Adolph Oehmes Imp.d Machine for Forming & Channeling Horseshoes.

3 Sheets--Sheet 1.

Patented Oct. 17, 1871.

No. 120,087.

Fig: 1.

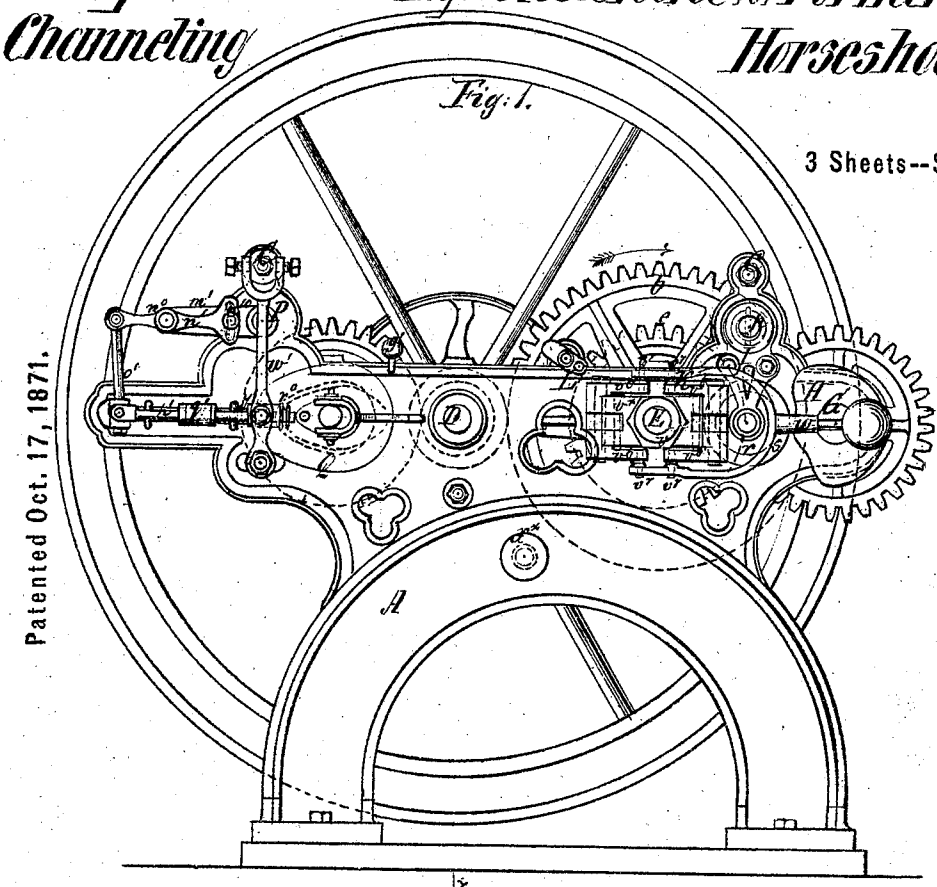
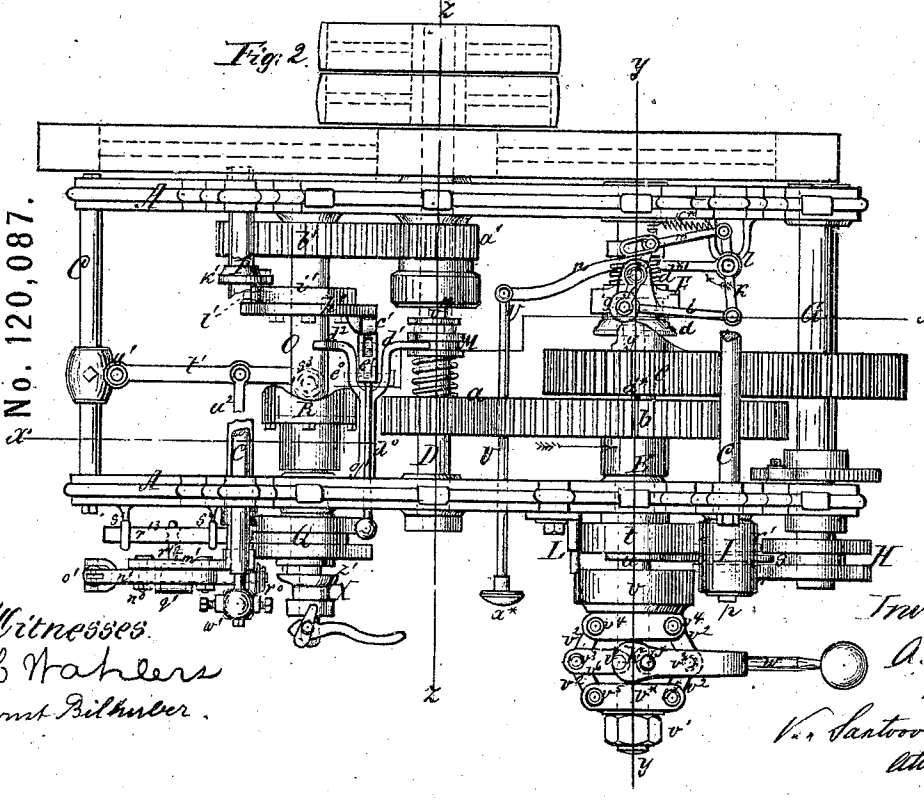


Fig: 2.



Witnesses.
C Wahlers
Ernst Bilhuber.

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A. Oehme
per
V. Santwood & Sons
Attys

Adolph Oehme's Impd Machine for Forming & Channeling Horseshoes.

3 Sheets--Sheet 2.

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Fig: 3.

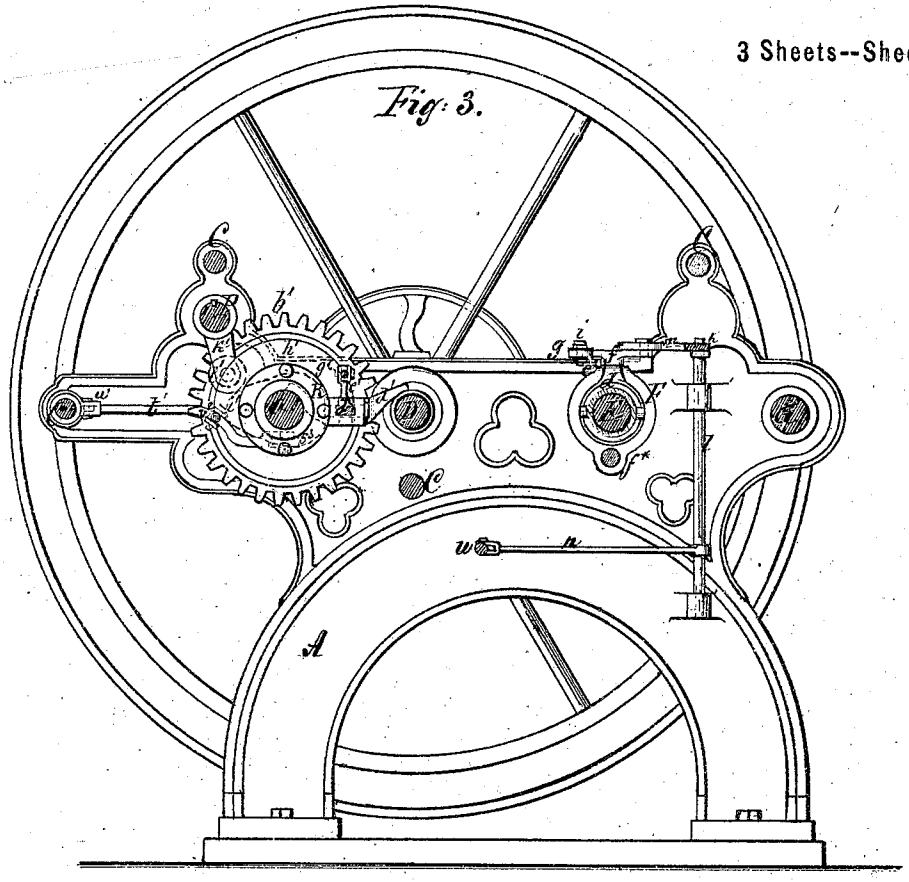


Fig: 4.

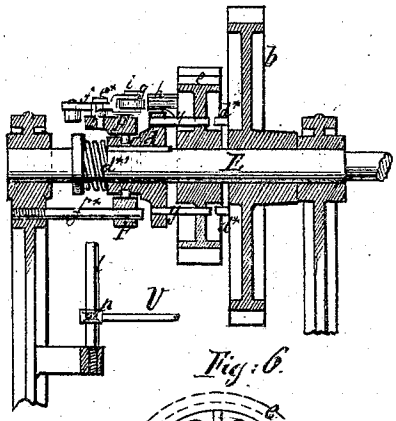


Fig: 5.

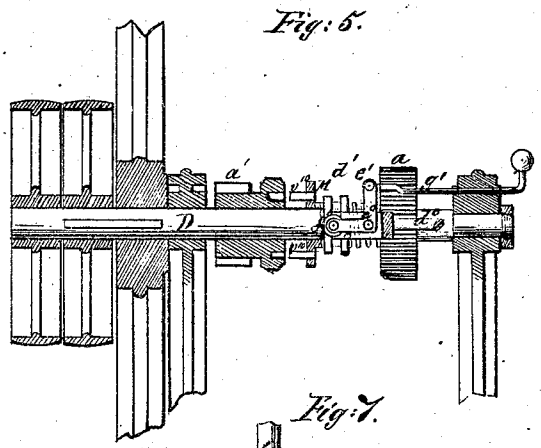


Fig: 6.

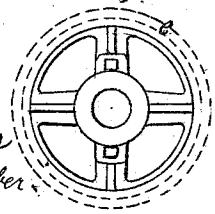


Fig: 7.

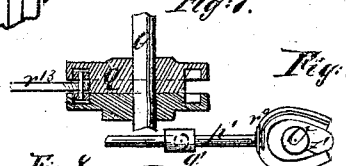


Fig: 9.

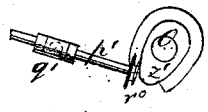
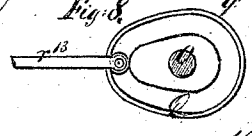


Fig: 10.

Fig: 8.



Witnesses.
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Fig: 15.

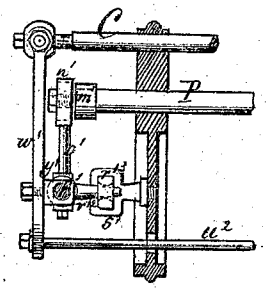


Fig: 11.

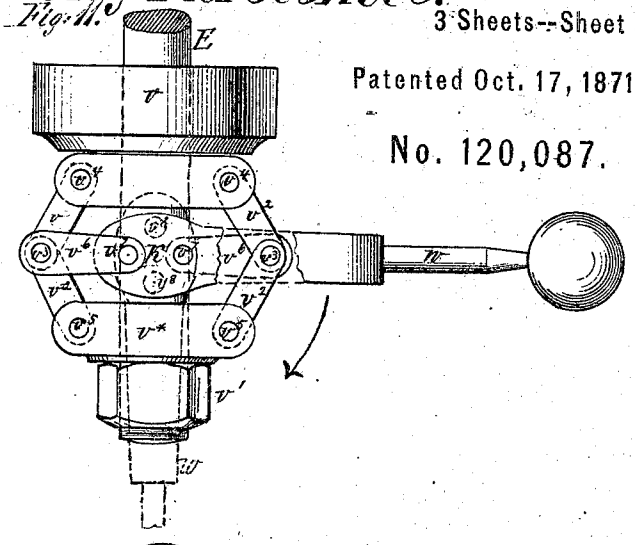


Fig: 12.

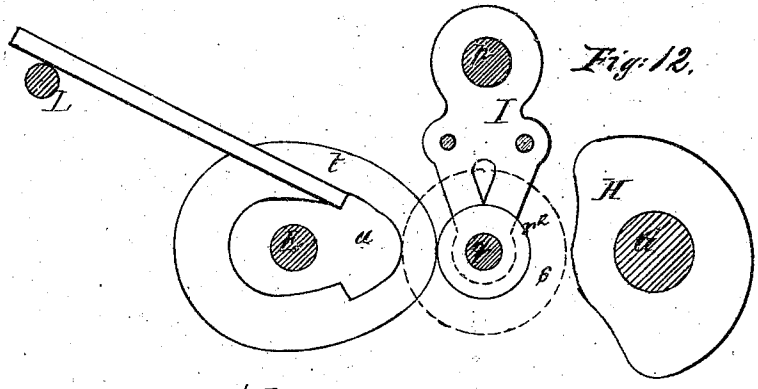


Fig: 14.

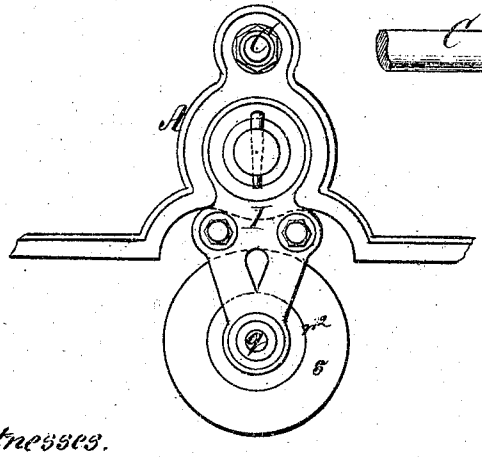
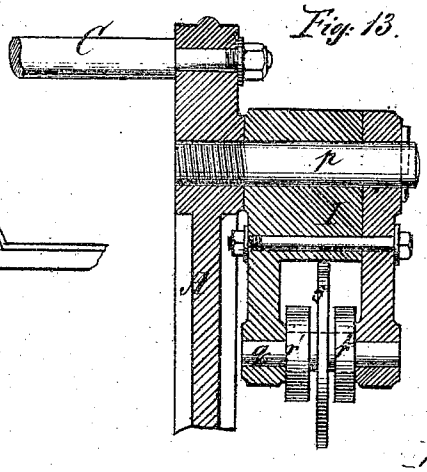


Fig: 13.



Witnesses.

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Ernst Bilhuber.

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UNITED STATES PATENT OFFICE.

ADOLF OEHME, OF ROCK ISLAND, ILLINOIS.

IMPROVEMENT IN MACHINES FOR BENDING AND CHANNELING HORSESHOES.

Specification forming part of Letters Patent No. 120,087, dated October 17, 1871.

To all whom it may concern:

Be it known that I, ADOLF OEHME, of Rock Island, in the county of Rock Island and State of Illinois, have invented a new and Improved Machine for Forming and Channeling Horseshoes; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a front view of my improved machine. Fig. 2 is a plan or top view thereof. Fig. 3 is a longitudinal vertical section of the same, the line *x x*, Fig. 2, indicating the plane of section. Fig. 4 is a transverse section of the same in the plane indicated by the line *y y*, Fig. 2. Fig. 5 is a similar section taken in the plane indicated by the line *z z*, Fig. 2. Figs. 6 to 15, inclusive, are details which will be referred to as the description progresses.

Similar letters indicate corresponding parts.

This invention relates to a machine for bending iron into the form of horseshoes, or into chain-links, or other articles of a similar shape; and and also for channeling the horseshoes after the iron has been bent, though I will here remark that by channeling the bars of iron previous to introducing them into the bending-machine, that part of the mechanism which serves for channeling the horseshoes may be omitted. My improvements consist, principally, in a pendulum lever, carrying a roller, which is pressed up by the action of a cam against the metal bar, so as to bend the same over the forming-die. The forming-die is secured on a shaft which stops automatically after it has completed one revolution, to give time for the removal of the finished horseshoe, and for the introduction of a fresh blank. The blanks are clamped on the forming-die by a toggle mechanism. The roller-die used in my machine for channeling the horseshoes has a compound motion, whereby the same is allowed to follow the eccentricity of the horseshoe, to place itself in a tangential position toward the curve of the channel, and to be forced in against the face of the horseshoe to the required depth. The shaft which carries the horseshoe to be channeled stops automatically after each revolution.

In the drawing, A designates a frame which forms the bearings for the working parts of my machine, the side pieces of said frame being firmly connected by traverses C. D is the main shaft, on which are mounted a fast and loose pulley, (see Figs. 2 and 5,) and also a fly-wheel close to the outside of the frame A; and within the frame is mounted on said main shaft the cog-wheel *a*, which gears into a cog-wheel, *b*, mounted loosely on the shaft E, and serves to impart motion to the same in the direction of the arrow shown near it in Figs. 1 and 2. Close to the cog-wheel *b* is another cog-wheel, *e*, also placed loosely on the shaft E, and this cog-wheel is provided with four arms, two of which are perforated with holes parallel to the shaft, and on opposite sides thereof, (see Fig. 6,) said holes being intended to receive keys or projections *y* secured to a sleeve or clutch, *d*, which slides on the shaft E in the direction of its length, being compelled to revolve with the same by a feather key, (see Fig. 4.) If the clutch *d* is moved up toward the wheel *e*, the projections *y* pass through the holes in the arms of said wheel and catch against studs *d** projecting from the inner surface of the cog-wheel *b*, and as this cog-wheel revolves its motion is transmitted to the cog-wheel *e*, to the clutch *d*, and through this to the shaft E. The hub of said clutch is provided with an annular groove, into which project two pins secured in the inner circumference of the strap F. This strap embraces a pin, *f**, situated below the shaft E, (see Fig. 4,) so that it (the strap) can be moved toward and from the cog-wheel *e*, and the clutch *d* is subjected to the action of a spring, *d**, which has a tendency to force the same in toward the cog-wheel *e*. From the upper part of the strap F rises a pin, E*, which forms the fulcrum of a lever, *f*, and in the front end of this lever is mounted a friction-roller, *g*, which bears on a cam, *h*, projecting from the cog-wheel *e*, (see figs. 2 and 4,) so that by this cam the strap, together with the clutch *d*, are forced back against the action of the spring *d**, and the projections *y* of the clutch do not engage with the cog-wheel *e* until the roller *g* is thrown off from the cam *h*. The arbor of the roller *g* projects through one end of a rod, *i*, the opposite end of which is pivoted to a lever, *k*, which is mounted on the top end of a vertical rock-shaft *l*, (see Fig. 3.) The lever *k* extends beyond the rock-shaft *l*, and its rear end connects by a link, *m*, with lever *f*, the connection between these two parts being ef-

fected by a slot, which straddles a pin projecting from the lever *f*, so that by the said slot the motion of the lever *f* is confined within certain limits. To the rear end of the lever *k* is secured a spring, *k**, which has a tendency to keep said lever, together with the roller *g*, in the position shown in Fig. 2, the lever *f* being prevented, by the slot in the link *m*, from turning back beyond the desired point. On the lower part of the rock-shaft *l* is mounted a lever, *n*, which connects with a rod, U, that extends through the front of the frame A, and carries on its end a cushion, *x**, so that, by pressing against this cushion the rod U is forced in, the rock-shaft *l* is turned in the direction of the arrow marked near it in Fig. 2, and the roller *g* is forced off from the cam *h*. When this is done, the clutch *d* is forced in toward the cog-wheel *e*, the projections *y* of the clutch are driven through the holes in the cog-wheel *e*, and, as the cog-wheel *b* revolves, the studs *d**, projecting from the side of the same, come in contact with the projections *y*, thereby imparting motion to the cog-wheel *e* and to the clutch *d*, and by the action of the clutch the motion is transmitted to the shaft E. When this shaft, together with the cog-wheel *e*, has completed one revolution, the cam *h* strikes the roller *g*, (the cushion having been released as soon as the motion of the shaft E commences,) and the clutch *d* is returned to its original position, throwing the projections *y* out of contact with the studs *d**, and the motion of the shaft E stops. The cog-wheel *e* gears in a similar cog-wheel mounted on the shaft G, on the end of which is mounted the cam H. This cam is composed of two disks, (see Fig. 2,) which act on two rollers, r^1 r^2, mounted in a pendulum, I, (see Figs. 13 and 14,) that is suspended from a pivot, *p*, secured to the main frame A. The rollers r^1 r^2 turn loosely on a pin, *q*, which has its bearings in the lower end of the pendulum I, (see Fig. 13) and on which is also mounted the steel disk *s*, that is situated between the rollers r^1 r^2, and projects between the two parts of the cam H, as shown in Figs. 2, 13, and 14. Said steel disk *s* acts against the forming-die *u*, which is mounted on the shaft E, between two jaws, *t v*, as shown in Fig. 2, being firmly attached to the surface of the jaw *t*, which is rigidly secured to the shaft E. The jaw *v* is mounted loosely on the shaft E, and it connects, by means of a toggle-mechanism, K, with a bracket, *v**, which slides on the shaft E, and abuts against a nut, v^1, screwed on the end of said shaft. The toggle mechanism K is operated by a lever, *w*, which may be operated by hand, or which may be so arranged that it is operated automatically by the machine at the proper intervals. The toggle mechanism consists of two pairs of toggle-arms, v^2, (see Fig. 11,) each pair being hinged together by pivots, v^3, and connected to the jaw *v* by pivots v^4, and to the bracket *v** by pivots v^5. The lever *w* is bifurcated and it straddles the toggle-arms, being connected to the fulcrum-pins v^3 of said toggle-arms, above and below, by links v^6. These links are fastened to the inner end of the lever by pivots v^7 situated at a certain distance apart, (see Figs. 1, 2, and 11,) so that by swinging the lever out to the position indicated by dotted lines in Fig. 11, the pivots v^7 are brought to the points v^8 and thereby the toggle-arms are straightened and the jaw *v* is forced up toward the jaw *t*. The iron bar which is to be formed into a horseshoe is heated to a white heat and then introduced between the jaws *t* and *v*, being supported by the pin L and by a shoulder on the forming-die *u*, as shown in Fig. 12; then the lever *w* is swung out so as to clamp the iron between the jaws *t* and *v*, the distance to which the jaw *v* closes up, being regulated by the nut v^1 to correspond to the thickness of the iron bar. As soon as the bar has been thus adjusted between the jaws *t v*, the workman, by pressing with his knee against the cushion *x**, pushes in the rod U, Fig. 2, the roller *g* is thrown out of contact with the cam *h* and the shafts E and G are started. By the action of the cam H and disk *s* the bar of iron is bent around the forming-die *u*, and when the shafts E and G have completed one revolution, their motion stops, the lever *w* is turned back to its original position and thereby the completed horseshoe is released so that it can be taken off from the die *u*. It will be readily understood, that by changing the form of the cam H and that of the forming-die *u*, horseshoes of different shape or size can be formed by my machine. After removing the horseshoe from the forming-die *u*, I immediately expose the same to the action of the mechanism for channeling the same, which I will now proceed to describe. On the main shaft D, Figs. 1, 2, and 3, is mounted loosely a cog-wheel, *a'*, the hub of which is provided with two recesses to admit the keys v^{10}, which, when not retained by the cam *c'* and fork d^1, are forced up against said hub by the action of a spiral spring wound around the shaft D. The keys v^{10} are secured in a sleeve or clutch, M, which is fitted on the shaft D with a feather-key, and which is provided with a circular groove to admit the fork d^1. This fork branches off from a slide, d^0, which is provided with a second fork, d^2, branching off in a direction opposite to the fork d^1 and embracing the shaft O, (see Fig. 2,) while the front end of said slide rests in a slot in the main frame. Through the bifurcated inner end of the slide d^0 extends a pin, e^0, which forms the fulcrum of an elbow-lever, e^1, one arm of which carries the friction-roller *f'*, while its other vertical arm is pivoted to the starting-bar *g'* which extends to the front side of the main frame over the slide d^0. (See Figs. 2 and 5.) A suitable stop prevents the arm of the elbow-lever *e'*, which carries the friction-roller *f'*, from sinking down below a horizontal position. The friction-roller *f'* bears against a cam, *c'*, secured to a disk, *h'*, which is mounted on the shaft O. The cog-wheel *a'* of the main shaft D engages with cog-wheel *b'* mounted on the shaft O, and on this shaft is also mounted an eccentric, *i'*, which may be secured to the disk *h*. If the shaft O revolves, the eccentric *i'* acts upon a roller, *l'*, secured in the bifurcated end of a lever, *k'*, which is mounted on a rock-shaft, P, that has its bearings in the side pieces of the main frame A and extends

through the front of said frame, bearing on its end an arm, m', to which is secured a lever, n^1, by means of a pivot, n^0, and a screw, n^{10}. This screw passes through a slot in the lever, (see Fig. 1,) so that said lever can be turned on its pivot and adjusted in the desired position. From the end of the lever n^1 is suspended a link, o', the bottom end of which is pivoted to the forked end of a rod, p', that carries on its opposite end the sharp-edged roller-die r^0. The rod p' is supported by an eye, q', being prevented from sliding through the same by two collars, one on each side of said eye. From this eye extends a pivot, r^{12}, through a hole in the slide r^{13}, which moves in guides s^1 secured to the main frame. To the end of said slide are secured two rollers, (see Fig. 7,) which engage with cam-grooves in the inner surfaces of the disks Q which are mounted on the shaft O outside the main frame, as shown in Figs. 1 and 2. When the shaft O revolves, therefore, the cam Q imparts to the slide r^{13} a reciprocating motion, which motion is transmitted to the rod p' by means of the pivot and eye q'. On the shaft O is mounted a cam, R, which acts on a roller, s^3, secured in the end of a lever, t', which has its fulcrum on a pivot, u^1, secured in a bracket attached to one of the traverses of the main frame. (See Fig. 2.) Said lever connects with a rod, u^2, (see Fig. 2,) which extends through the front piece of the main frame and is attached to a pendent lever, w', (see Figs. 1 and 15,) which is suspended from the end of one of the traverses of the main frame so that it can fully swing in and out. To this pendent lever is secured a fork, y', which embraces the rod p' and forms the connection between it and the pendent lever w', thereby compelling said rod to follow the motions imparted to the lever w' by the action of the cam R on the lever t'. The horseshoe, as the same is removed from the forming-die u of the bending mechanism, is placed on a die, z', which is secured to the side of the cam Q, and it is clamped fast between said cam and a jaw, X, which slides on the end of the shaft O and to which motion is imparted by a hand-lever and toggle mechanism, as shown in Fig. 2 of the drawing. By pulling the rod g' out, the friction-roller f' is lifted off from the cam c', the clutch M is thereby released and caused to engage with the cog-wheel a', and motion is imparted to the shaft O. The cam i' imparts to the shaft P a rocking motion, which, being transmitted to the rod p', keeps the roller-die r^0 in the required tangential position in regard to the horseshoe clamped on the die z'. In order to illustrate the necessity of this motion of the roller-die I have shown the same in two different positions in Figs. 9 and 10. At the same time a traversing motion is imparted to the roller-die toward and from the shaft O by the action of the cam Q on the slide r^{13}, causing the same to follow the eccentricity of the horseshoe, and, finally, said roller-die is pressed in against the horseshoe, at the proper places, by the action of the cam R on the lever t', rod u^2, and pendent-lever w'. When the shaft O has completed one revolution, the clutch M is forced back by the action of the cam t' on the roller f' and the channeled horseshoe is taken off from the die z', and, after a fresh blank has been introduced, the operation is repeated. If the iron bars used for forming the horseshoes are already provided with channels, the operation of channeling, as above described, can be dispensed with.

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

1. The pendulum I, carrying the rollers r^1 r^2 and a disk, s, in combination with a cam, H, acting on the rollers r^1 r^2, and with the forming-die, all constructed and operating substantially in the manner herein shown and described.

2. The cam h acting on a roller, g, in the lever f, which connects, by rods m i, with a lever mounted on a rock-shaft, l, to which motion is imparted by the starting-bar U, in combination with the shaft E carrying the forming-die u and with the cog-wheels which impart motion to the shafts E and G, substantially in the manner and for the purpose herein set forth.

3. The toggle mechanism K, constructed substantially as shown, in combination with the jaws v t and the forming-die u mounted on the shaft E, as specified.

4. The roller-creasing die r^0, mounted on a rod, p', in combination with the mechanism for reciprocating said rod longitudinally to bring the creasers to and from the shoe, and mechanism to draw the creasers down upon the shoe, as and for the purpose set forth.

ADOLF OEHME.

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