(No Model.) 2 Sheets—Sheet 1.

J. D. BILLINGS.

MACHINE FOR BENDING HORSESHOE BLANKS.

No. 498,838. Patented June 6, 1893.

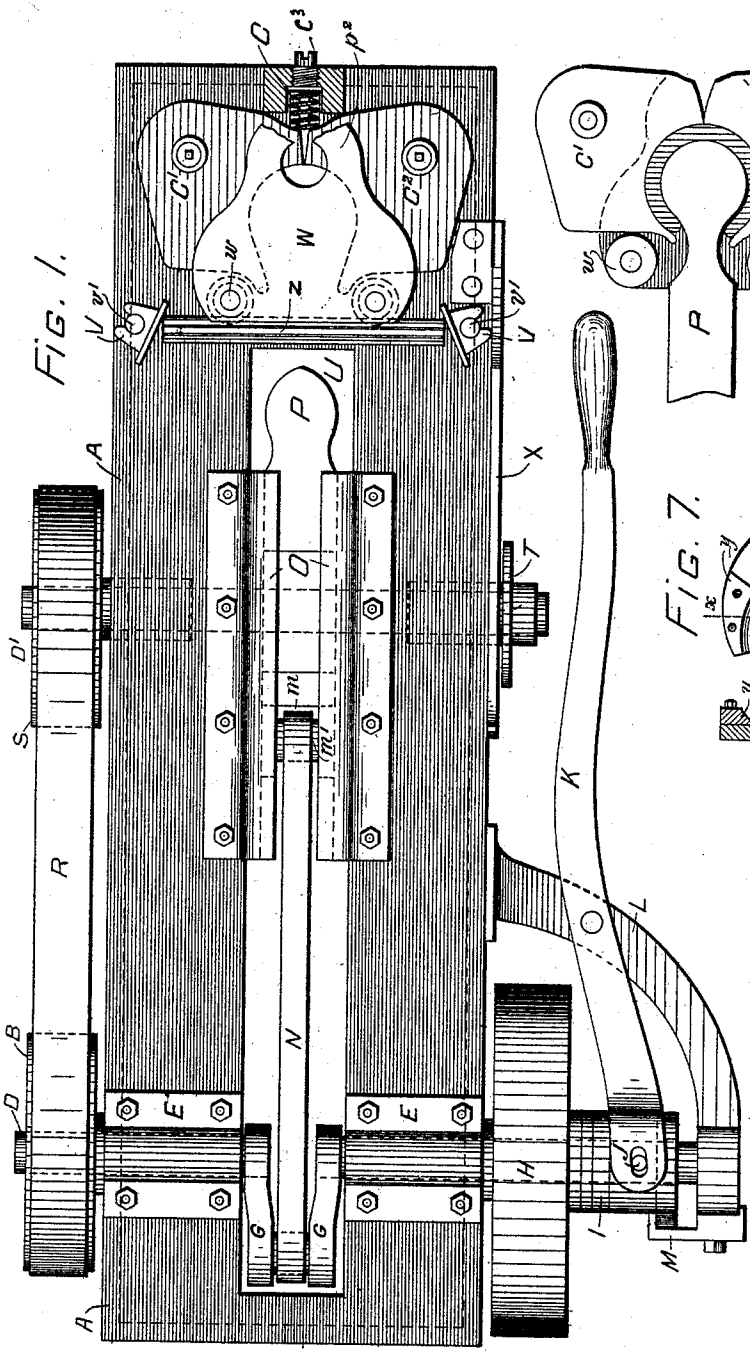

FIG. 1.

FIG. 6.

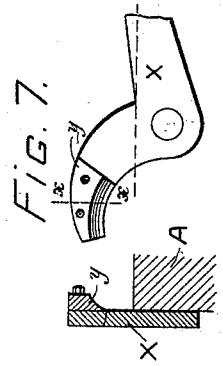

FIG. 7.

FIG. 8.

Witnesses:
Alfa Scott
Albin M Long.

Inventor
John Douglas Billings,
By J. Walter Douglass.
Atty.

(No Model.) 2 Sheets—Sheet 2.

J. D. BILLINGS.

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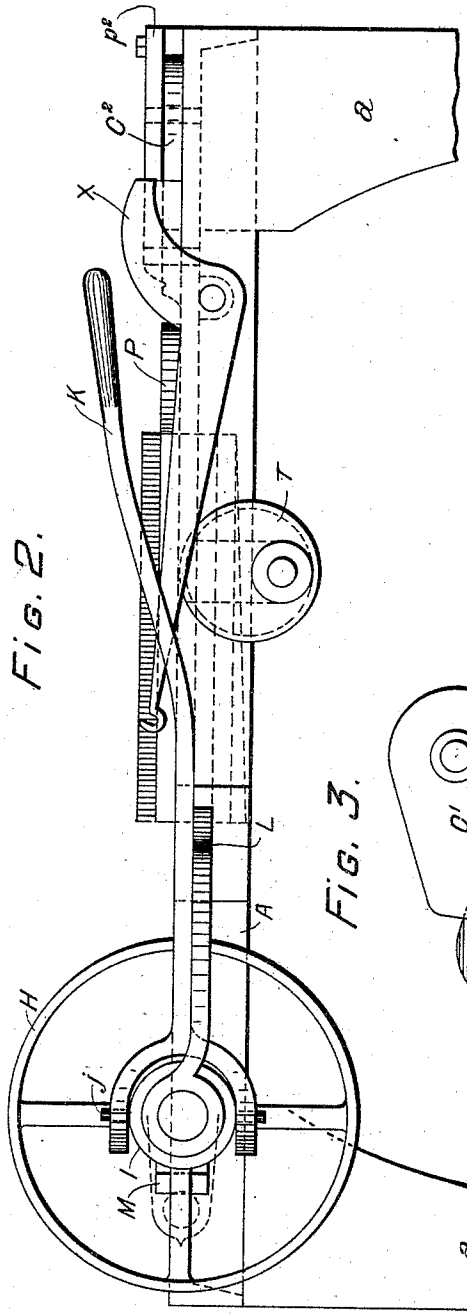

Fig. 2.

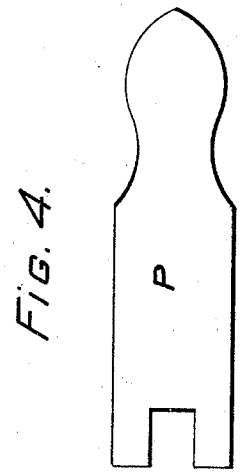

Fig. 4.

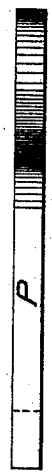

Fig. 5.

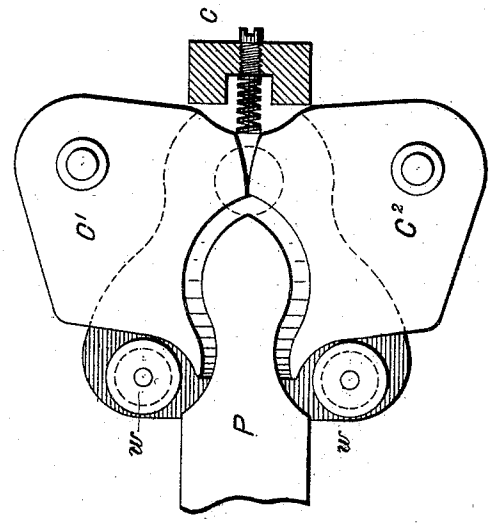

Fig. 3.

Witnesses:
Alex. Scott.
Albin M. Long.

Inventor:
John Douglas Billings.
By J. Walter Douglass.
Atty.

UNITED STATES PATENT OFFICE.

JOHN D. BILLINGS, OF NEW YORK, N. Y., ASSIGNOR TO THE SOUTHERN HORSE AND MULE SHOE MANUFACTURING COMPANY, OF STRASBURG, VIRGINIA.

MACHINE FOR BENDING HORSESHOE-BLANKS.

SPECIFICATION forming part of Letters Patent No. 498,838, dated June 6, 1893.

Application filed June 7, 1892. Serial No. 435,901. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. BILLINGS, a citizen of the United States, residing at the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Bending Shoe Bars or Blanks into Horse or Mule Shoe Shapes, of which the following is a specification.

The principal objects of my invention are first, to provide a simple, comparatively inexpensive, durable and efficient machine for bending metal shoe bars or blanks into horse or mule shoe shapes; second, to provide a machine adapted to readily and efficiently bend metal shoe bars or blanks into shoe shapes and of their being automatically released by comparatively simple and efficient devices or mechanism in order to permit the shoe to fall by gravity or its own weight away from the machine; third, to provide convenient means for regulating the tension of the spring that co-operates with the oscillating jaw dies of the machine; fourth, to provide a machine with a plunger or punch-die and with gages adapted to hold the metal shoe-bar or blank against end-play and in proper position in respect to the jaw dies, and to permit the extremities of the bar or blank to become free while the bar or blank itself is being operated upon by the plunger or punch die; and fifth, to provide a machine with a cutting device adapted to receive dies of different forms for separating or severing a metal shoe bar or blank and for giving to the end thereof the required contour or shape or for chamfering the bar or blank thereat.

My invention consists in the improvements in machines for bending shoe blanks into horse or mule shoe shapes hereinafter fully described and particularly pointed out in the claims.

According to my invention after a metal bar or shoe blank is taken from the machine for forming or bending the same into a horse or mule shoe, and while warm or hot, is passed through a cutter connected with the bending machine and operated in conjunction therewith, whereby it is cut in two and of the proper length and is presented in the required position for bending or forming by suitable appliances and mechanism to be presently explained into a shoe shape, the bending machine and the cutter connected therewith lying in a horizontal plane, the metal bar or shoe blank lying or resting against rolls, which support the same adjacent to the ends preparatory to the forming or bending operation thereof and between adjustable gages in order to prevent the bar from moving either way and a plunger or punch-die following conducts the bar or blank to and into contact with the walls of oscillating jaw-dies provided with an adjustable spring located in rear of the dies and controlling the jaws by allowing the jaws to close up around the bar or blank while encircling the plunger or punch-die and the bar or blank is being formed into a shoe shape and the adjustable spring held under compression during the forming of the shoe, causing the dies to be spread apart to allow the plunger or punch-die to return to place with the shoe, which is released and delivered, and the jaws opened at their forward ends in order to be in position to receive another metal bar or shoe blank, the plunger or punch-die sliding backward and forward in ways stopping above an aperture or space provided in the bed plate or table, at which point the bent shoe is permitted to fall by its own weight or gravity from the machine to the ground.

The nature and characteristic features of my invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof; and in which—

Figure 1, is a top or plan view of a bending machine embodying features of my invention. Fig. 2, is a side elevation of the machine. Fig. 3, is a view partly in plan and partly in section of the oscillating jaw-dies provided with an adjustable spring, the rolls upon which the blank rests preparatory to the forming or bending of the same into shoe shapes and also showing the forming mechanism of the machine. Fig. 4, is a top or plan view of the plunger or punch-die, showing the manner of attaching the rod thereto for operating the same. Fig. 5, is a side elevation of the plunger or punch-die. Fig. 6, is a top or plan view of a modified form of oscillating jaw-dies,

showing the punch-die inclosed at its forming end between said dies and this figure serving to illustrate a mode of forming rings of any required circumference or size by means of the jaw-dies and adapted for use on the feet of animals having what are knows as "drop" soles or tender or diseased feet. Fig. 7, is an elevation of the cutting appliance of the machine showing the same provided with a die; and Fig. 8, is a transverse sectional view on the line x—x, of Fig. 7, showing the bed-plate and cutting appliance provided with a die adapted to chamfer or give to the end of the severed bar the proper contour or finished shape thereat.

Referring now to the drawings, A represents a metal bed-plate or table of the machine resting upon legs a.

B and S, are pulleys respectively mounted upon shafts D and D′, and revolved by means of a belt R. The shaft D, actuates a crank-arm G and the shaft D′, actuates a cutting device X, as illustrated in Figs. 1 and 2. This cutting device X, is adapted to receive dies y, of any suitable form or shape for the purpose of giving the required contour to the ends thereof, in order that when the bar or blank has been formed or bent into a shoe shape to be hereinafter explained no further finishing will be required by an independent or separate hand or power operation.

O, are ways provided in or on the bed-plate or table A, and adapted for the reception of the plunger or punch-die P, which is permitted a range of sliding to and fro movement in or on said ways. The plunger or punch-die P, co-operates with the jaw-dies C′ and C^2, in order to form or bend the shoe blank or metal bar into a shoe shape.

N, is a rod or pitman connected at one extremity thereof with the plunger or punch-die P, by means of a slot m, and pin bolt m', and at the other extremity thereof with the crank-arm G. On opposite sides of the crank-arm G, are boxes E, in which the shaft D, is permitted to revolve, as will be readily understood by reference to Fig. 1.

U, is an aperture or space formed in the bed-plate or table A, and through which the shoe falls when released from the plunger or punch-die P, after having been formed into a shoe shape by means of the punch-die P, and the oscillating jaw-dies C′ and C^2. These jaw-dies C′ and C^2, receive the shoe while being bent around the plunger or die P, and in conjunction therewith form and give the required shape or contour to the shoe. A cap p^2, encircles or surrounds these jaw dies in the manner illustrated in Fig. 2. A spring C, is disposed at or about the middle of the rear portion of the jaw dies C′ and C^2, and is adapted to normally hold said jaws in an open position in order to permit the same to receive the metal bar or shoe blank and to close while the shoe is being shaped and then open again to release the punch-die and shoe and to remain open for the reception of another metal bar or shoe blank for the forming or bending of the same in the manner hereinabove described.

C^3, is a set-screw engaging the bed-plate A, and provided with a collar or flange engaging the spring C, so that the set-screw affords means for regulating the tension of the spring C^3.

W, is an aperture located beneath the jaw-dies C′ and C^2, in the bed-plate or table A.

w, are rolls against which rest the bar or blank preparatory to its forming or bending and aiding the plunger or punch-die P, in the forming or bending of the same between the jaw-dies C′ and C^2.

V, are adjustable gages secured to the bed-plate or table A, by means of screws or pins v', and adapted to firmly hold the shoe bar or blank in proper position to be bent by the punch-die P. The working faces of these gages are inclined as shown in Fig. 1, in order to permit the respective extremities of the bar or blank Z, to swing clear of them as soon as the punch die or plunger P, commences to bend the bar or blank.

H, is a pulley adapted to permit of a belt being connected therewith for imparting motion to the shaft D, for revolving the pulley B, and also imparting motion to the pulley S, and shaft D′, by means of the belt R. The motion of the shaft D, is imparted to the cam T, operating the cutter X, in the manner more particularly illustrated in Fig. 2.

M and I, are clutches adapted to be brought into engagement with each other by means of the lever K, for stopping and starting the machine.

J, is a pin adapted to connect the clutch mechanism with the lever K.

L, is an arm or brace connected with the bed-plate A, and supporting the extremital portion of the clutch mechanism.

The mode of operation of a machine as hereinbefore described, is as follows:—The shoe bar or blank while warm or hot is taken and the end thrust beneath the cutter X, whereby the same is severed and the end by means of the die y, chamfered or given the required contour or shape after the clutches M and I, by means of the lever K, have been brought into engagement with each other for setting in motion by suitable power imparted to the pulley H, by means of a belt, the propelling mechanism of the machine. This cutter X, severs the metal bar or shoe blank. The portion thus severed is brought into contact with the rolls and between the gages V, as shown in Fig. 1, whereupon the punch-die P, is impelled forward and pushes and bends the shoe blank into the forming jaw dies C′ and C^2. The punch-die P, then returns with the bent shoe and carries it over the aperture U, in the bed-plate or table A, where it is released by its own weight or gravity and falls to the ground. Another metal bar or shoe blank is cut in a similar manner as above explained and thus the above described opera-

tion of the machine may be pursued indefinitely in the forming or bending of shoes according to my invention or until the machine is brought to a stop by the throwing of the clutches M and I, out of engagement with each other by means of the lever K, the time consumed in cutting and forming or bending a metal bar or shoe blank into a shoe shape and delivering the same not exceeding two seconds.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a machine for bending shoe blanks into shoe shapes, of a pair of oscillating jaw-dies between which a partially bent blank is inserted against the force of a spring by a reciprocating die, a pair of guide-rolls for supporting the bar as it is partially bent by the plunger die and for guiding it into the jaw dies, a pair of gages, as V, having inclined working faces for engaging the extremities of the bar to insure the contact of the plunger die with the center thereof and for permitting said extremities to clear the gages as the plunger-die drives the intermediate portion of the bar between the guide-rolls, and a set-screw for adjusting the tension of the spring that controls the jaw-dies, substantially as and for the purposes set forth.

2. The combination, in a machine for bending shoe blanks into shoe shapes, of a pair of oscillating jaw-dies between which a partially bent blank is inserted by a reciprocating die, a spring tending to open said jaws, a set-screw provided with a collar engaging said spring, a pair of guide-rolls for supporting the bar as it is partially bent by the plunger-die and for guiding it into the jaw-dies, a pair of gages as V, having inclined working faces for engaging the extremities of the bar to insure the contact of the plunger-die with the center thereof and for permitting said extremities to clear the gages as the plunger die drives the intermediate portion of the bar between the guide-rolls, substantially as and for the purposes set forth.

3. The combination, in a machine for bending shoe blanks into shoe shapes, of a fixed cutter, a centrally pivoted arm provided with a cutter, a die as *y*, attached to said arm and adapted to chamfer the severed portion of the blank, a counter-shaft provided with a cam for actuating the pivotal arm, a pair of oscillating jaw-dies between which the partially bent blank is inserted against the force of a spring and by a reciprocating die, a pair of guide-rolls for supporting the bar as it is partially bent by the plunger and for guiding it into the jaw-dies, a pair of gages, as V, having inclined working faces for engaging the extremities of the bar to insure the contact of the plunger-die with the center thereof and for permitting said extremities to clear the gages as the plunger-die drives the intermediate portion of the bar between the guide-rolls, and a set-screw for adjusting the tension of the spring appertaining to the jaw-dies, substantially as and for the purposes set forth.

In witness whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN D. BILLINGS.

Witnesses:
THOMAS M. SMITH,
RICHARD C. MAXWELL.