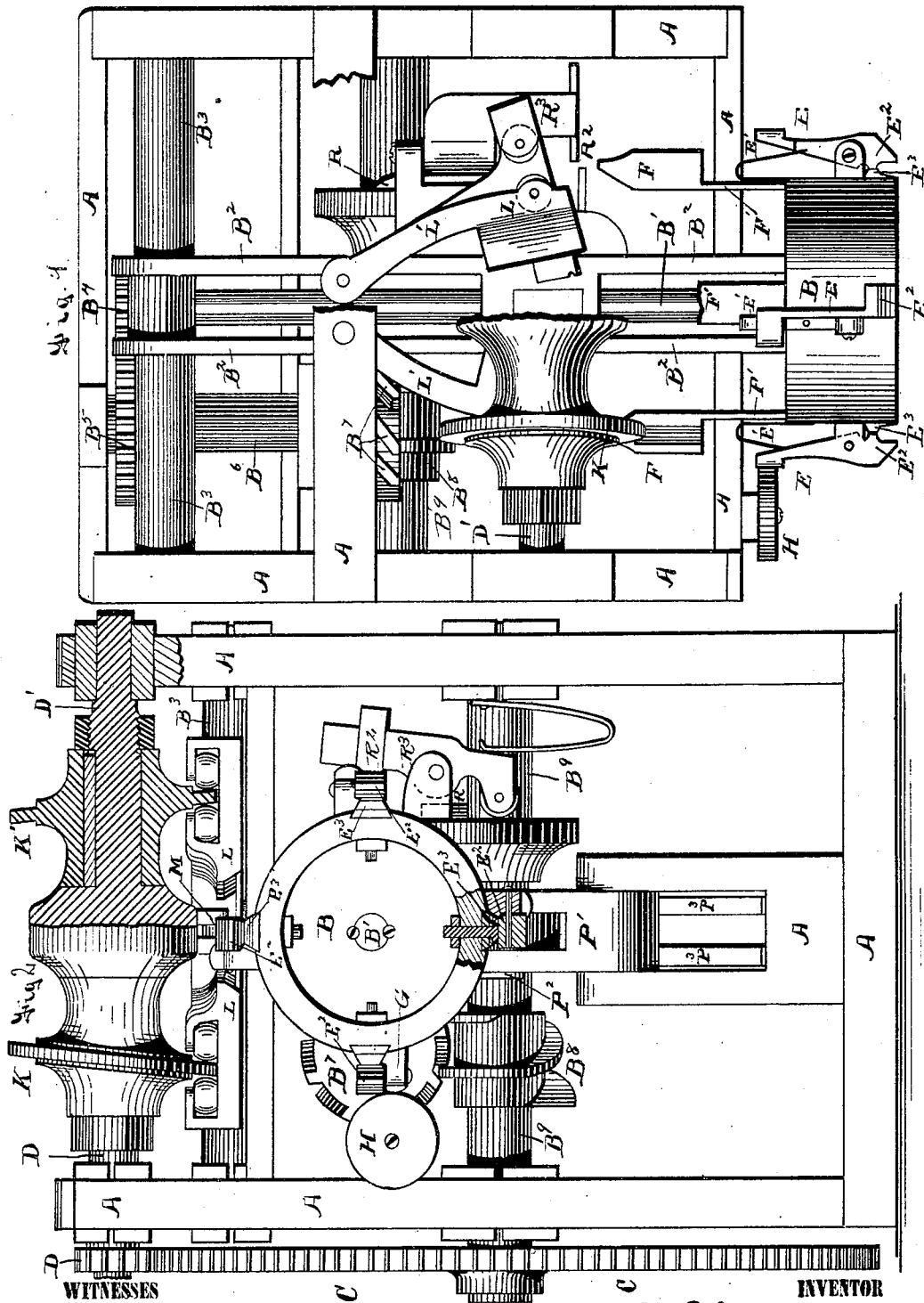
3 Sheets—Sheet 1.

B. L. BLANCHARD.

Machine for Forging Horseshoe Nails.

No. 242,587.

Patented June 7, 1881.



WITNESSES
 Frank M. Tabor
 William C. Donnelly

INVENTOR
 B. L. Blanchard
 By *Seignett & Seignett*
 ATTORNEY

B. L. BLANCHARD.

Machine for Forging Horseshoe Nails.

No. 242,587.

Patented June 7, 1881.

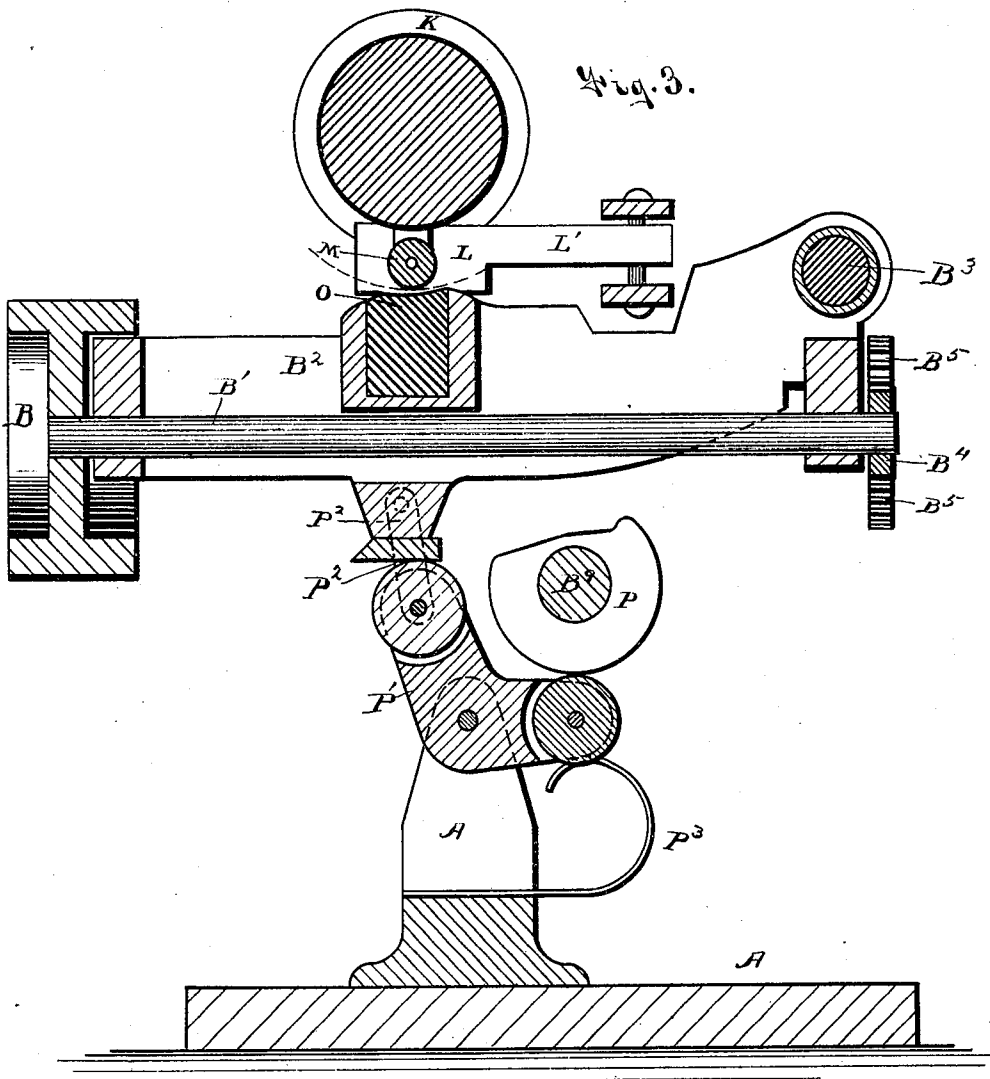


Fig. 3.

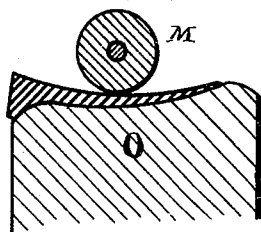


Fig. 4.

WITNESSES

Frank M. Taylor
 William C. Donnelly

INVENTOR

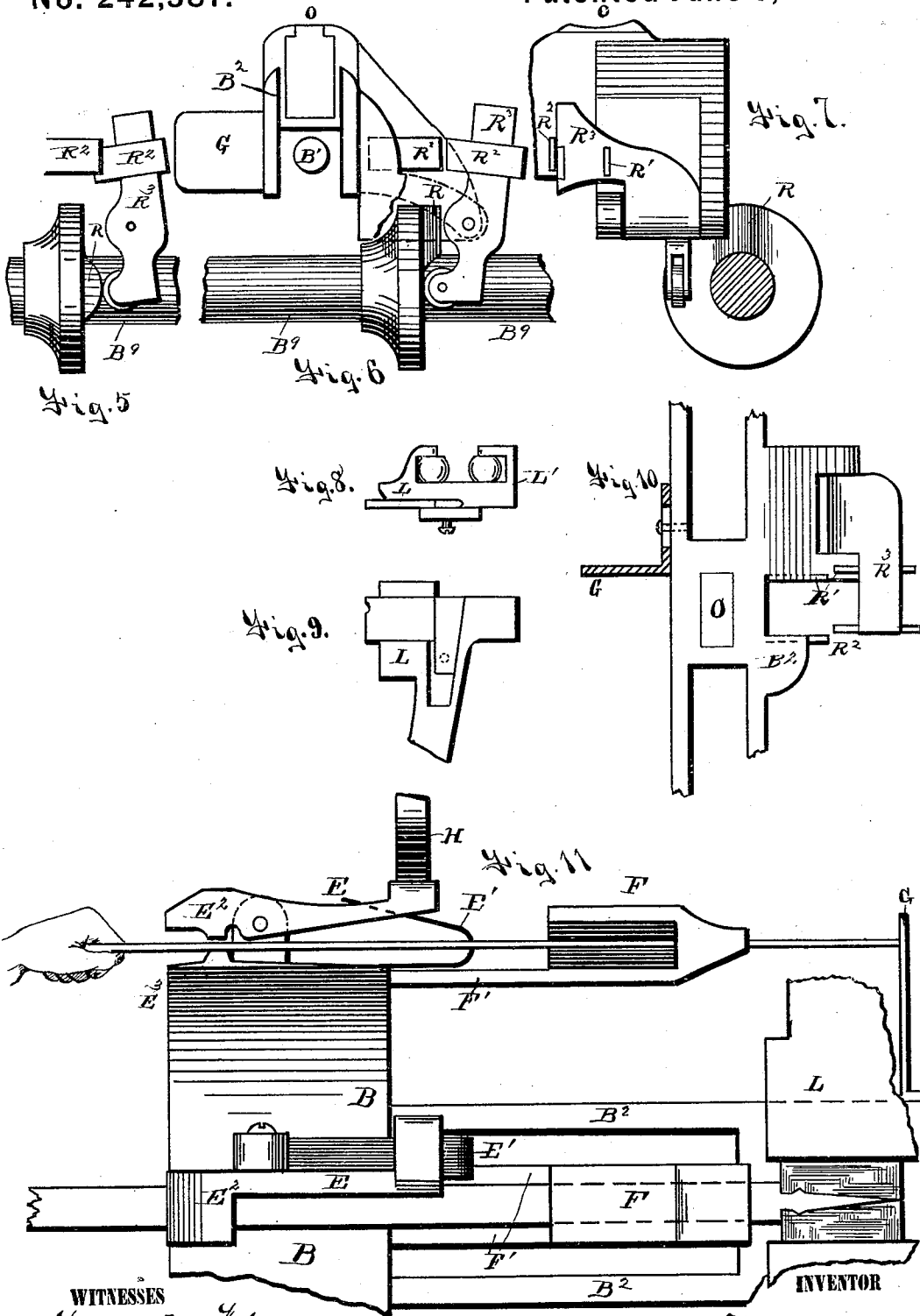
B. L. Blanchard.
 By Dequette & Dequette,
 ATTORNEY

B. L. BLANCHARD.

Machine for Forging Horseshoe Nails.

No. 242,587.

Patented June 7, 1881.



WITNESSES
 Frank M. Talbot
 William G. Donnelly

B. L. Blanchard
 By Leggett & Leggett ATTORNEY

UNITED STATES PATENT OFFICE.

BENJAMIN L. BLANCHARD, OF CLEVELAND, OHIO.

MACHINE FOR FORGING HORSESHOE-NAILS.

SPECIFICATION forming part of Letters Patent No. 242,587, dated June 7, 1881.

Application filed June 4, 1880. (Model.)

To all whom it may concern:

Be it known that I, BENJAMIN L. BLANCHARD, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Forging Horseshoe-Nails; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to machinery for forging horseshoe-nails from a rod or bar of wrought-iron; and it consists, substantially, in the following parts and combination of parts, constructed, combined, and adapted to operate in the manner hereinafter specified.

In the drawings, Figure 1 represents a plan view of a machine constructed according to my invention, with some of its parts removed to expose hidden parts beneath. Fig. 2 is a view, in front elevation, (part section,) of said machine. Fig. 3 is a view of said machine in vertical section, taken on a line transverse to the axis of the main shaft. Fig. 4 is a detail view of the anvil and the roller-hammer. Figs. 5, 6, and 7 are detached views of the cutting apparatus, showing the same in its various stages of operation. Fig. 8 is a detached view of the anti-friction bearings between which the disks K K' revolve. Fig. 9 is a detached view, showing a wedge method of adjusting the side hammers in position. Fig. 10 is a plan view, showing in detail the cutting-blades and the stop-plate G; and Fig. 11 is a detached plan view, showing in detail the operation of the feeding and clamping mechanism.

In the said drawings, A is a frame, constructed preferably of metal and of such shape and dimensions as are required to hold and accommodate the various working parts of my device. The mechanism held by and operated within the frame A may be divided into three classes—viz., the feeding, the forging, and the cutting. All these are connected together and combined in such a manner as to be driven from a single shaft, and to operate in harmony and concert as a single automatic machine which shall receive the bar from which the nail is to be made, forge said nail into shape while it is still attached to the end of the bar, and

then cut off the nail from its bar when finished.

Taking the above classes of mechanisms in their order, the first to be described is the feeding mechanism. This is essentially a gripping device, which receives and retains the wrought-iron rod or bar from which the nail is to be formed and cut. Several of these gripping devices (four in the machine shown in the drawings) are placed upon a single head or cylinder, B, which is fixed upon the end of a shaft, B', journaled in a frame, B², which frame has a rear pivotal attachment, B³, to the frame A. At the rear end of the shaft B' is a pinion, B⁴, which meshes into a gear-wheel, B⁵, fixed upon a shaft, B⁶, journaled to the frame A. Upon the inner end of the shaft B⁶ is carried a peculiarly-shaped gear-wheel, B⁷, which combines the features substantially of a worm-gear and of a lock as concerns its operation in connection with the worm B⁸, fixed upon the secondary shaft B⁹, journaled in the frame A. Fixed also to the shaft B⁹ is a gear-wheel, C, meshing into and actuated by a driving-pinion, D, fixed upon the main shaft D', to which shaft the driving-power for the machine is applied. The proportion between the driving-pinion D and the gear-wheel C is preferably about ten to one, although as to this exact proportion I do not limit myself, as it may be nine, ten, or eleven to one, or otherwise, according to the number of times that it is desired to hammer the nail during its process of forging. The worm B⁸, gear-wheel B⁷, and the wheels B⁵ and B⁴ are all so proportioned in relation to the driving-pinion D and gear-wheel C that the gripping-head B shall receive exactly a quarter-turn for every complete revolution of the wheel C. This revolution, however, of the griper-head B is not a continuous one, but an intermittent one. It is moved a quarter-turn, and stopped in such a position that one of its gripers shall each time present the rod properly to the forging apparatus, while another griper is presented to the feeding apparatus and the cutting apparatus. During the time that the forging process is going on the griper-head is held stationary by the engagement between the straight portion of the worm-gear B⁷ and worm B⁸. As soon, however, as the forging process is finished the worm B⁸ turns the wheel B⁷, and through the shaft and gear-wheel con-

nection B⁶, B⁵, B⁴, and B' the griper-head B is given a quarter-turn, and then again stopped until the next succeeding nail is forged. This operation is repeated in succession as long as the machine is working.

Each griper consists of a lever, E, pivoted after the manner of a lever of the first order upon the griper-head B. The long arm of the lever E is pushed upward by a spring, E', which operates to press the short or biting arm E² down against a suitable surface, E³, formed upon or attached to the griper-head B in such a manner as to hold the nail-rod placed between E² and E³. On a line in front of each griper is a guiding feed-nose, F, through which the nail-rod passes just before it reaches the forging apparatus. Each feed-nose F is attached to the griper-head B by a spring-shank, F'. The spring-shanks F' allow of an elastic yielding motion to the feeding-noses F. This element is important for the reason that these shanks are so adjusted as to lift the nail from the anvil after each operation of the hammers, and thus prevent its sticking or clogging during the process of forging.

G is an adjustable stop attached to the frame B², and it constitutes an element of the feeding mechanism, as it is placed to limit the distance to which the nail-rod is to be fed to the machine. Whenever a feeding-nose, F, comes opposite to the plate G the lever E of that particular griper impinges against a wheel or cam, H, in such a manner as to open or release the gripe of the arm E², and allow the nail-rod to be manually or automatically moved forward to a distance limited by the adjustable plate G, which plate is suitably adjusted for the length of nail to be made.

Having thus described the feeding mechanism, the forging mechanism is next in order to be specified. This consists of apparatus for hammering or forging the nail alternately upon its sides and face. The forging mechanism consists of two slanting disks, K K', rigidly fixed upon the main shaft D'. These disks are constructed to engage with the side hammers, L L. These hammers are fixed upon arms L', pivotally attached to the frame A. These arms are constructed to have a horizontal swinging movement. The slanting disks K K' are adjusted oppositely to each other in such a manner as to impart to the side hammers, L L, an approaching and receding motion in relation to each other. The disks K K' are also adjusted to open or separate the side hammers, L L, at the time when the rotary or upper hammer, M, (which is in the shape of a roller fixed upon and projecting from the main shaft D') is performing its forging operation. Thus constructed and relatively adjusted it will be seen that as the nail-rod rests upon the anvil O it receives in alternation a stroke from the hammer M and the hammers L L. The number of strokes that the nail shall receive during the process of forging is dependent upon the relative proportions of the pinion D and gear-wheel C.

The wearing-surfaces of the hammers LL should be made of separate pieces detachably attached, and adjustable in their bearings. This adjustability can be effected by abutting screws or wedges, whereby an exact position of the hammers L L can be accurately fixed. This is evidently a matter of great importance, inasmuch as upon this adjustment depends the shape of the nail, and on this account the striking-faces of the hammers L L are shaped in counterpart of the nail they are to form. In this respect they perform the compound function of hammers and dies.

The above describes the essential elements of the forging mechanism of my device. I shall now proceed to a specification of the cutting mechanism. This mechanism is intended to operate to sever at one operation the point of the nail and to cut the finished nail from the nail-rod. The first operation after the nail is forged upon the anvil O is to impart a drop motion to the frame B², which carries the anvil O. This drop is to bring the finished nail down so that it may be carried underneath the hammers L L as the head B revolves toward the cutting mechanism. This dropping motion of the frame B² and anvil O is effected through a cam, P, fixed upon the secondary shaft B⁹. This cam P is so formed as to operate to retain the frame B² in its lifted position during the whole time that the nail is being forged, and to suddenly drop it after the forging operation is finished, and retain it dropped until the next succeeding nail-rod is brought over the anvil O, when it again operates to raise the frame B² to its elevated position. The connection between the cam P and the frame B² is the angular lever P' and one or two links, P², connecting the end of the angular lever P' with the frame B². The lever P', which is pivoted to the frame A, is provided at either end with an anti-friction roller for evident purposes, and a spring, P³, fixed to the frame A, bears against the lever P' in such a manner as to keep it at all times in close juxtaposition with the cam P.

Instead of the spring P³, a weight suitably applied can be employed to keep the lever P' and cam P always in contact with each other.

R is a cutter-cam fixed rigidly upon the secondary shaft B⁹. The shears R' operate to trim or sever the extreme point of the nail. One blade of the shears R' is attached to the frame B² and the other is adjustably secured to the lever R³. Shears R² operate to sever the finished nail from the rod. One blade of the shears R² is attached to the frame B² and the other to the forward face of lever R³. The shears R' R² are located at a suitable distance apart to properly trim the point of the nail and sever it from its rod. These shears consist each of two blades, one fixed in or upon the frame B² and fastened by suitable set-screw arrangement, and the other blade carried by lever R³, which is pivoted to an extended portion of the frame B². The cam R impinges against the lever R³ in such a manner as to

bring the blades of the shears R' R^2 into cutting function whenever a nail is presented to them after it is forged. The cutting-blades of the shears R' and R^2 , which are carried by the lever R^3 , are adjustably fixed within said lever, and are made detachable for the purposes of renewal and repair.

Having now described the construction of my invention, its operation is briefly as follows:

10 A nail-rod is fed through one of the noses F to an extent limited by the plate G . It is then, by the revolution of head B , carried up to the anvil to be forged, and, while being forged, another nail-rod is brought up opposite the feeding-plate G , and is fed forward. Meanwhile the forging operation is going on and the griper-head B is maintained stationary. When the forging operation is completed the griper-head and its frame B^2 suddenly drops, allowing the forged nail to move underneath the hammers down to the cutters, where it is severed from the rod and its imperfect point cut off at the same time. Meanwhile the next preceding nail is being forged and another nail-rod brought opposite the plate G to be fed.

A feature of my device, which constitutes one of its important characteristics, is illustrated in Fig. 4 of the drawings. The object of the construction shown in this figure is to impart to the nail a tapering form. This is accomplished by forming the nail-fate of the anvil on the arc of a circle eccentric to the circle described by the revolution of the rotating hammer M . By this construction, as illustrated in Fig. 4 of the drawings referred to, the nail, as there indicated, will be given its tapering form. The anvil, as indicated, should also have the shape of a die to form the head of the nail.

40 What I claim is—

1. In a horseshoe-nail machine, the combination, with the vibrating frame B^2 , rotary griper-head B , attached to a revolving shaft supported in frame, anvil O , secured to frame B^2 , and hammers L , L' , and M , of the cam P and bell-crank lever P' , for raising and lowering the frame and anvil at proper intervals of time, substantially as set forth.

2. In a horseshoe-nail machine, the combi-

nation, with the vibrating frame B^2 , provided with anvil O , of the rotary griper-head B , attached to a revolving shaft supported in the vibrating frame, and hammers L , L' , and M , substantially as set forth.

3. In a horseshoe-nail machine, the combination, with a vibrating frame, B^2 , provided with an anvil, O , and the hammers L , L' , and M , of the rotary griper-head B , provided with a series of gripers, each consisting of the lever E E^2 and spring E' , and a rotary presser, H , for opening the gripers at the desired intervals of time, substantially as set forth.

4. In a horseshoe-nail machine, the combination, with a vibrating frame, B^2 , provided with anvil O , the hammers L , L' , and M , of the rotary griper-head B , provided with a series of gripers, and a series of feed-noses F , the latter being connected with the griper-head by means of spring-shanks F' , rigidly secured thereto, substantially as set forth.

5. In a horseshoe-nail machine, the combination, with a vibrating frame, B^2 , provided with anvil O , the hammers L , L' , and M , of the rotary griper-head B , provided with a series of gripers and yielding feed-noses, the releasing-roller H , and adjustable gage or stop G , substantially as set forth.

6. In a horseshoe-nail machine, the combination, with a vibrating frame, B^2 , provided with anvil O , rotary griper-head B , and the hammers L , L' , and M , of a shaft provided with a cam for raising and lowering the vibrating frame B^2 , and worm-gearing, substantially as shown and described, for imparting an intermittent motion to the shaft of the rotary griper-head, substantially as set forth.

7. The combination, with the vibrating frame B^2 , provided with anvil O , and rotary griper-head B , of the hammers L , L' , and M , and shears R' R^2 , substantially as set forth.

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

BENJAMIN L. BLANCHARD.

Witnesses:

JNO. CROWELL, Jr.,
WILLARD FRACKER.