L. D. ROBERTS.

Horseshoe Machine.

No. 41,022. Patented Dec. 22, 1863.

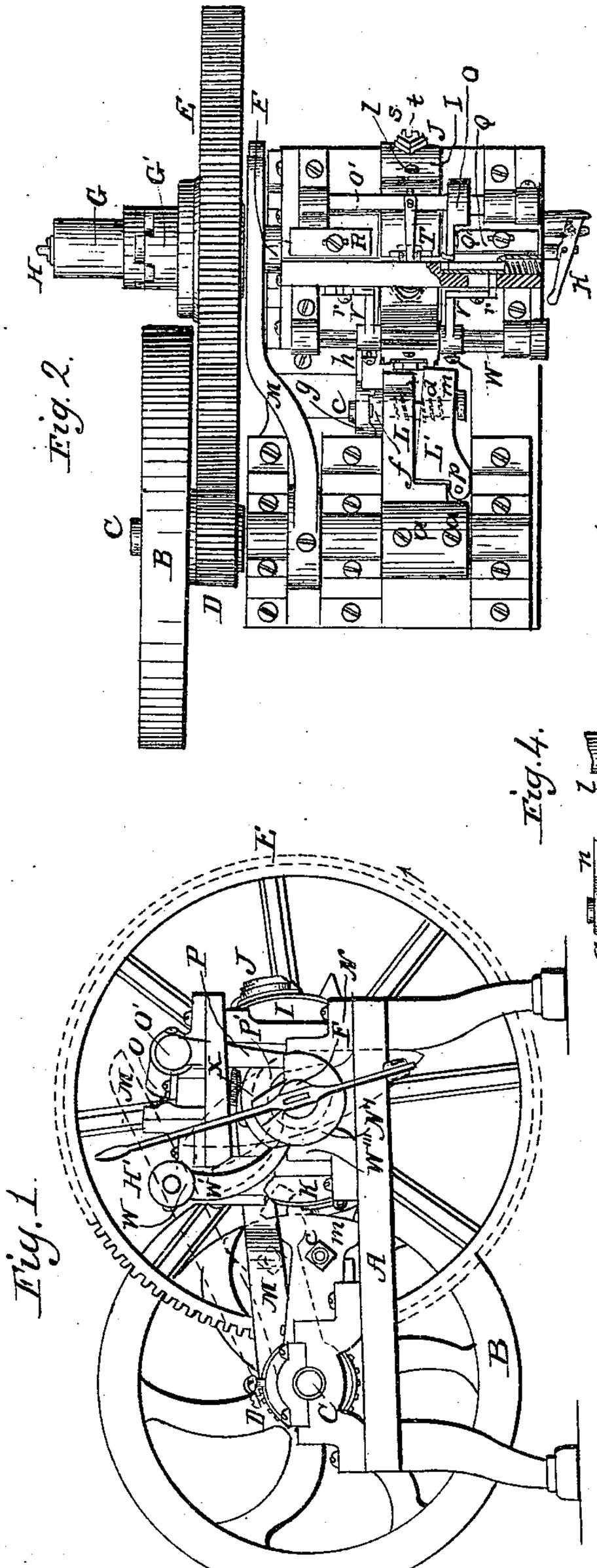

Fig. 1.

Fig. 2.

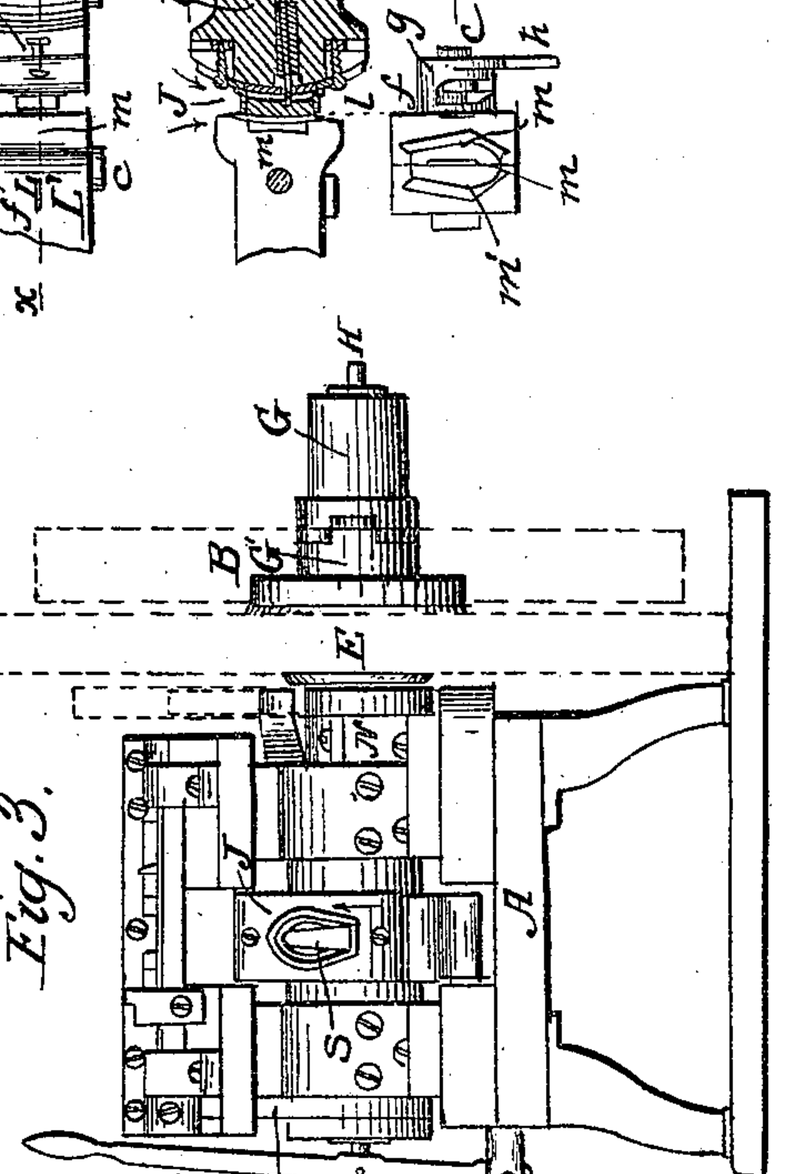

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Witnesses:
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UNITED STATES PATENT OFFICE.

L. D. ROBERTS, OF CLEVELAND, OHIO.

IMPROVEMENT IN MACHINES FOR MAKING HORSESHOES.

Specification forming part of Letters Patent No. **41,022**, dated December 22, 1863.

To all whom it may concern:

Be it known that I, L. D. ROBERTS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Horseshoe-Machines; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation. Fig. 2 is a top view. Fig. 3 is an end view, and Figs. 4, 5, 6, 7, and 8 are detached parts.

The nature of my invention is fully set forth in the following description and claims.

All of the various parts and movements are attached to the bed-plate A, which I make of one piece of cast-iron, having an opening in the center for the discharge of the shoes.

B is a balance-wheel, to which power is applied. This wheel runs freely upon the end of the shaft C and has attached to its inner face a pinion, D. The pinion D connects with and puts in motion the cog-wheel E. The cog-wheel E runs freely upon the shaft F, which shaft it puts in motion by means of the coupling G and G′. The coupling G slides like a sleeve upon the outer end of the shaft F and is prevented from rotating upon it by means of a key and seat. (Not shown in the drawings.) The shaft F is hollow, through which the rod H passes, and by means of which rod and the lever H′ the coupling G is thrown out and into gear with the coupling G′, which is firmly attached to the wheel E, consequently when the coupling is in the position shown in Figs. 2 and 3, the balance-wheel B, pinion D, and cog-wheel E will rotate without giving motion to other parts of the machine.

The arms I I′, which carry the male dies, are composed of one heavy piece of casting, and is firmly secured to the middle of the shaft F and rotates with it in the direction of the arrow.

The male dies are two in number and are shown at J K. The structure and operation of these dies will hereinafter be more fully explained.

The female die is shown at *m*. The main arm L of this is secured to the shaft C by set-screws *a a*, Fig. 2. The arm L′ is hinged to the arm L at *b* in Fig. 2. A bolt, *c*, passes through both of these arms loosely near the outer end, and in a recess formed in each, upon the inner sides and around the bolt *c*, is situated a spiral spring, *d*, which presses the arms apart; but these are brought together by means of the inclined plane *f* upon the outside of the arm L, which is acted upon by the movable inclined plane *g* upon the bolt *c*, to which it is firmly secured and which is operated by means hereinafter described. An arm, M, is also secured to the shaft C, as shown in Fig. 2. This arm extends forward over the shaft F close to the wheel E and is caused to rise and fall by means of an elliptical shaped cam, N N′, whose form is indicated by the dotted line N N′ in Fig. 1. The side N of the cam is more full than the side N′, consequently the arm M falls nearer to the shaft F when that side of the cam is upward. By this movement of the arm M the arms L L′ receive a vibratory movement upward and downward through the horizontal plane marked by the center of the shafts C and F. Now, when the arms L and M are properly adjusted upon the shaft C and the cam N N′ and arms I I′ properly adjusted upon the shaft F, the rotation of the shaft F will bring the male dies in regular and successive contact with the female die, once for each at every entire revolution of the shaft F. When the arm L rises to its highest position, as seen at L″ in Fig. 7, the finger *h*, extending from the inclined plane *g*, is brought into contact with the stop *i*, and the inclined planes *f* and *g* are brought into the position shown in Fig. 4, consequently the arms L L′ are closed and the faces of the two parts constituting the female die are brought into contact and there held until released by the changing of the position of the inclined planes *f* and *g*.

The several parts are so adjusted that when the male die J is in contact with the female die *m* the side N of the cam N N′ is in contact with the arm M, consequently the finger *h* is not allowed to fall low enough to bring the two inclined planes into contact, and the arms L L′ remain closed until another half-revolution of the shaft F brings the flat side N′ of the cam in contact with the arm M, which brings the finger *h* in contact with the stop *i*′, when the arms separate for the purpose hereinafter stated. It will be thus seen that at every revolution the male die J is brought into contact with the female die *m*, when closed, as seen in Figs. 4 and 6. They move together in concert

until separated by the rotation of the shaft F, when the cam N N′, by its action upon the arm M, raises the female die to the position seen at L″ in Fig. 7. In the meantime the male die K is brought into position and contact by the revolution of the shaft F, and the male die K and female die *m* in turn descend in contact with the forming-shoe. The flat side of the cam N′ being now in contact with the arm M, the arm M is allowed to descend so that the finger *h* comes in contact with the stop *i′*, which brings the two inclined planes, *f g*, into the position seen in Fig. 2, when, by the action of the spring *d*, the two parts of the female die are separated, as shown in Fig. 2, for the purpose of discharging the shoe, as hereinafter stated, and the relation of the cam N N′, shaft F, arms I I′, and arm L are such that the same movements must always occur.

O represents a cutter for cutting off the blank from the heated bar for the formation of the shoe. This cutter is secured to the rock-shaft O′. The rock shaft O′ receives a rocking motion by means of the arm P, operated by the cam P′ on the shaft F. A stationary cutter, Q, made adjustable by means of a slot, forms one part of the cutting-surface. Both the movable cutter O and stationary cutter Q are adjustable by means of set-screws to regulate the length of the shoe-blank. An adjustable stop, R, corresponding in position with the stationary cutter Q, serves to regulate the position of the blank, so that the two ends shall be equidistant from the center of the male die J. The male die J is provided with a mandrel, S, which is supported upon a spring, S′, in a recess in the arm I, which mandrel, in its rotation with the arm, is brought in contact with and bends the blank into a U shape, and, being depressed as it comes in contact with the female die, leaves the blank therein for the subsequent action of the male die K.

T, Fig. 2, represents a spring secured to the rock-shaft O′, which falls into the slot *t* in the mandrel S, and holds the blank in place until bent into its U shape by the forward movement of the arm I and mandrel S.

U U represent pressure-guides, which are placed immediately behind the cutter Q and stop R, and against which the blank is pressed by the mandrel S in bending the blank into a U shape; but these guides are not stationary, being pressed inward by the springs *n n*, which have sufficient strength to close the blank closely around the mandrel S to form the heel of the shoe. The springs *n n* are of sufficient strength to withstand all the pressure required to bend the blank into a U shape, but are held apart by two inclined planes, V V, Figs. 2, 5, and 8, being connected by arms to the rock-shaft W, upon which they are adjustable in regard to their distance apart. The guides U U are also adjustable by means of set-screws *r*, Figs. 2 and 5, for different-sized shoes. The rock-shaft W is held steadily in position by means of the arm W′, which is constantly pressed against the edge of the cam W′ by the action of the springs *n n* upon the guides U U and inclined planes V V. The cam W′ has a recess, X, into which the end of the arm W′ falls, which elevates the inclined planes V V, connected to the rock-shaft W, and allows the guides U U to approach each other sufficiently to bend the heel of the shoe closely around the mandrel S. The cam W″ is so adjusted upon the shaft F that the rock-shaft W gives the upward movement to the inclined planes V V at the moment the widest part of the shoe passes between the guides. This position of the guides and their action upon the shoe is shown at *y* in Fig. 5. The blank thus shaped is forced into the female die *m* by the pressure of the male die J. The mandrel S′, being crowded back by its pressure against the center of the female die, leaves the partly-formed shoe in the female die, which is raised, by the action of the cam N N′ upon the arm M, to the position seen at L″ in Fig. 7. In the meantime, by the rotation of the shaft F, the male die K is brought into position with the female die, and by their mutual action completes the operation of forming the shoe. The die K is so formed that it creases and makes the nail-prints in the shoe. These devices are shown at K′ K′ in Fig. 4, and are set into recesses in the die, and are held in place by set screws upon each side, as seen in the figure. Both of the male dies are detachable and adjustable by means of the set-screws *l l* in Figs. 4 and 5, consequently they can be changed at pleasure for different sized shoes. The female die can also be changed by removing the blocks *m′ m′* and inserting others, as shown in Fig. 6. This is readily accomplished by separating the arms and raising the pieces *m′ m′* from their bed in the end of the arms. The blocks are held in place by fitting tightly into the recesses formed for them. The heated bar from which the shoe is formed is introduced at Q′, when the male die J is in the position shown in Fig. 2, and an entire revolution of the shaft forms the shoe, which falls to the ground upon the separation of the arms L L′.

I claim—

1. Operating the arms L L′ by means of the peculiarly-shaped cam N N′, in combination with the arm M and shaft C, as specified.

2. Operating the arms L L′ by means of the cam N N′, arm M, the inclined planes *f g*, the finger *h*, and stops *i i′* and spring *d*, substantially as described.

3. The inclined planes *f* and *g*, spring *d*, stops *i i′*, and finger *h*, for opening and closing the arms L L′, when constructed, combined, and arranged as specified.

4. The guides U U, constructed and operated substantially as and for the purpose set forth.

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