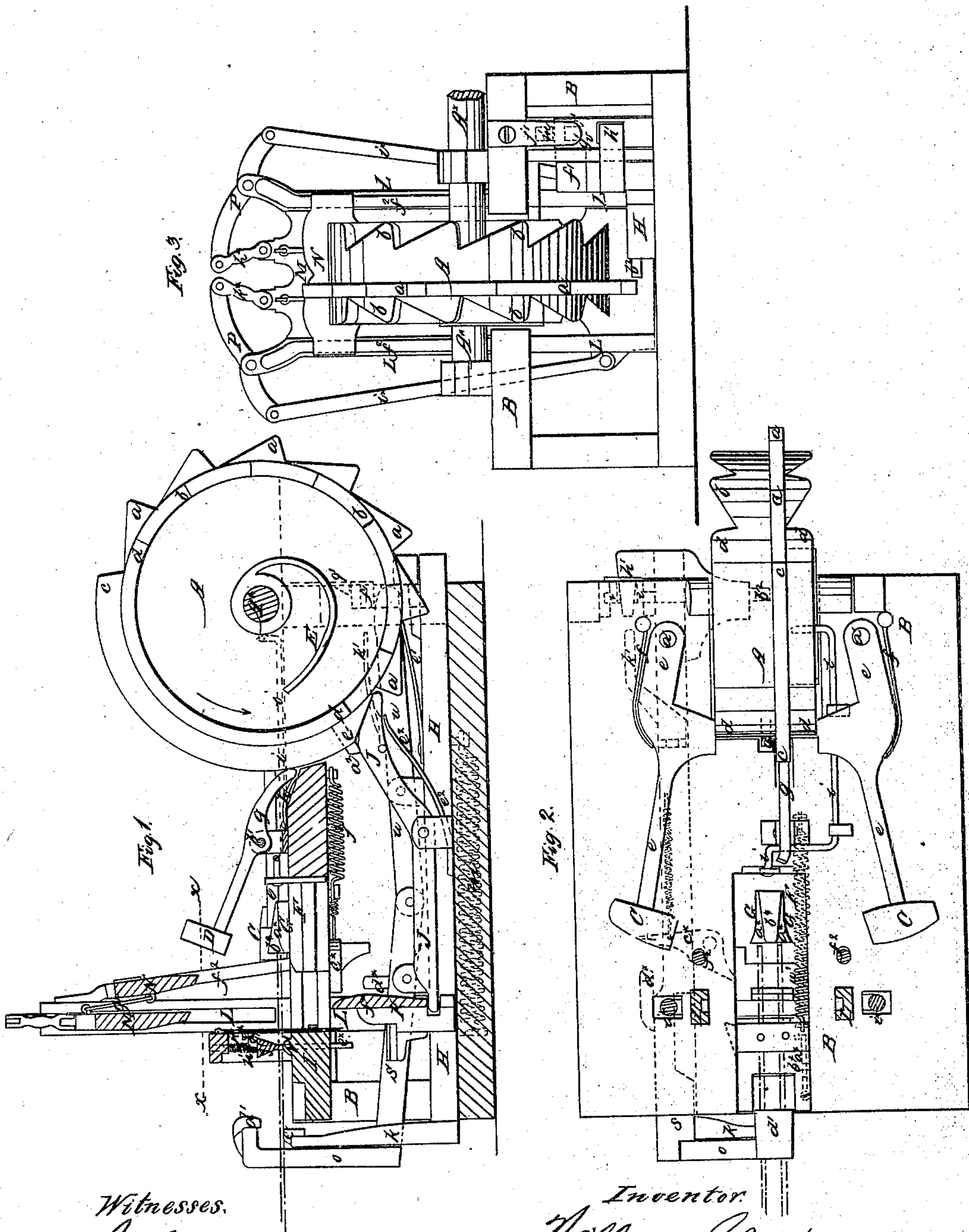


W. SHARTS.
MACHINE FOR MAKING HORSESHOE NAILS.

No. 66,642.

Patented July 9, 1867.



Witnesses.
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Letters Patent No. 66,642, dated July 9, 1867.

IMPROVEMENT IN MACHINES FOR MAKING HORSE-SHOE NAILS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM SHARTS, of Hudson, in the county of Columbia, and State of New York, have invented certain new and useful improvements in Nail-Forging Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings making a portion of this specification, in which—

Figure 1 is a vertical longitudinal section of a machine constructed according to my invention.

Figure 2 is a horizontal section of the same.

Figure 3 is a rear elevation of the same.

Similar letters of reference indicate corresponding parts in all the figures.

This invention is designed more especially for the manufacture of horse-shoe nails, and it consists in an anvil of peculiar construction, in combination with suitable forging hammers, whereby two nails may be forged simultaneously, and whereby the nails may be brought to the required shape with great exactness.

The invention further consists in so operating the aforesaid anvil that it shall have a sliding movement with reference to the hammers and to the nail-rods, whereby the forging operation is very much facilitated.

The invention further consists in a novel construction of cutters with the forging mechanism, whereby the pointed ends of the nails may be cut off simultaneously with the severing the said nails from the nail-rods.

The invention further consists in a novel means of gauging and feeding the nail-rods to the forging mechanism; and, furthermore, in certain novel combinations of parts, whereby the more efficient working of the principal features of the invention is secured.

To enable others to understand the construction and operation of my invention, I will proceed to describe it with reference to the drawings.

The cam-wheel A is secured upon a transverse driving-shaft, A*, situated at the rear end of the frame B, and has formed in a portion of its circumference a series of cams, *a*, and formed upon each side of the said cam-wheel, adjacent to and concentric with the cams *a*, is a series of laterally projecting cams *b*, the number of cams being the same in all the said series. Formed concentric with the plain portion *c* of the circumference of the cam-wheel A, one upon each side thereof, is a semicircular rib, *d*. The cams *b* operate to spread apart the horizontally moving hammers C, the helvcs *e* of which are pivoted, as shown at *a*¹, and which are forced inward by springs *f*, the circumferential cams *a* operating in a similar manner upon the rear end of the helve *g* of the vertically moving hammer D, which is pivoted, as shown at *b*¹, to elevate such hammer, the same being forced downward by the action of a spring, *h*. A laterally extending cam, E, is attached to one side of the cam-wheel A, at the central part thereof. This cam operates a sliding-bar, *i*, which moves forward a sliding-block, F, which slides in suitable longitudinal guides formed in the top of the frame B, and has firmly fitted upon it the anvil G. The anvil G is constructed with two nearly horizontal faces *a*^{*}, the surfaces of which correspond to the curvature or inclination of the flat sides of the nails to be forged, and which are situated one upon each side of the raised centre portion *b*^{*}, the two lateral faces of which are so formed as to correspond with the desired shape of the edges of such nails. The faces *a*^{*}, just hereinbefore mentioned, taper or diminish in width toward their forward ends in a form answering to that of one of the flat sides of a finished nail, as indicated in fig. 2. The upper side of the central portion *a*^{*} is so shaped that the width of the lateral faces thereof correspond to that of the edges of the finished nail, the said surface of such central portion serving as a guide for the hammer D, in forging the flat sides of the nail, and the lateral or outer edges of the faces *a*^{*} serving as guides for the hammers C in forming the edges of the nails, as hereinafter further set forth. A spring, *j*, shown in fig. 1, draws back the sliding block with the anvil attached thereto, when the same is released from the action of the cam E. H represents a horizontal bar, which slides longitudinally in the lower portion of the frame B, and is furnished with an upwardly extending arm, *k*, at its forward end, at the upper extremity of which is formed or attached the lower jaw *c*['] of the tongs that feed the nail-rods to the forging mechanism. The forward movement of this bar is produced by a spring shown in dotted outline at *m*, in fig. 1, and the backward or feeding movement thereof by means of a radial spur, *a*², projecting from the circumference of the cam-wheel A, and which acts upon a lateral stud formed upon the rearmost end of the said bar,

and shown in dotted outline at b^2 , in fig. 2. The upper jaw d of the aforesaid feeding-tongs is formed upon the upper end of an arm, o , which extends up from the forward end of a lever, s , which is pivoted upon the bar H , and the inner end of which is pivoted to the inner end of a similar lever, u , also pivoted to the bar H , and the outer end of which is pressed upward by a spring, e^1 , the rear end of the lever u being made sloping at its upper side, and working underneath an inwardly projecting spur, f^1 , formed upon a vertical slide, v . This slide has a slot, g^1 , formed thereon, as shown in fig. 3, the lower side of such slot being made sloping, and being acted upon to depress the slide by the forward movement of the inclined under side of a spur, h^1 , which is attached to the rear end of the bar H , and of course moves therewith. A spring-catch, j^1 , holds upon the top of this slide to hold the same in a depressed position when the bar H and the parts attached thereto are moved forward, the said catch being forced back to permit the slide to rise at the end of the backward stroke or movement of the bar H , by means of a small bar or rod, k^1 , attached to the bar H , and the extremity of which passes through a long slot formed in the slide v , and shown at m^1 in fig. 3. Placed in the same guides as sliding-block F , and between the said block and the jaws c^1 d^1 of the feeding-tongs, is a solid sliding-plate, I , upon which are situated two vertical guides n^1 , and formed upon the said plate, between such guides, is a gripping-jaw, r^1 . Sliding vertically in the guides n^1 is another gripping-jaw, s^1 , which is pressed downward to grip the nail-rods by springs u^1 . This sliding gripping-jaw is held up away from the other jaw r^1 , when required, by means of a spring-catch, e^* , the end of which extends downward below the under surface of the sliding-plate just mentioned, and which catches upon a stud, o^1 , attached to the gripping-jaw, s^1 , as shown in fig. 1. Projecting down from one end of the moving jaw s^1 , is a small rod, $c+$, the lower end of which is passed through a loop formed in the end of a spring-catch, $a+$, the said rod serving to raise the aforesaid gripping-jaw, as hereinafter fully explained. The backward movement of this sliding-plate is produced by a spiral spring, W^1 ; its forward movement is derived from that of the block F . A horizontal lever, shown more fully in dotted outline at c^* , in fig. 2, and the outer arm of which is moved forward by an upright stud, d^* , upon the sliding-bar H , serves to disengage the sliding gripping-jaw when required, as hereinafter set forth, the inner end of the said lever acting upon the downwardly projecting end of the spring-catch aforesaid. J shows a strong lever, which is situated in the lower part of the frame B , and the rear arm of which is pressed by a spring, e^2 , upward against the circumference of the cam-wheel A , and the forward end of which is attached to a vertically sliding block, K , which moves between the lower portions of vertical standards L , and to which is attached the knife or cutter f^* . Sliding between the upper portions of these standards L is an upright knife, M , and connected therewith by rods or straps g^* , is another similar knife, N , which slides on separate guides f^2 . P indicates two levers, which are pivoted, one at the upper end of each of the standards L , and which are connected at their inner ends with the sliding-knife M by means of links h^* , and at their outer ends with the vertically sliding block K , by means of connecting-rods i^* , in such manner that an upward movement of the vertically sliding block just mentioned will produce a downward movement of the knives or cutters M N , and *vice versa*.

In the operation of the machine, a suitable furnace for heating the nail-rods is placed in front of the said machine, and a rotary movement in the direction of the arrow, shown in fig. 1, is communicated to the cam-wheel A . The aforesaid rods, two in number, have their inner portions passed between the jaws d^1 c^1 of the feeding-tongs, and between the gripping-jaws s^1 r^1 , with their inner extremities so situated as to come one upon each side of the central part b^* of the anvil G , when the same is moved forward, as presently herein set forth. The nail-rods being in this position, as shown in red outline in figs. 1 and 2, the several hammers D and C are kept spread apart by the action upon their helms of the plain portion e of the circumference of the cam-wheel and the semicircular ribs d upon the sides thereof. The continued movement of the cam-wheel A causes the spur a^2 thereof to strike the stud b^2 of the bar H , and thus force the said bar backward, whereupon the sloping upper surface of the rear end of the lever u passing under the lateral inwardly projecting spur f^1 of the slide v , is depressed in such manner as to operate the lever S , to bring downward the jaw d^1 toward the other jaw c^1 of the feeding-tongs to grasp the nail-rods between them; and the gripping-jaw having been first elevated by the action of the spur a^2 upon the lever J , as hereinafter further shown, and being held in such elevated position by the spring-catch e^* , as hereinbefore mentioned, the backward movement of the bar H draws back the jaws d^1 c^1 , and thus feeds the rods inward until their inner ends are brought one upon each side of the forward end of the central portion b^* of the anvil G , which, being done, the end of the rod k^1 passes through the slot m^1 , and forces out the spring-catch j^1 , thus releasing the slide v , and allowing the spring e^1 to press upward the rear arm of the lever u , to spread apart the jaws d^1 c^1 , to release the nail-rods from the grasp thereof. The spur a^2 of the cam-wheel then passes through the spur b^2 and the spring m forces forward the sliding-bar H , and thus brings the jaws d^1 c^1 to their original position, this return movement of the bar H causing the stud d^* to strike the outer arm of the lever c^* , and operate the same to press back upon the lower end of the spring-catch e^* , and thus disengage the sliding gripping-jaw s^1 , which being forced down by the springs u^1 , the nail-rods are firmly gripped between the two gripping-jaws s^1 r^1 , and held thereby during the foregoing operation. The nail-rods being thus brought into position, with their inner ends partially over or upon the faces a^* of the anvil G , and one upon each side of the central part b^* thereof, the cams a raise the hammer D alternately with the outward movement of the horizontally moving hammers C , (the outward movements of which are produced by the lateral cams b ,) and the said hammers being forced inward to the anvil by the springs h and f , as hereinbefore explained, partially forge the end portions of the nail-rods and the said end portions being thus partially elongated, the cam E , acting through the rod i , moves forward the sliding-block F , which carries the anvil G , and also forces back the sliding-plate I , and all the parts attached thereto, the anvil being thus carried forward in such manner that the ends of the nail-rods are acted upon by the forging-hammers, notwithstanding the elongation of the aforesaid end portions of the same. The nails are thus "drawn," as it were, gradually into shape by the forging operation. And inasmuch as the lateral edges of the faces a^* act as

guides to limit the inward movement of the hammers C, and the upper side of the central portion b^* acts in like manner as a guide for the hammer D, as hereinbefore explained, it follows that the under sides and the inner edges of the nails will be shaped respectively by the faces a^* , and the sides or faces of the central portion b^* , while the upper sides and outer edges of the said nails will be shaped respectively by the hammer D and the laterally moving hammers C.

The forging operation being thus completed, the cam E releases the rod i , whereupon the spring j draws back the sliding-block F, and the anvil thereon, the sliding-plate I, which carries the gripping-jaws, being held stationary at this part of the operation by the spring-catch $a+$, which catches upon the fixed stud $b+$, when the aforesaid plate is pushed quite forward to its limit by the forward movement of the block F. The plain portion c of the circumference of the cam-wheel, and the semicircular ribs d of the said wheel, then operate to spread apart the three hammers as hereinbefore fully explained, and the radial spur a^2 acts upon the rear end of the lever J, which, forcing upward the cutter f^* , and also operating simultaneously through the connecting-rods i^* , levers P, and links k^* , forces downwards the cutters M N. The cutter N cuts off the pointed extremities of the nails, the said extremities being supported by that portion of the block F in front of the anvil G; simultaneously with which the cutters M and f^* coming together sever the nails from the rods, the said nails falling downward through the space left, as just explained, between the block F and plate I. The upward movement of the slide K, in raising the cutter f^* , forces upwards the vertically sliding rod $c+$, and thus disengages the catch $a+$ from the stud $b+$, in order that the plate I may be drawn back by the spring w' , after the descent of the cutter f^* , and elevation of the cutters M N, which takes place as soon as the spur a^2 passes from the end of the lever J; the aforesaid upward movement of the sliding-rod $c+$, also raising the sliding gripping-jaw s so that the same is caught by the spring-catch e^* and retained in an elevated position while the nail-rods are again fed forward to the forging mechanism by the action of the spur a^2 upon the spur b of the sliding-bar H, whereupon the forging operation is repeated upon the ends of the nail-rods to form the succeeding nails.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The anvil G, constructed as described, in combination with the hammers C and D substantially as and for the purpose specified.
2. Imparting to the anvil G a sliding movement with reference to the hammers and the nail-rods, as described, during the forging operation, substantially as and for the purpose specified.
3. The gripping-jaws arranged upon the sliding-plate I, and in relation with the sliding anvil G and the jaws d^1 e^1 of the feeding-tongs, substantially as and for the purpose herein set forth.
4. The cam-wheel A, with the several series of cams a b , plain circumferential portion c , and semicircular ribs d , in combination with the three hammers C D, all constructed and arranged substantially as and for the purpose specified.
5. The cutters M N f^* , in combination with the system of levers and the wheel A, all constructed and arranged substantially as and for the purpose specified.
6. The sliding-bar H, provided with the spur h^1 , and the levers s u , arranged in combination with each other and with the slide V and the radial spur a^2 of the wheel A, for the purpose of operating the jaws d^1 e^1 of the feeding-tongs or mechanism, substantially as and for the purpose specified.
7. The combination of the spring-catch e^* , rod c^* , sliding gripping-jaws s^1 and the vertically moving slide K, substantially as and for the purpose specified.
8. The sliding-rod c^* , spring-catch $a+$, stud $b+$, arranged in relation with each other and with the sliding-plate I, sliding gripping-jaws s^1 and spring-catch e^* , substantially as and for the purpose specified.

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Witnesses :

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