(No Model.) 4 Sheets—Sheet 1.

J. A. BURDEN.

HORSESHOE MACHINE.

No. 373,125. Patented Nov. 15, 1887.

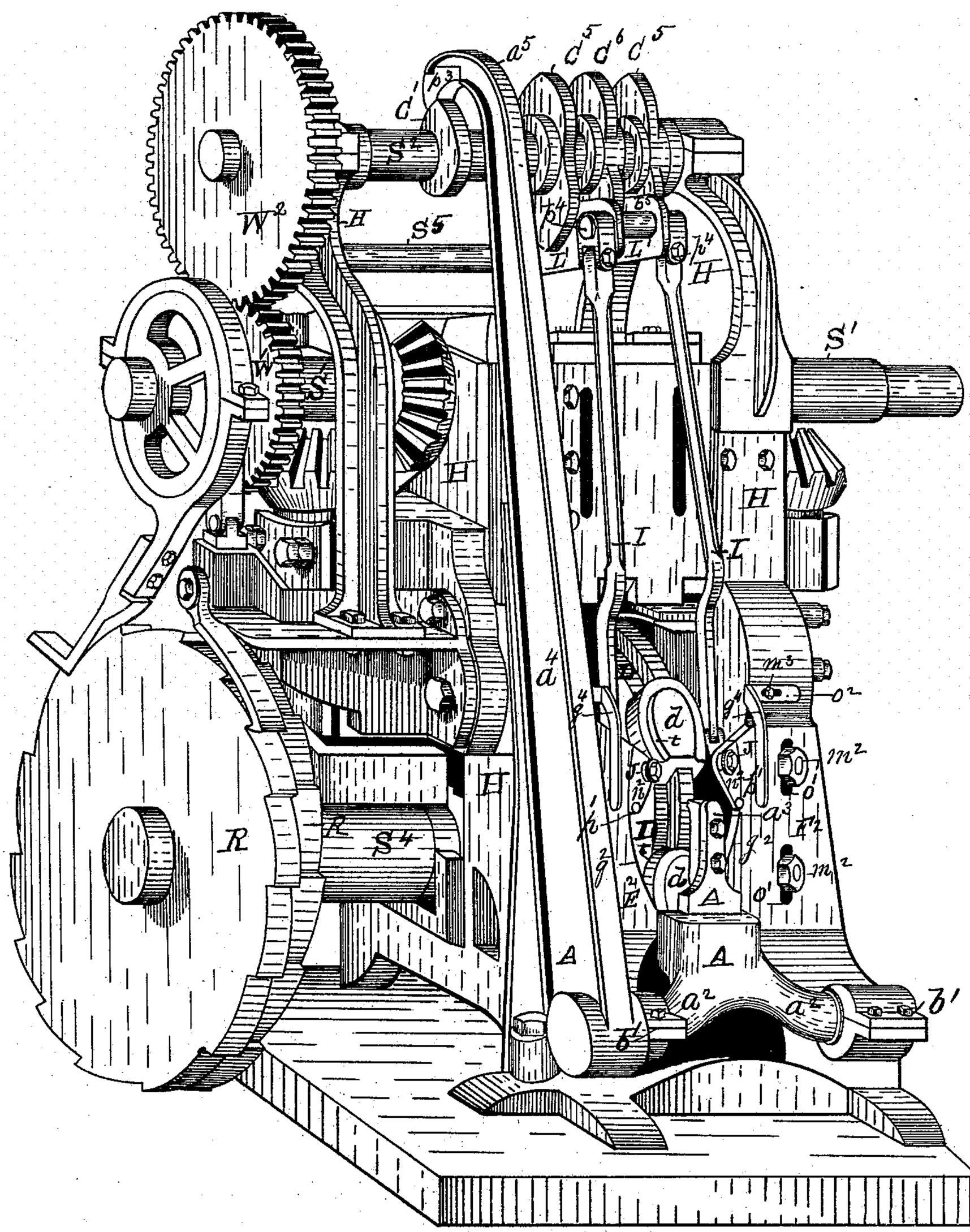

FIG 1

WITNESSES

Geo. A. Darby.

Charles S. Brintnall

INVENTOR

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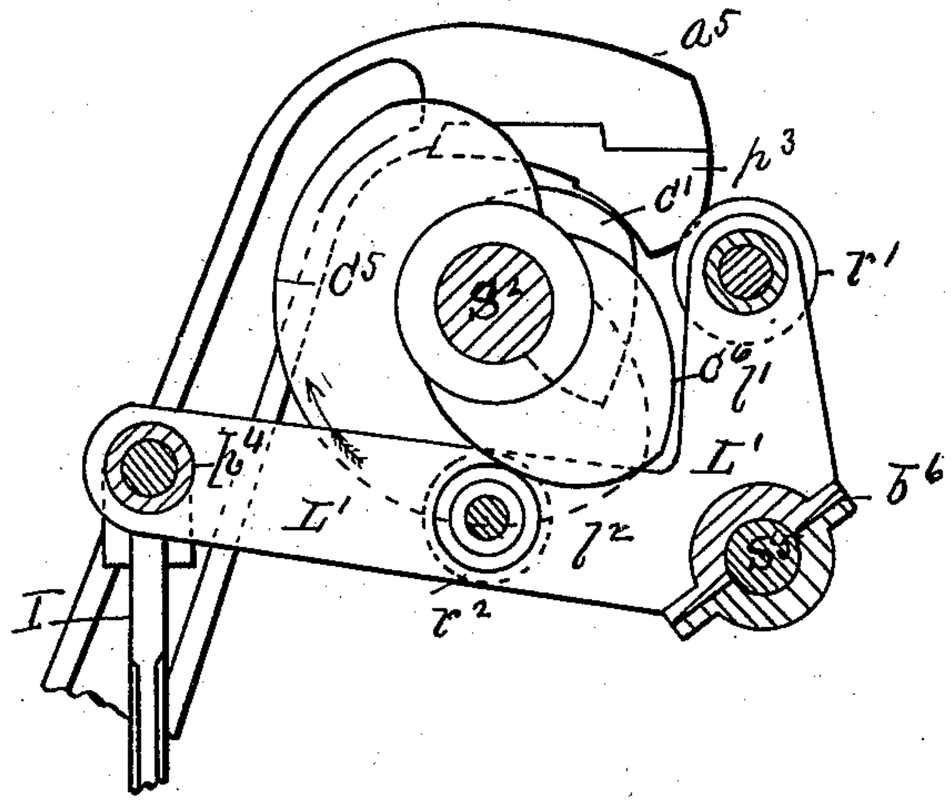
W E Wagan his atty.

(No Model.) 4 Sheets—Sheet 2.

J. A. BURDEN.

HORSESHOE MACHINE.

No. 373,125. Patented Nov. 15, 1887.



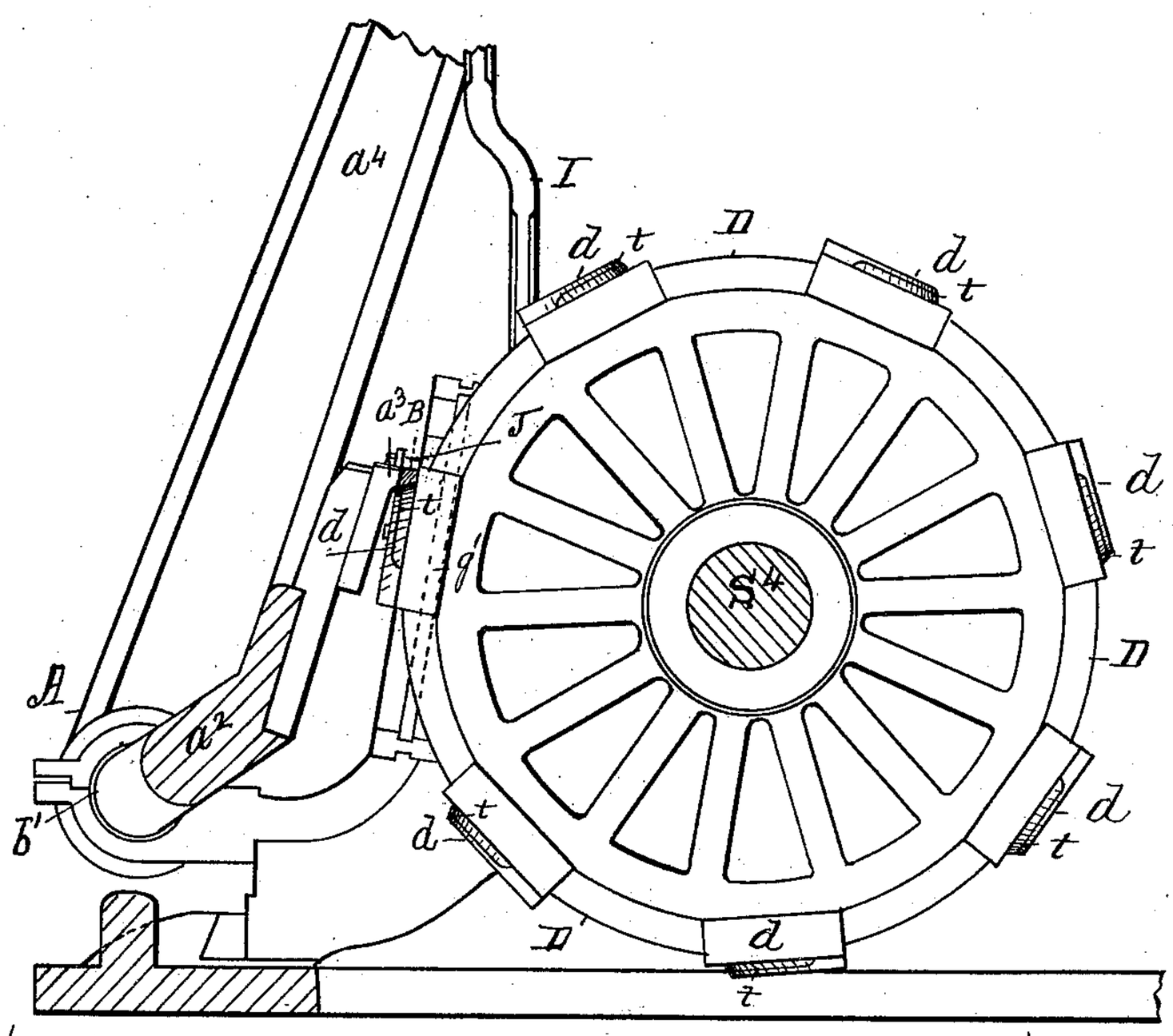


FIG 2

WITNESSES

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4 Sheets—Sheet 3.

J. A. BURDEN.

HORSESHOE MACHINE.

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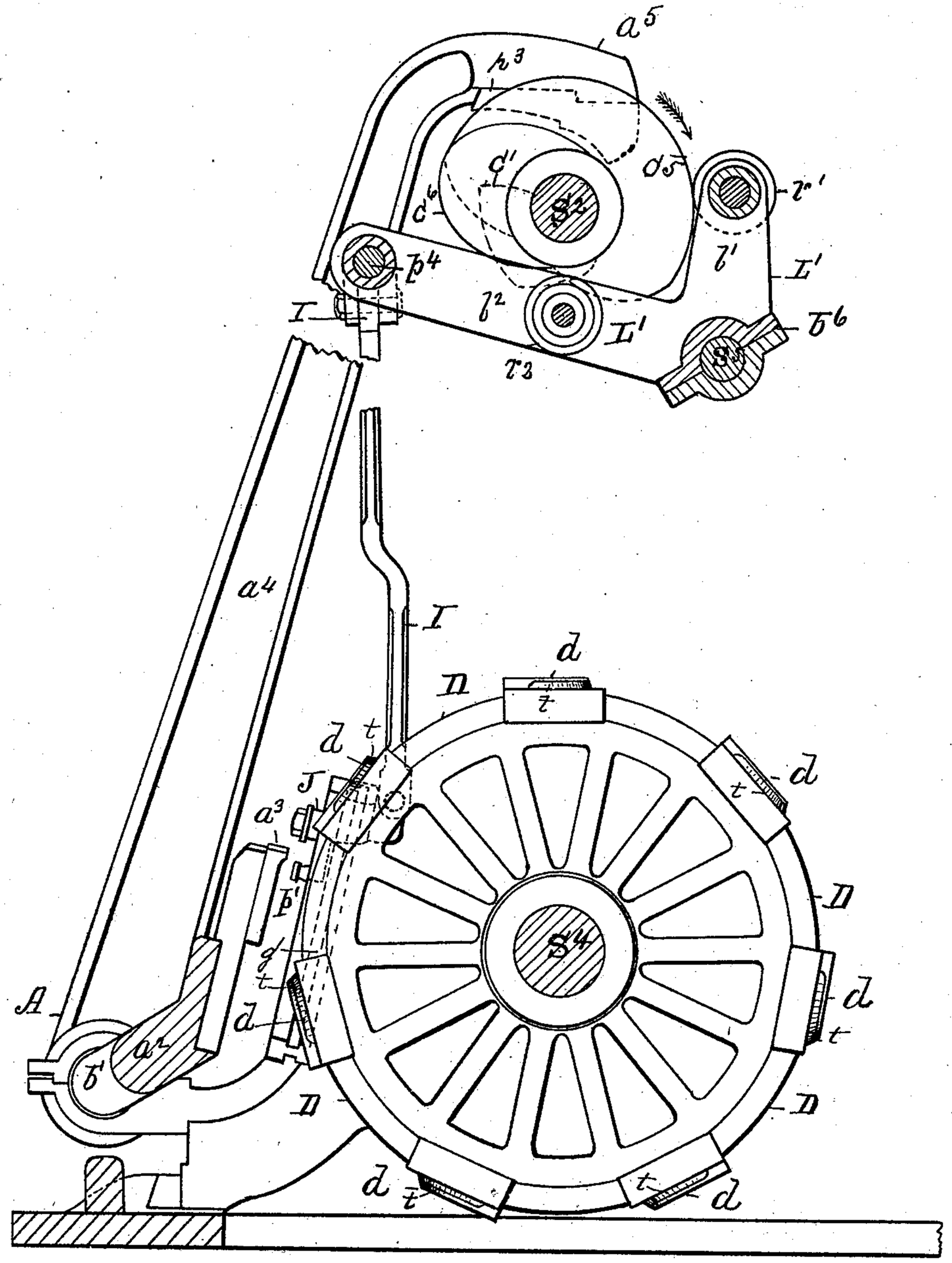

FIG 3

WITNESSES

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(No Model.) 4 Sheets—Sheet 4.

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HORSESHOE MACHINE.

No. 373,125. Patented Nov. 15, 1887.

FIG 8

FIG 4

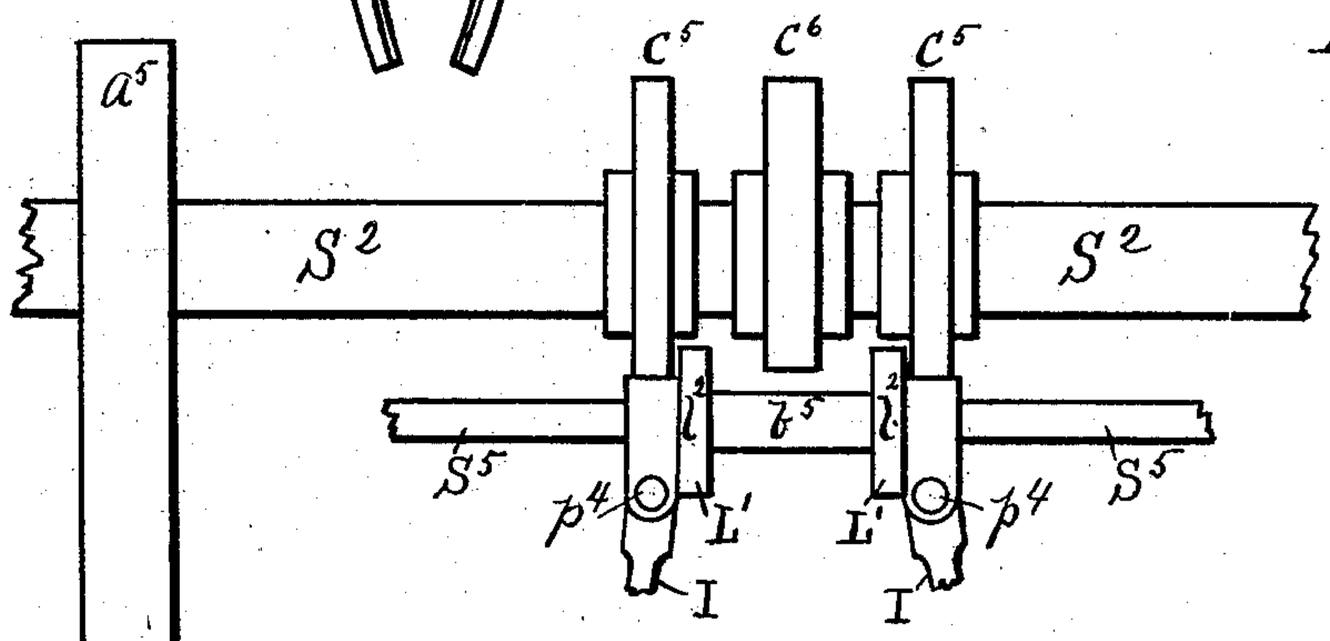

FIG 7

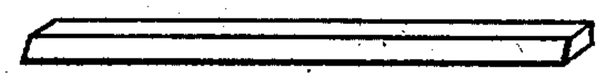

FIG 5

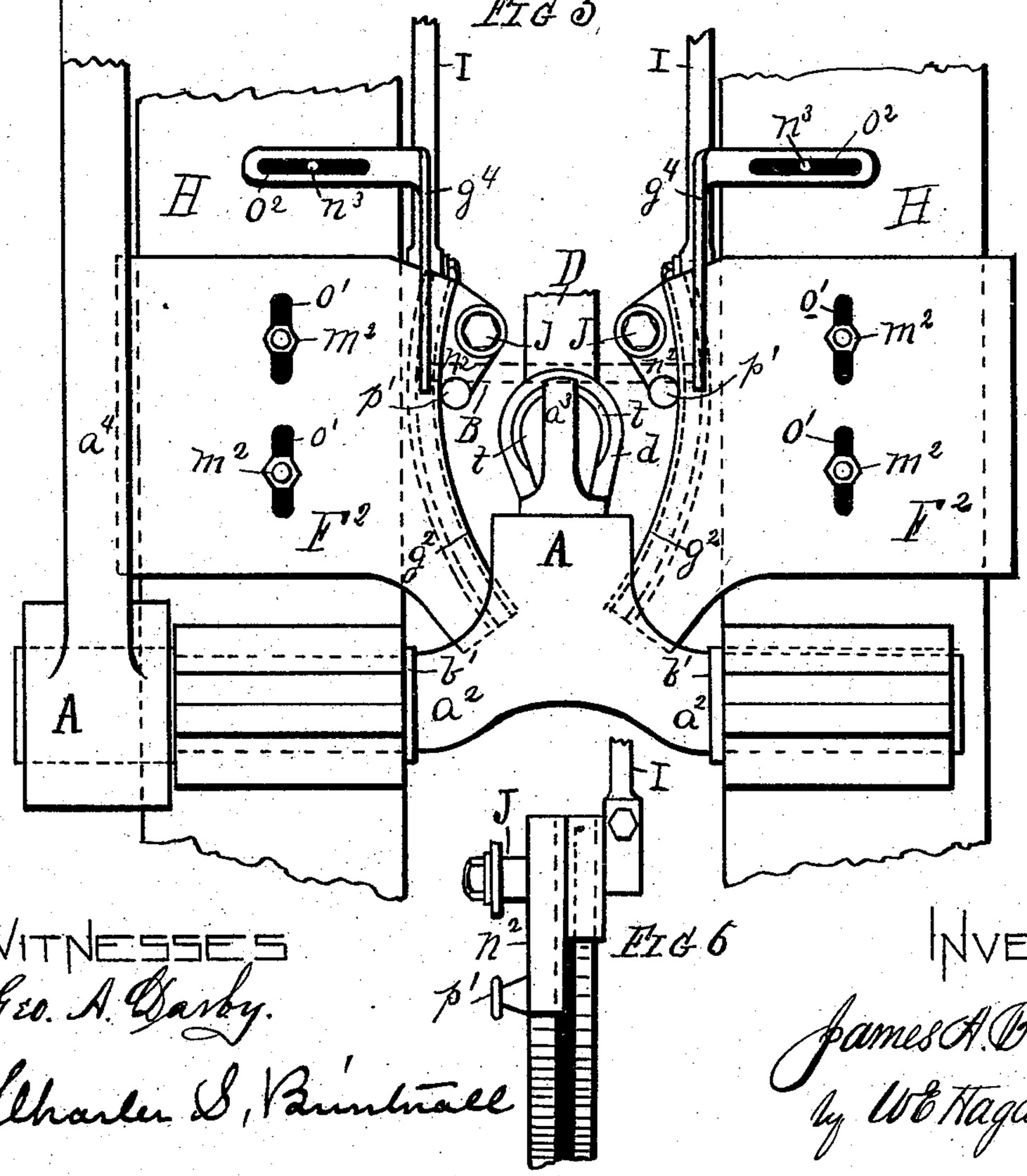

FIG 6

WITNESSES

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Charles S. Bumnell

INVENTOR

James A. Burden

by W. E. Hagan his Atty

UNITED STATES PATENT OFFICE.

JAMES A. BURDEN, OF TROY, NEW YORK.

HORSESHOE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 373,125, dated November 15, 1887.

Application filed August 13, 1887. Serial No. 246,840. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. BURDEN, of the city of Troy, county of Rensselaer, State of New York, have invented new and useful Improvements in Horseshoe-Machines, of which the following is a specification.

My invention relates to machines for making horse and mule shoes, and more particularly to that class of such machines in which the dies from which the shoes are swaged or shaped are arranged upon the perimetral face of a wheel that is actuated to revolve with intermittent and predetermined regular periods of rest.

The object and purpose of my invention is to better adapt this class of machines to produce what are known as "snow or mud shoes" for mules or horses; and this kind of shoes to which my invention is more particularly applicable are made from a blank or bar of the requisite length and width, and having one beveled side edge which, when the blank is bent into the form of a shoe, gives to the interior edge of the latter a concavity which prevents the hollow of the hoof from balling up with snow or mud.

My invention consists, as will be more fully described hereinafter in connection with its illustration, in the combination, with a wheel that is constructed with shoe-form dies upon its perimetral face, and which wheel is operated to revolve with intermittent and regular periods of rest, during which the blank is shaped upon the dies by successive operations, of a pivoted holder that is actuated to swing in when a shoe-blank is inserted in the machine to hold the said blank in place and to prevent its buckling while being bent around that one of the dies upon the wheel which is adjacent and which holder is actuated to move back and away from the dies for the insertion of a shoe-blank, and then to reciprocatingly return to hold it in place as before to repeat the operation.

My invention also consists, as will be more fully detailed hereinafter in connection with its illustration, in the combination, with a wheel that is constructed with shoe-form dies upon its perimetral face, and which wheel is operated to revolve with intermittent and regular periods of rest, of bending or swaging rollers that are adapted to move by means of guides in a circular direction parallel to the curved sides of the dies and arranged to engage with a shoe-blank placed on and across the toe part of each of the dies, and which rollers in their curved movement will close the blank around the die and thereafter be actuated to move away from the die operated upon to repeat the operation upon another die and inserted blank.

My invention is shown as applied to the machines illustrated and described in Letters Patent granted to me on the 25th day of January, 1876, No. 172,604; also, Letters Patent No. 216,828, granted to me June 24, 1879.

Accompanying this specification to form a part of it there are four plates of drawings, containing eight figures, illustrating my invention, with the same designation of parts by letter-reference used in all of them. Of these illustrations, Figure 1 is a perspective of a horse-shoe-making machine containing my invention. Fig. 2 is a combined side elevation and section of the die-wheel, the pivoted blank-holder, and the pitman-rods which move the bending-rollers, the mechanism which operates the foregoing parts being shown in side elevation, the actuating-shafts and tongue of the pivoted blank-holder, as well as the shoe-blank, being shown in section and the holder shown as moved in on its pivoted connection to engage with a shoe-blank. Fig. 3 shows the same parts that are illustrated at Fig. 2, but with the blank-holder moved back from its position for engagement with a shoe-blank, and the latter omitted. Fig. 4 shows in front elevation the shaft and cams which operate the bending-rollers and pitman and the cam which operates the blank-holder. Fig. 5 shows in an enlarged representation and in front elevation as broken away from the other mechanism the bending-rollers, the lower ends of the pitmen which operate them, their curved guides being indicated by a dotted line and their position relatively to one of the dies being shown just as before operating to bend an inserted blank. Fig. 6 shows a side view of one of the bending-rollers and its connection with the pitman which operates it. Fig. 7 shows one of the blanks, and Fig. 8 a shoe formed by the machine from one of the blanks.

The several parts of the mechanism thus illustrated are designated by letter-reference, and the function of the parts is described as follows:

The letter H designates the housing or frame that supports the mechanism, and the letter S′ designates the driving-shaft provided with a driving-pulley. (Not shown in the drawings.) This shaft has upon it a gear-wheel, W′, that meshes into a gear-wheel, W^2, on the shaft S^2, to communicate motion to the latter.

The letter R indicates a double ratchet-wheel receiving power from the shaft S′, and which by means of a pawl and detent communicates motion to the shaft S^4, on which there is arranged to turn with said shaft the die-wheel D. This die-wheel is constructed with dies *d* on its perimetral face, and which dies have the form and the size of the shoes to be made, all of which before-named parts are like those shown and described in the older patents before named, excepting the gear-wheel W^2 and the shaft S^2 and the beveled form given to the sides of the dies.

By means of the mechanism thus described and shown, through the action of the double ratchet, pawls, and pawl-detents, a regular intermittent motion with regular periods of rest is communicated to the die-wheel D.

The letter A designates a holder having two journaled arms, a^2, provided with bearings *b*′. This holder, by means of this pivoted connection, is adapted to move at its holder end proper, a^3, so as thereat to engage with a horse-shoe-blank, B, when the latter is laid with its ends resting upon the pins *p*′, as shown at Fig. 5, and to move out from such engagement, as shown at Fig. 3. When engaging with the blank, as shown at Fig. 2, it holds the latter in place, and when moved out away from its engagement with a shoe blank it is in position for the insertion of a succeeding shoe-blank. This holder is operated by means of the lever-arm a^4, which at its lower end is connected with the journaled arms a^2, and at its upper end, a^5, having a circular end, the inner face of which is adapted to engage with the cam C′, arranged on the shaft S^2, so as to be moved outwardly or inwardly thereat, and thus to move outwardly or inwardly the holder proper, (indicated at a^3.) This lever-arm a^4 is provided with a detachable plate, p^3, on its inner face near the upper end, by which plates of different thickness may be applied to increase or decrease the throw of the lever-arm and to correspondingly increase or decrease the measure of distance traveled by the holder proper, (indicated at a^3.) This holder A performs its function independently of the mechanism used to bend the blank around the dies, and as its operation would be the same whether the means shown were used to so bend the blanks, or some other mechanism, I do not limit my invention of said blank-holder to its combination with the means which I show as used to bend the blanks around the dies.

The letters J J designate the bending-rollers, arranged upon pintles that are projected from the side of the traverse-stocks n^2. These stocks have curved guides *g*′, which are made in the curve g^2 of the frame F^2, and in which they slide reciprocatingly. These curved guides and rollers are arranged to be operated in front of the frame F^2. The curve of these guides in which the bending-roller stocks slide corresponds with the side curve of the dies *d*, so that as said rollers are moved down and back by the connecting-rods I the rollers move in a line corresponding to the curves upon the opposite sides of the said dies. Thus when a shoe-blank is placed upon the pins *p*′, and resting upon the toe end of one of the blanks, as indicated at Fig. 2, and the stocks n^2 and bending-rollers J J are caused to descend, said rollers will engage with the upper edge of the blank to bend it around the exterior edge of one of the dies *d*. Said bending-rollers as they descend, and as moved by the stocks n^2 in the curved guides *g*′, engage with the outer edge of the blank at each side of the dies and carry the blank down and around the curved sides of the die on which the blank has been placed, at the same time pressing the blank in close against the sides of the die to give it interiorly the form of the latter, this bending of the blank around one of the dies *d* being performed by the bending-rollers when the die-wheel is at one of its periods of rest. After the bending-rollers have finished the bending of the blank they return upon their curved guides to repeat the operation as before upon another blank, the die-wheel in its intermittent movement having brought another succeeding die into position to repeat the operation of the bending-rollers as before. These bending-rollers and the stocks on which they are journaled to turn and be moved are each operated by a connecting-rod, I, and these connecting-rods, at their upper ends, are each pivoted at p^4 to the outer ends of two bell-crank pivoted levers, L′ L′. These bell-crank levers are connected by a cross-bar, b^5, and are each at their turn-angle arranged with bearings b^6 on the shaft S^5, so that they are moved and operated to turn together thereon. Both of these bell-crank levers L′ are provided with friction-rollers *r*′ at the upper ends of their arms *l*′, and with another friction-roller, r^2, upon the side of and near the center of one of the bell-crank-lever arms l^2. The function of these rollers upon the bell-crank lever L′ is to reduce the friction where the cams which operate the levers engage with them.

The letters C^5 C^5 designate cams arranged on the shaft S^2, each of which cams is constructed to engage with one of the friction-rollers *r*′ on each of the arms *l*′ of the bell-crank lever L′ to force rearwardly the said arms *l*′ on their angular bearings and upwardly the front ends of the arms l^2 to raise the connecting-rods I and bending-rollers.

The letter C^6 designates a cam that is also arranged on the shaft S^2, and which cam is constructed to engage with a friction-roller, r^2,

on one of the arms l^2 of the bell-crank lever L′ to force down the said connected arms l^2, and also each of the connecting-rods I, the stocks n^2, and the bending and swaging rollers J, to bend a shoe-blank on and around one of the dies of the wheel D. As these bending or swaging rollers are thus constructed and arranged, their operation would be the same whether the blank was held in place by the mechanism which I illustrate and describe or by some other mechanism which would perform the same function; hence I do not limit my invention of the bending and swaging rollers as I illustrate and describe them to their combination with the blank-holding mechanism that I illustrate and describe.

The cams operating the holder mechanism are arranged upon the shaft S^2 so as to bring the blank-holder into operation relatively to the movement of the die-wheel D, so that the blank-holder will engage with a blank when one of the dies *d* is in position to receive it, and with the parts in position as indicated at Fig. 2, before the bending and swaging rollers commence to act, to hold the applied blank in position while being operated upon by the bending and swaging rollers and then to move away from the die to the position shown at Fig. 3.

The cams upon the shaft S^2 are arranged thereon to move the bell-crank levers to operate the connecting-rods I and the bending and swaging rollers J while the die-wheel is stationary with one of the dies *d* in position, and after the holding mechanism has engaged with an inserted blank, and after the bending has been completed to ascend in its guideways.

The frame F^2 is attached to the housing H by means of bolts m^2 and slotted openings O′, made in the frame, so that the guides in which the bending-roller stocks slide may be adjusted relatively to the dies upon the die-wheel.

The letters g^4 designate adjustable guides attached to the housing H by means of bolts m^3 and slotted openings O^2, by which said guides may be moved outwardly or inwardly. The function of these guides g^4 is to position the ends of the blank properly, so as to bring its center upon the toe of the adjacent die when inserted. The dies *d* have beveled sides *t*, corresponding to the beveled sides of the blanks, and are arranged upon the die-wheel with intermediate blank places where there are no dies used.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for making horseshoes, the combination, with a wheel having horseshoe-dies upon its perimetral face, said wheel being actuated to be rotated with regularly-intermittent periods of rest, of a blank-holder that is operated to engage with a shoe-blank placed upon one of the dies of said wheel and to hold the same in position upon the die while the blank is being bent, substantially in the manner as herein described.

2. In a machine for making horseshoes, the combination, with a wheel having horseshoe-dies upon its perimetral face, said wheel being actuated to be rotated with regularly-intermittent periods of rest, of bending-rollers arranged upon pintles projected from stocks, operated to move in guides that curve in parallel coincidence with the curved sides of the dies, substantially in the manner as and for the purposes set forth.

3. In a machine for making horseshoes, the combination, with a wheel having horseshoe-dies upon its perimetral face, said wheel being actuated to be rotated with regularly-intermittent periods of rests, of a holder mechanism constructed to engage with an inserted blank, substantially as described, and bending-rollers operated to be reciprocatingly moved in a curved line corresponding to the side curve of the dies, constructed and arranged substantially in the manner as and for the purposes set forth.

4. In a machine for making horseshoes, the combination, with a wheel having horseshoe-dies upon its perimetral face, said wheel being actuated to be rotated with regularly-intermittent periods of rest, of bending-rollers turning upon pintles projected from slide-stocks, and a frame for each slide-stock made with curved slideways and made adjustable toward or from the die-wheel, substantially in the manner as set forth.

5. The combination, with a wheel constructed to be rotated with regularly-intermittent periods of rest, of horseshoe-dies made with downwardly and outwardly beveled edges and arranged at intervals upon the perimetral face of said wheel, a holder adapted to engage with and keep in place an inserted blank, and bending-rollers journaled upon stocks reciprocatingly moving in slideways that are curved coincidently with the sides of the dies, substantially as and for the purposes set forth.

Signed at Newport, Rhode Island, this 27th day of July, 1887, and in the presence of the two witnesses whose names are hereto written.

JAS. A. BURDEN.

Witnesses:
FRANK B. PORTER,
R. C. DERBY.