(No Model.) 2 Sheets—Sheet 1.

J. A TRUDEAU.

MACHINE FOR MAKING HORSESHOE TOE CALKS.

No. 537,249. Patented Apr. 9, 1895.

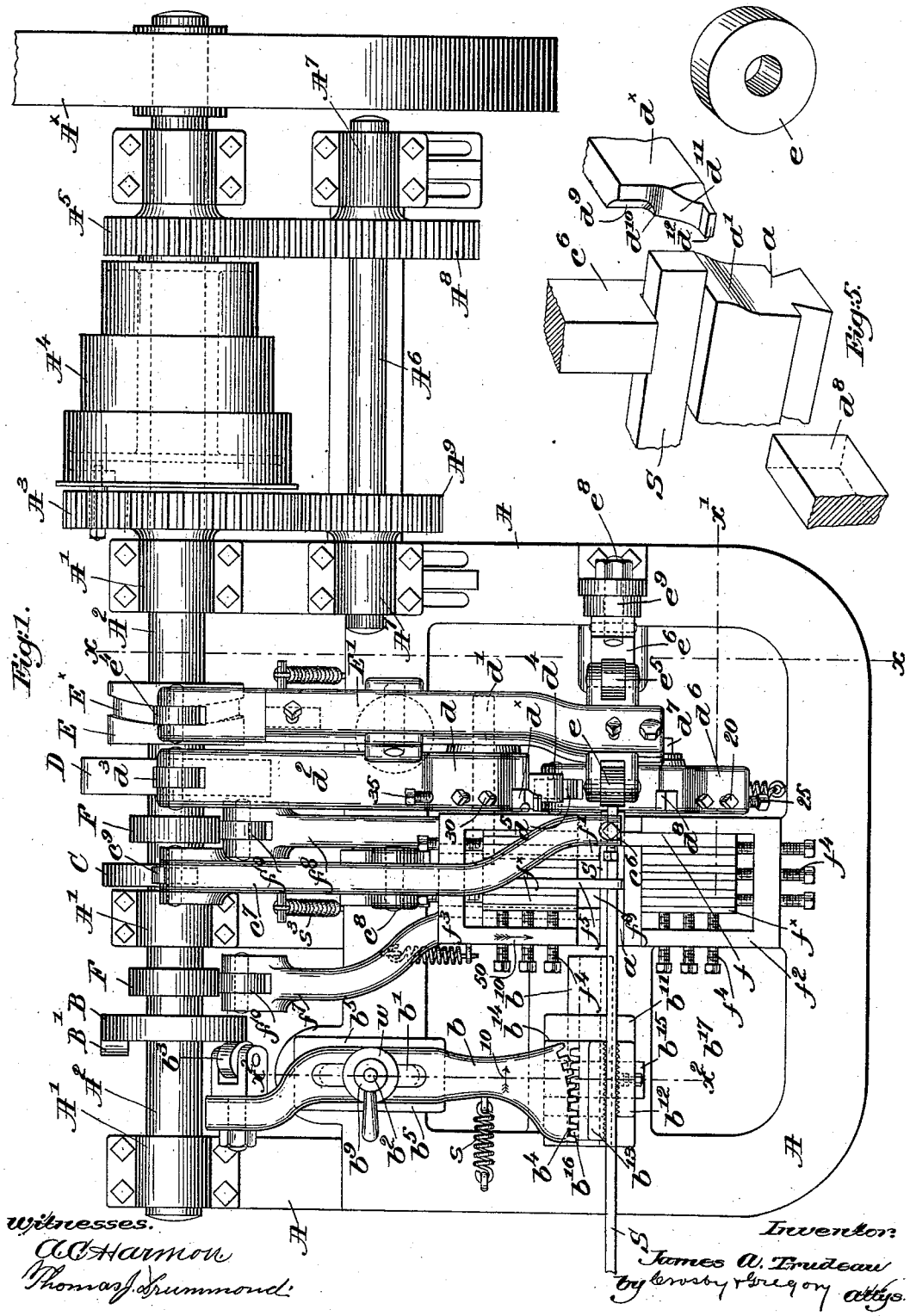

Fig. 1.

Fig. 5.

Witnesses.
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Thomas J. Drummond.

Inventor:
James A. Trudeau
by Crosby & Gregory Attys.

(No Model.) 2 Sheets—Sheet 2.

J. A TRUDEAU.

MACHINE FOR MAKING HORSESHOE TOE CALKS.

No. 537,249. Patented Apr. 9, 1895.

Fig:7.

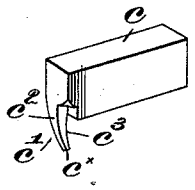


Fig:8.

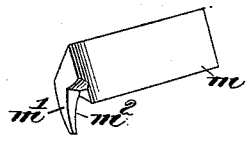


Fig:2.

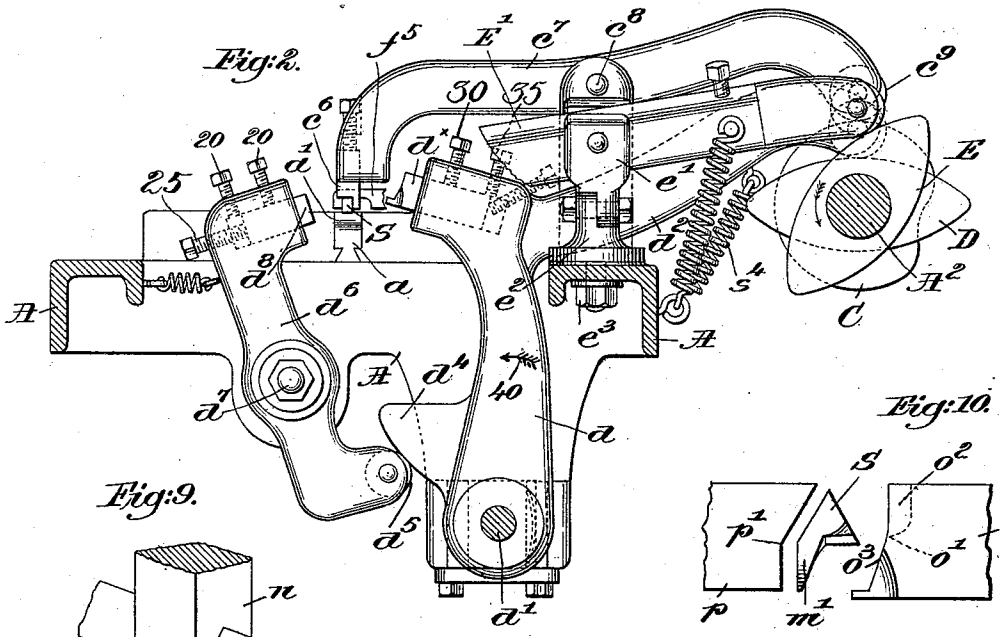


Fig:10.

Fig:9.

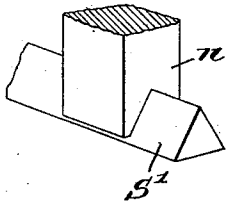


Fig:3.

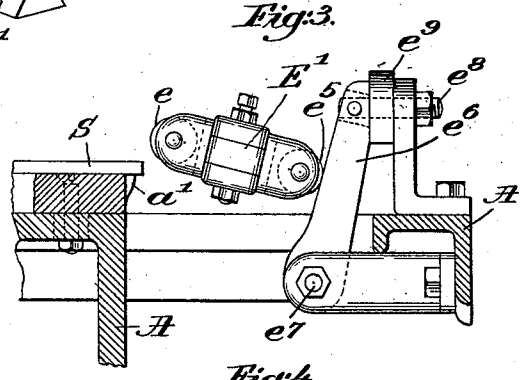


Fig:11.

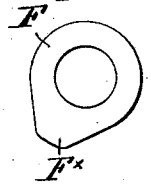


Fig:6.

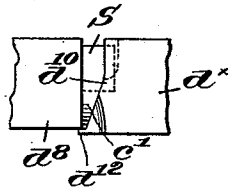
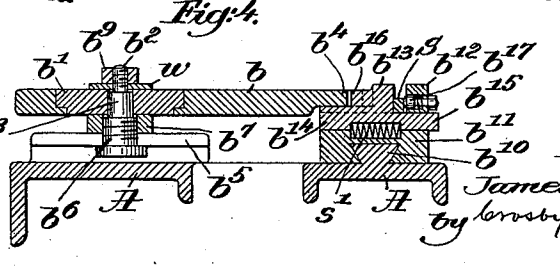


Fig:4.



Witnesses.
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Thomas J. Drummond.

Inventor:
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by Lovejoy & Gregory
Attys.

UNITED STATES PATENT OFFICE.

JAMES A. TRUDEAU, OF BOSTON, ASSIGNOR OF ONE-THIRTIETH TO LOUIS B. CANTIN, OF EVERETT, MASSACHUSETTS.

MACHINE FOR MAKING HORSESHOE TOE-CALKS.

SPECIFICATION forming part of Letters Patent No. 537,249, dated April 9, 1895.

Application filed September 28, 1894. Serial No. 524,371. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. TRUDEAU, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Machines for Making Horseshoe Toe-Calks, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

The short piece of steel forming a toe calk is provided, as is well known, with a spur which is driven into the heated shoe, to retain the calk in position thereon when they are heated preparatory to being welded together.

Toe calks have been made in comparatively small quantities by machinery, but such machine-made calks though cheap in cost, have been unable to compete with more expensive hand-made calks on account of the difficulty experienced by blacksmiths in retaining them on the shoe before welding.

On all machine-made calks, so far as I am aware, the spur is substantially conical in shape, with straight sides, and when driven into the heated shoe, the opening made by such a spur is so shaped that when the blacksmith places the shoe and calk in the fire to heat, the calk will drop off, or it will fly off at the first hammer blow. Hand-made calks, however, are provided with a slightly bent or turned spur, which enters the shoe in a diagonal direction, and when the point of the spur impinges against the anvil as it is driven into the shoe it is still farther turned or clinched in the shoe, firmly retaining the calk in place during heating and welding.

This invention has for its object the production of a machine for making toe calks having a spur whose point is slightly offset or turned over, and which will have all the advantages of a hand-made calk, the machine embodying my invention being simple in construction, rapid and economical in operation, and automatically forming the calk from a strip of steel of proper shape.

In accordance therewith my invention consists, in a machine for making toe calks, of the following instrumentalities in combination, viz:—a stationary anvil upon which the stock rests, a clamp to hold the stock thereon, a co-operating anvil and die to act upon opposite sides of the stock and form the spur, and a die movable in an adjustable path and adapted to travel over the outer side of the spur from base to point, substantially as will be described.

Other features of my invention will be hereinafter described and particularly pointed out in the claims.

Figure 1 is a top view of a machine embodying therein my invention for making toe calks. Fig. 2 is a sectional view, partly broken out, taken on the line x—x, Fig. 1, looking to the left. Fig. 3 is a detail taken on the line x', Fig. 1. Fig. 4 is a similar view on the line x^2—x^2, Fig. 1. Fig. 5 is a diagrammatic view of the stock clamped on the anvil, and the spur-forming dies in position to advance upon the stock. Fig. 6 is a detail showing the spur-forming dies in engagement with the stock. Fig. 7 is a perspective view of a toe calk as made in accordance with my invention. Fig. 8 is a similar view of a modified form of calk. Figs. 9 and 10 are detail views of the clamp, and the forming dies respectively, for the calk shown in Fig. 8; and Fig. 11 is a side view of one of the cams, to be referred to.

In order that the product of the machine may be clearly understood reference is first made to Fig. 7, showing a completed toe calk, the main portion or bar c having depending from one corner thereof a tapering spur c', the outer face c^2 of the spur being convexed and its inner face c^3 concaved, between the bar c and the spur point $c^\times$, to offset the latter. The spur is thus bent initially, and when driven into the heated shoe the point $c^\times$ will be turned by the anvil still farther toward the concave side c^3, and thus clinched upon the inner side of the shoe. Accidental separation of the calk from the shoe during subsequent operations is thus rendered impossible, and furthermore, the clinching of the spur holds the calk in proper position on the shoe until it is welded thereon.

As shown in Figs. 1 to 4 inclusive, the operating parts are supported in a suitably shaped frame A, having bearings A′ for the main or operating shaft A^2, said shaft having fast thereon a gear A^3 and fly wheel $A^\times$, and a loose sleeve upon which are rigidly mounted belt

pulleys A^4 and a small gear A^5. The sleeve and gear A^3 are adapted at times to be connected by any usual clutch device, forming no part of my invention, and when clutched, the driving shaft A^2 is rotated at the same speed as the sleeve. When it is desired to increase the power at the expense of speed, a countershaft A^6, mounted in bearings A^7 adjustable toward and from the main shaft, is moved toward said shaft A^2 until the gears A^3 and A^5 respectively engage a small gear A^9 and a large gear A^8, both fast on the countershaft, the belt pulleys A^4 being unclutched from the main shaft. The power is then transmitted from the pulleys A^4 through gears A^5, A^8, A^9 and A^3 to the main shaft A^2, reducing the speed and making a back gearing for the apparatus, no claim being herein made to the same, however, as it is not of my invention.

A series of cams B, C, D, E and F are secured at intervals to the main shaft A^2, to actuate respectively the feed, clamping, spur-forming and severing devices, now to be described in their order.

A lever b longitudinally slotted to receive a removable bushing b', see Figs. 1 and 4, through which is extended its adjustable fulcrum b^2, is provided at one end with a roller or other stud b^3 to be engaged by a raised portion B′ on the side of the cam B, the other end of the lever having a segmental toothed face b^4, a suitable spring s maintaining the roll b^3 in engagement with the cam. A raised guideway b^5 on the top of the frame-work A receives between its flanged lips the enlarged and headed end b^6 of the fulcrum post b^2, threaded to engage a set nut b^7 adapted to be screwed tightly upon the guideway b^5 to hold the post b^2 in adjusted position. The post is reduced in diameter at b^8, see Fig. 4, and extended through the bushing b', which rests in the slot in the lever b, the ends of the slot being stepped to hold the bushing in place, a washer w and set nut b^9 retaining the lever and bushing upon the post b^2.

The lever b operates the feed mechanism, and inasmuch as the length of feed varies with the length of the bar c of the toe calk, it is necessary to vary the throw of the lever b, which is accomplished by inserting in the lever b a bushing having the post-receiving opening at the proper distance from its center, adjusting the post b^2 in the guideway b^5 until it will enter the bushing, and then securing the washer w and nut b^4 in place. It will be obvious that by using different bushings the fulcrum of the lever will be moved without disarranging the lever and its co-operating parts.

The frame A has secured thereto or forming a part of it an undercut tongue b^{10} extended in the direction of feed, upon which a suitably grooved block b^{11} is longitudinally movable, having upon its top and at one side an abutment b^{12} to form one jaw of the feed mechanism, the other jaw b^{13} forming a part of a sliding jaw-carrier b^{14} movable in a transverse groove in the block b^{11} and held in place by a tongue b^{15}. A series of rack teeth b^{16} on the jaw-carrier b^{14} are engaged by the segmental toothed end b^4 of the actuating lever b. The inner faces of the jaws b^{12}, b^{13}, are preferably corrugated or roughened, to better grip the stock S, between them. As shown in Fig. 1, the segmental end b^4 of the lever is so curved that when moved in the direction of the arrow 10 the movable jaw b^{13} will be first moved toward the other jaw, gripping the stock S, and the movement of the lever b continuing, the block b^{11} will be moved forward, carrying the stock with it to place its leading end in position to be acted upon by the forming or shaping dies. On the reverse movement, as soon as the pressure exerted by the lever on the jaw-carrier b^{14} is loosened, the jaws are separated by a strong spring s', inserted between the jaw-carrier b^{14} and the slide block b^{11}, in suitable recesses, shown only in Fig. 4. A spring-controlled pin b^{17} held in the fixed jaw b^{12} projects from its inner face, and serves to effectually release the stock from engagement with the serrated face of the jaw during the retrogression of the jaws preparatory to gripping the stock anew and again feeding it.

The bed of the frame-work A is grooved, see Fig. 2, to receive the anvil or support a for the leading end of the stock, while it is being shaped to form the spur of the toe calk, the end of the anvil a being convexed at a', as shown in Fig. 5, to shape the concave side c^3 of the spur.

The stock S is clamped from the time it is fed forward by the devices described until the finished calk is severed therefrom by a suitably shaped clamp-block c^6, held in one end of an arm c^7 pivoted at c^8 in a suitable standard, the other end of the lever having a roller or other stud c^9 thereon, held against the periphery of the cam C by a spring s^3.

In Fig. 2 the shape and relative position of the cam C is shown, the dwell occupying the greater portion of the periphery, as the clamp c^6 is only inoperative a very small portion of the entire cycle of operation. A rocker arm d is pivoted to the frame at d', and provided with a lateral extension d^2 having a roller stud d^3 thereon, held in engagement with a substantially elliptical cam D by a spring s^4, to rock the arm d twice at each revolution of the shaft A^2. An ear or lug d^4 on the rocker arm engages a roll d^5 on the toe of a lever d^6, pivoted at d^7, and having removably secured in its upper end, as by set screws 20, a setting die or anvil d^8, to co-operate with a swaging die $d^\times$, shown in Figs. 1, 2 and 5, removably held in the head of the rocker arm d by set screws 30. Adjusting screws 25 and 35, see Figs. 1 and 2, adjust the anvil d^8 and the swaging die $d^\times$ respectively, according to the thickness of the stock. When the rocker arm is moved in the direction of the arrow 40, Fig. 2, the lever d^6 is moved toward it, until the an-

vil d^8 bears against one side of the stock, as in Fig. 6, while the die $d^\times$ swages or forms the spur c'. The die $d^\times$ is cut away at d^9, Fig. 5, to form a clearance and leave an abutment d^{10}, below which the face of the die is beveled at d^{11}, and provided with a lip d^{12} at its lower end, to limit the length of the spur, as shown in Fig. 6. The abutment d^{10} enters the side of the stock S, and draws down or swages the spur c' between its face d^{11} and the straight face of the anvil d^8, after which the die and anvil are withdrawn from the stock. Immediately a revoluble, cylindrical die e is brought against the end of the stock and rolled down over the outer side c^2 of the spur of the calk, thereby shaping the spur over the convexed portion a' of the anvil a, and giving it its concave side c^3 and slightly bent or offset condition. As soon as the revoluble die e is retracted, the die $d^\times$ and anvil d^8 are again brough up to operative position, and following their separation the die e is again operated, so that each calk is subjected to the swaging action of the dies twice, perfectly forming the spur thereon.

The revoluble die e is mounted on a lever E′ pivoted in a bearing e', adjustably hinged to a standard e^2 mounted rotatably on the frame A and held in place by a nut e^3, see Fig. 2, the outer end of the lever having a suitable roller stud e^4 resting against the periphery of the cam E and in the groove E$^\times$ therein, the combined action of the groove and the cam periphery turning the lever E′ in its bearing e' and also with the latter about the vertical axis of the standard e^2, thereby giving a convex form to the outer side of the spur of the calk. A roll e^5, shown in Figs. 1 and 5, is mounted on the side of the lever E′, to travel along an adjustable guide-track e^6, pivoted to the frame at e^7 and adjusted by a suitable bolt e^8 and washer e^9, the shape of the track being such that it presents a solid backing for the lever E′ when its die e is in operation. The various adjustments described enable long or short spurs to be made, with different degrees of convexity for its side c^2. The calk having been properly shaped and swaged is now severed from the stock, by means of fixed and movable cutters f and f', normally on opposite sides of the stock and held in place in suitable carriers f^2, f^3, by means of filling strips $f^\times$ and clamp screws f^4.

As shown in Fig. 1, the fixed cutter f bears against one side of the stock, and when the cutter f' is moved toward it, it impinges against the opposite side of the stock and its full movement shears the main portion from the calk, and in order to bring the leading end back into position to be fed forward I have secured to the movable carrier f^3 a guide f^5 having a notch in its under side, to loosely embrace or straddle the stock, see Figs. 1 and 2, whereby the stock is positively drawn back into place by the retraction of the carrier f^3. The sliding carrier is provided with a tongue to enter an undercut groove f^6 in the frame, see Fig. 1, arms f^7 and f^8 secured to the carrier having rolls f^{10} thereon in engagement with the two like cams F on the shaft A^2, whereby, when the raised portion F$^\times$, shown only in Fig. 11, of said cams engages the rolls f^{10}, the carrier f^3 is moved in the direction of the arrow 50, to sever the stock. By moving the cutters in their respective carriers the length of the calk is regulated, and the cutters can readily be adjusted according to the thickness of the stock. The various cams are so set upon the main shaft that the co-operating mechanisms are moved in proper order, so that one step follows another in the operation of forming the calk.

Instead of making the calks from stock rectangular in cross section, other shapes may be used, as for instance, triangular, a completed calk made from such stock being shown in Fig. 8.

The bent spur m' is shaped the same as heretofore described, with a concave inner face m^2, and it projects from one corner of the body m of the calk. Such a change in the stock S necessitates a change in the clamp n, as shown in Fig. 9, and in the swaging die o and co-operating anvil p, the latter having an obtuse angled face p', see Fig. 10, the point o' of the die, formed by the clearance o^2 entering the stock, and, in conjunction with the inclined face o^3, shaping and drawing down the spur m'. Thus by changing the faces of the various dies or parts directly engaging the stock, it is obvious that any desired shape of stock may be handled with equal facility.

The operation of the various parts is direct and powerful, while the construction is simple, and all the parts are controlled by a single operating shaft, the completed calk being removed by the advancing end of the stock as it is fed forward.

It is to be understood that while the operating parts are actuated by a single shaft the latter is not of unusual size, for the reason that each step or act is performed by itself, so that the step requiring the greatest power to accomplish it regulates the size of the shaft A^2.

My invention is not restricted to the construction and arrangement herein shown, as it is obvious that alterations may be made therein without departing from the spirit and scope of my invention.

I claim—

1. In a machine for making toe calks, the following instrumentalities, in combination, viz;—a stationary anvil upon which the stock rests, a clamp to hold the stock thereon, a co-operating anvil and die to act upon opposite sides of the stock and form the spur, and a die movable in an adjustable path and adapted to travel over the outer side of the spur from base to point, substantially as described.

2. In a machine for making toe calks, the following instrumentalities, in combination, viz;—a stationary anvil upon which the stock

rests, said anvil having a projecting portion of its end convexed; an intermittingly movable clamp for the stock; a movable anvil having its face corresponding to one side of the stock; a co-operating die to act upon the opposite side of the stock and swage the spur; a die movable in an adjustable path and adapted to travel over the outer side of the spur, to force its inner side against the convexed part of the supporting anvil, and means to actuate said clamp and dies, substantially as described.

3. In a machine for making toe calks, the following instrumentalities, in combination, viz;—a slide block; a fixed jaw, and a jaw movable laterally on said block to grip the stock between them; a vibrating lever movable in a horizontal plane to close the jaws and thereafter move them longitudinally in unison with the slide block to feed the stock; a clamp; dies to act respectively upon one side and the end of the stock, to form the spur; co-operating cutters to sever the completed calk; and means to operate said clamp, dies and cutters, substantially as described.

4. In a machine for making toe calks, the following instrumentalities, in combination, viz;—a stationary supporting anvil for the stock; a clamp to hold it thereon; a die and an anvil movable toward and to co-operate with opposite sides of the stock, to swage the spur; a revoluble die adapted to roll over the outer side of the spur; and means to adjust the movement of said die, substantially as described.

5. In a machine for making toe calks, the following instrumentalities, in combination, viz;—a stationary supporting anvil for the stock; a clamp to hold it thereon; dies to act upon the side and end of the stock to form the spur; a fixed cutter and a movable cutter located at the rear of the clamp; means to adjust said cutters, toward or from the clamp and also relatively toward each other, and means to actuate the movable cutter; and an adjustable intermittingly operating feed device, to feed the stock a predetermined distance when unclamped, substantially as described.

6. In a machine for making toe calks, the following instrumentalities, in combination, viz;—a supporting anvil for the stock; a clamp to hold it thereon; dies to act upon the side and end of the stock to form the spur; a fixed cutter and a movable cutter located at the rear of the clamp; a guide to loosely engage the stock intermediate the cutters and feed mechanism, and traveling in unison with said movable cutter, to restore the stock to proper position when cut; and feed mechanism to feed the stock forward a predetermined distance after the operation of the cutters, substantially as described.

7. In a machine for making toe calks, the following instrumentalities, in combination, viz;—two independent dies operating at an angle to each other; a fixed anvil supporting the stock and opposed to one die; a movable anvil to co-operate with the other die; a clamp; connections between said die and movable anvil, whereby one actuates the other, and mechanism for withdrawing the movable anvil and the connected die before the other die is brought into operative position, substantially as described.

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

JAMES A. TRUDEAU.

Witnesses:
JOHN C. EDWARDS,
ALFRED PINEL.