(No Model.) 2 Sheets—Sheet 1.

J. ROBERTS.

HORSESHOE MACHINE.

No. 494,166. Patented Mar. 28, 1893.

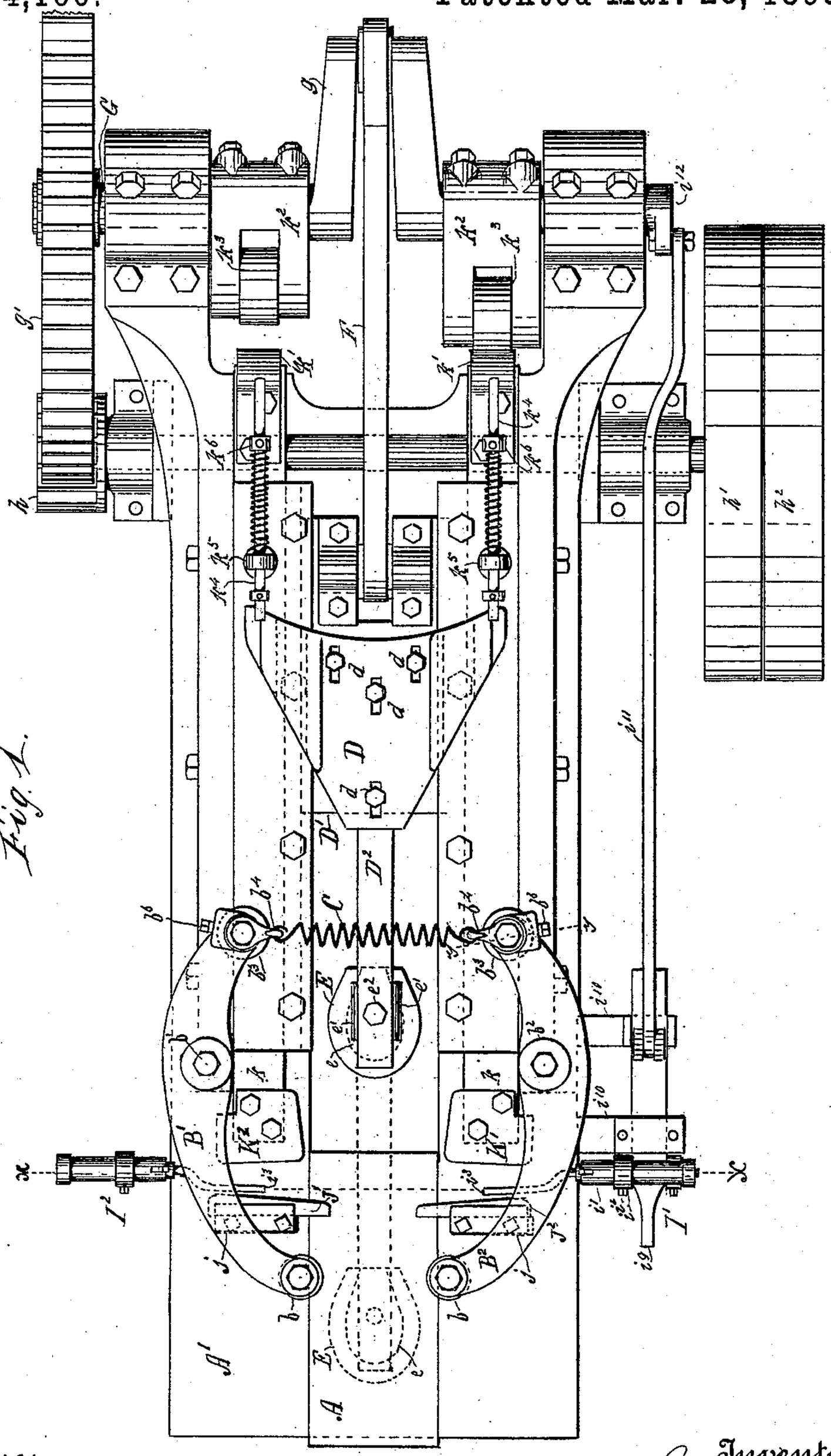

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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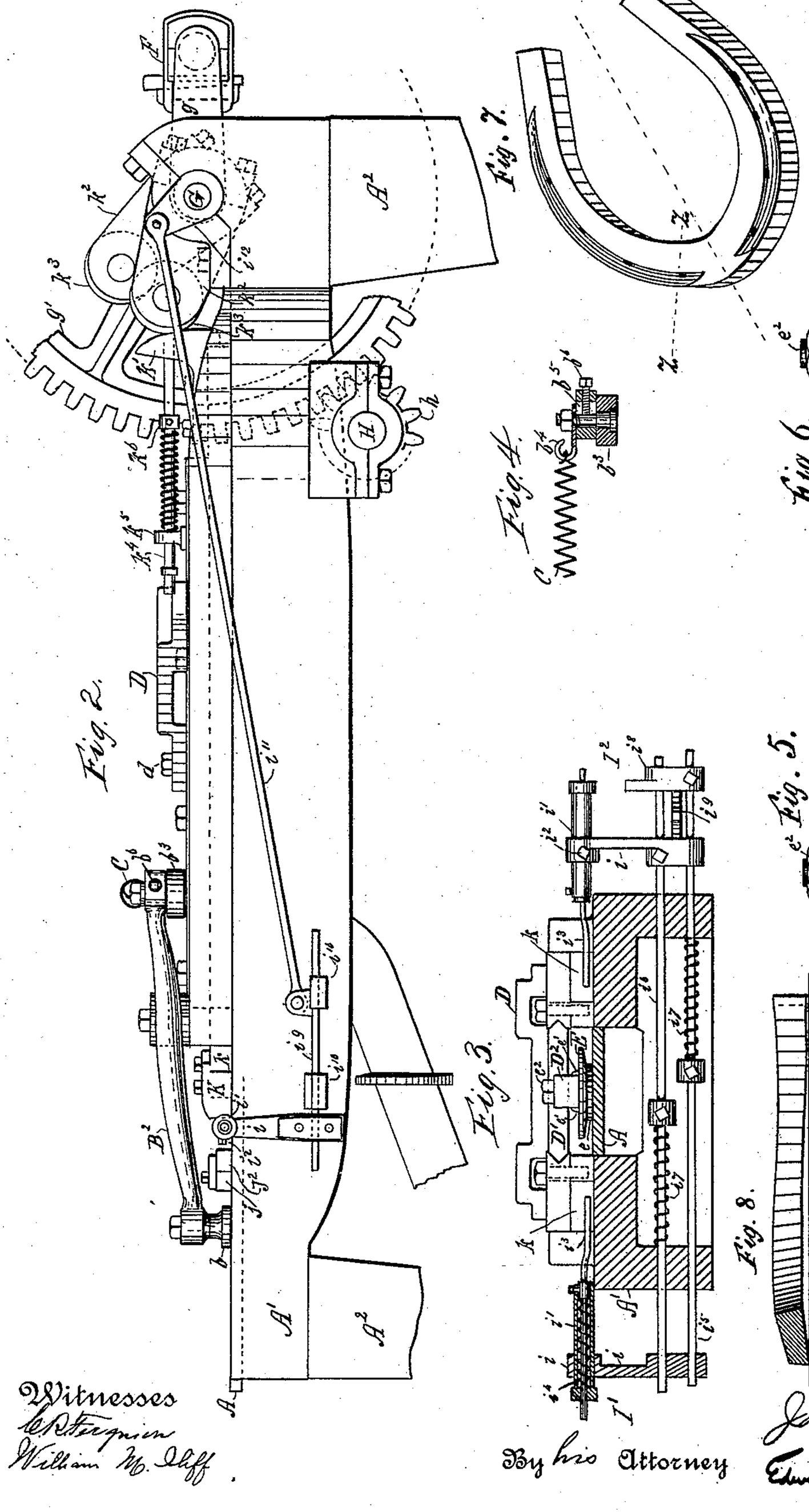

Fig. 2.

Fig. 3.

Fig. 4.

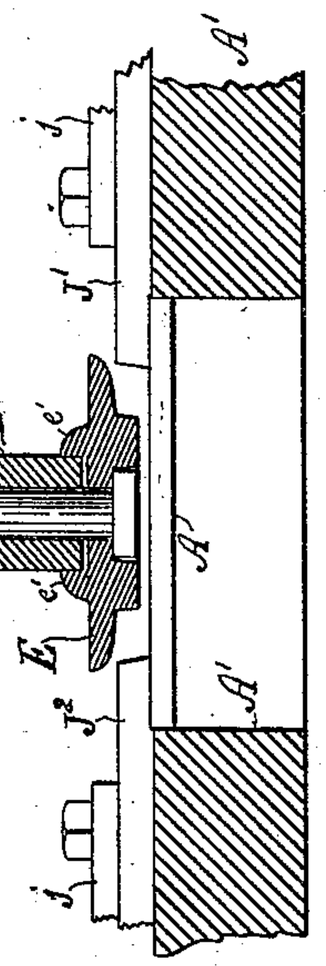

Fig. 6.

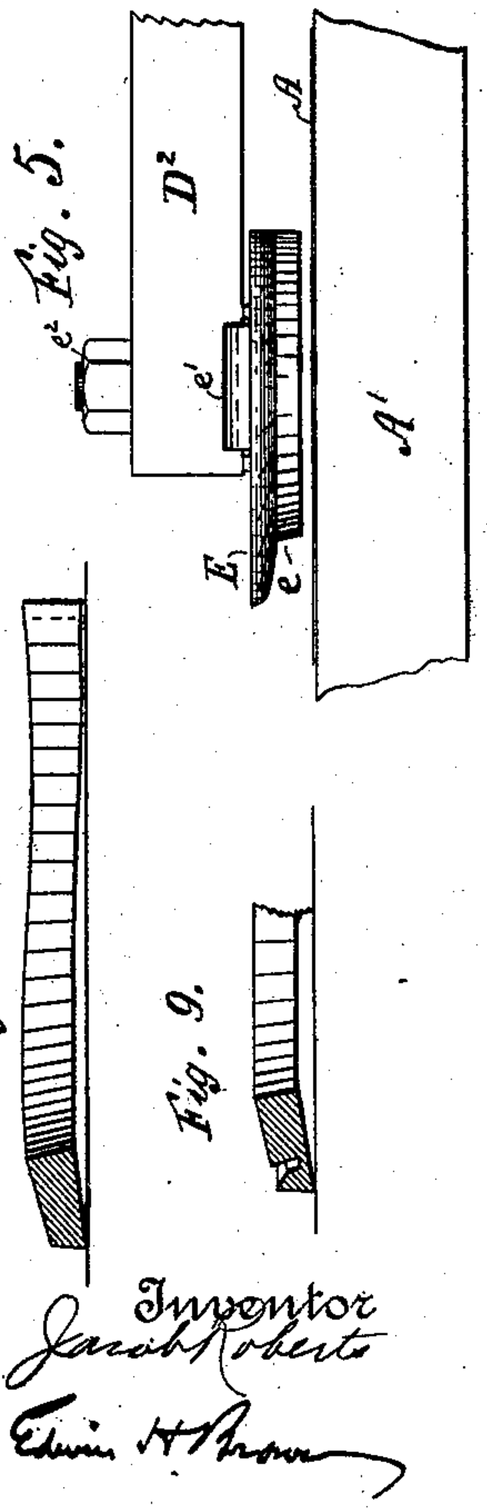

Fig. 5.

Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE.

JACOB ROBERTS, OF CATASAUQUA, PENNSYLVANIA.

HORSESHOE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 494,166, dated March 28, 1893.

Application filed March 19, 1891. Serial No. 385,594. (No model.)

To all whom it may concern:

Be it known that I, JACOB ROBERTS, of Catasauqua, Lehigh county, and State of Pennsylvania, have invented a certain new and useful Improvement in Machines for Forming Horseshoes or Horseshoe-Blanks, of which the following is a specification.

I will describe a machine embodying my improvement and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a top view of a machine embodying my improvement. Fig. 2 is a side view. Fig. 3 is a transverse section taken at the plane of the dotted line *x x* Fig. 1, certain parts being omitted. Fig. 4 is a sectional side view taken at the plane of the dotted line *y y* Fig. 1. Fig. 5 is an enlarged side view of certain parts. Fig. 6 is a transverse section on the same scale as Fig. 5, the plane of this section being at the center of the former. Fig. 7 is a perspective view of a horseshoe or horseshoe blank as it leaves my machine. Fig. 8 is a central longitudinal section of the horseshoe or horseshoe blank. Fig. 9 is a section of the horseshoe or horseshoe blank at the plane of the dotted line *z z* Fig. 7.

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

A designates a table. It is supported upon the top of a frame A′ which comprises legs A^2. The frame may be made of iron, but the table will preferably be made of steel, and, to afford facility for its renewal, it is set into a recess in the frame. Before being renewed or replaced by another table, it may be reversed end for end and also replaced upside down, so as to present new surfaces. This will prolong its usefulness very materially because most of the wear is at its middle.

B′ B^2 designate two arms fulcrumed by studs b' b^2 to the top of the frame A′. Each is shown as having its end extended somewhat toward the end of the other. The operative ends extend over the middle portion of the table A and are provided with loosely turning rollers *b*. The other ends are provided with anti-friction rollers b^3 and also with hooks b^4, to which the ends of a spring C are connected, which is here shown as of helical form. The spring C tends to pull the operative ends of the arms B′ B^2 which are furnished with the rollers *b* away from one another to hold them in position after such adjustment. With those ends of the arms B′ B^2 which are provided with the anti-friction rollers b^3 a sliding cam plate D coacts. This cam plate is of tapering form and is crowded between the anti-friction rollers b^3, so as to force the operative ends of the arms B′ B^2 carrying the rollers *b* toward each other.

The cam plate D is connected by screws *d* with a cross-head D′ affixed to the top of the frame A′. Preferably the cam plate will be longitudinally slotted so that it may be adjusted forwardly or backwardly upon the cross-head D′ and fastened after adjustment. This will provide for varying the time at which the operative ends of the arms B′ B^2 carrying the rollers *b* will be forced toward each other and consequently may be made to produce variations in the shapes of horseshoes. Further provision for the same purpose may be afforded by connecting the anti-friction rollers b^3 adjustably with the arms B′ B^2. I have represented the anti-friction rollers b^3 as adjustably connected with the arms by journaling them in bifurcate portions b^5 of said arms and forming in said bifurcate portions slots which extend transversely to the length of the arms, or, in other words, extend in each arm toward the other arm. Set screws b^6 are fitted in tapped holes formed at the outer sides of the bifurcate portions of these arms, and, after passing through the same, impinge against the studs upon which the rollers b^3 are mounted. By adjusting these set screws, the studs may be adjusted in the slots.

The cross-head D′ carries a former E consisting of a plate having its upper portion shaped substantially like the outer circumference of a horseshoe and having a downwardly projecting body *e* corresponding to the shape of the inner circumference of the horse shoe. The front or central portion of the body *e* is downwardly and rearwardly inclined, and the under side of its flange like portion upwardly and outwardly inclined. This former is secured to a rod D^2 affixed to and extending considerably beyond the cross-head D′. As here shown, the rod fits between clips or

ribs e' extending upwardly from the former and is fastened to the former by means of a screw e^2.

The cross-head D′ is reciprocated by means of a pitman rod F pivotally connected thereto at one end and at the other end to a crank g carried by a shaft G which is journaled in bearings in the top of the frame A′ and deriving motion through a gear wheel g' affixed to its end and engaging with a pinion h affixed to a driving shaft H. On the driving shaft H ordinary fast and loose pulleys h' h^2 may be used.

A piece of metal to be formed into a horseshoe or horseshoe blank will be placed across the table A, and as soon as the former E reaches it, it will be carried forward into contact with the rollers b of the arms B′ B². The movement of the former is continued and results in the bending of the piece of metal around its forward end. Owing to the movement of the rollers b toward each other by the action of the cam plate D upon the arms B′ B², the piece of iron will be bent inward so as to hug the body e of the former, and owing to the incline of the front portion of the body e the central or toe portion of the horseshoe blank resulting from the bending of the piece of iron will be bent at an incline as shown in Figs. 8 and 9. The advantage of thus bending the blank is to render it suitable for treatment in a finishing or pressing machine, forming the subject of another application. The rollers b are of course arranged in the same plane with the body e of the former to compass this.

Preferably the piece of metal, or the billet, as it is usually called, from which the horseshoe or horseshoe blank is formed will be swaged in the same machine. I will now describe means whereby this may be done.

I′ I² designate two centering devices. They are arranged opposite to each other on different sides of the frame A′. Each comprises an upright arm i and a tube i', which is fitted so as to be adjustable longitudinally in a collar formed at the upper end of the arm and fastened in said collar by means of a set screw i^2. The tube is arranged so as to be above the plane of the top of the frame A′. Each tube i' has fitted to it a finger i^3 which extends over the top of the frame A′ and nearly to the table A. Each finger is shown as bent to one side, but this is not essential. A spring i^4 is fitted in each tube i', so as to bear against the corresponding finger i^3 and press it longitudinally outward. In this way, the fingers of the two centering devices will be pressed toward each other. The arms i are fastened to rods i^5 i^6. Each arm is rigidly fastened to but one of these rods and the other rod passes freely through it. By thus combining two rods with each arm i, the arms will be maintained in an upright position. The rods i^5 i^6 pass through the side pieces of the frame A′ and are supported thereby. The rods i^5 i^6 have combined with them springs i^7, which as here shown are of helical form, coiled around them. Each spring bears at one end against a side of the frame A′ and at the other end against a collar fastened to the rod. The effect of the springs is to move the rods in such direction as to draw the arms i toward each other and hence to move the fingers i^3 toward each other. In the present instance, it may be assumed that the arm i of the centering device I′ is fastened to the rod i^5 and that the rod i^6 passes loosely through said arm. The rod i^6 has fastened to it outside of the arm i of the centering device I′ an arm i^8. This arm extends upwardly close to the arm i of the centering device I′, and between these two arms a wedge i^9 is reciprocated. When this wedge is drawn rearward or toward the shaft G, it allows the springs i^7 to draw the centering devices I′ I² toward each other, but when the wedge is moved in the reverse direction, it forces the centering devices farther apart against the resistance of said springs. The wedge is shown as working in guides i^{10} affixed to one side of the frame A′. Motion is imparted to it through a pitman rod i^{11} from a crank i^{12} affixed to the shaft G.

The centering devices will be periodically moved farther apart and afterward allowed to move toward each other. When they are moved farther apart, a piece or billet of metal is placed between them, and will be held by them when they move toward each other again. As they move toward each other with a yielding action owing to presence of the two sets of springs, they will adjust themselves to variations in the lengths of the billets and will always be centered.

Adjacent to the fingers of the centering devices swaging tools J′ J² are arranged. They are fastened in holders j which are secured to the top of the frame A′. The fingers of the centering devices will hold the billets or pieces of metal against these swaging tools J′, J².

K′ K² are other swaging tools co-operating with the swaging tools J′ J². They are mounted upon bars k fitted to guides with which the frame A′ is provided and reciprocate so as to carry the swaging tools K′ K² forcibly against the ends of a billet of metal held by the centering devices against the tools J′ J². The bars k have toes k' affixed to their rear ends and with these co-operate cams k^2 affixed to the shaft G. Preferably the cams will have rollers k^3 at the ends which coact with the toes. The toes, it will be seen, have their outer surfaces curved outward from the top toward the bottom, so that the action produced by the cams striking thereon is quick and similar to a hammer blow. It will be seen that the cams k^2 are set out of line. Owing to this, one end of that billet will be swaged before the other. After each swaging operation the blank may be centered by the co-operation of the springs

with the fingers i^3. The swaging is to give the usual formation to the heel portion of a horseshoe and is of course done before the bending or shaping of the billet into a shoe or shoe blank. The bars k are returned to their normal positions by means of rods k^4 which work in guides k^5 fastened to the frame A′, and are moved rearwardly by means of springs coiled around them between their guides and collars k^6 which are fastened to them.

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

1. In a machine for forming horse shoes or horse shoe blanks, the combination with bending mechanism and swaging mechanism, of centering devices consisting of longitudinally yielding fingers, arms carrying said fingers and in which they are longitudinally adjustable, two rods extending through side pieces of the machine frame and each rod being rigidly connected to an arm and passing loosely through the other arm, a spring for each rod and reciprocating ways or inclines for separating the centering devices, substantially as specified.

2. In a machine for forming horse shoes or horse shoe blanks, the combination with bending mechanism substantially such as described and intermittingly acting swaging mechanism, of centering devices each comprising an upright arm, a tube longitudinally adjustable in said arm, a finger extending into said tube, a spring within the tube for forcing the finger longitudinally, a rod rigidly attached to each of said arms and passing loosely through the other, springs for drawing said arms toward each other and means operated from the main shaft for separating them, substantially as specified.

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

JACOB ROBERTS.

Witnesses:
V. H. ROBERTS,
AUSTIN A. GLICK.