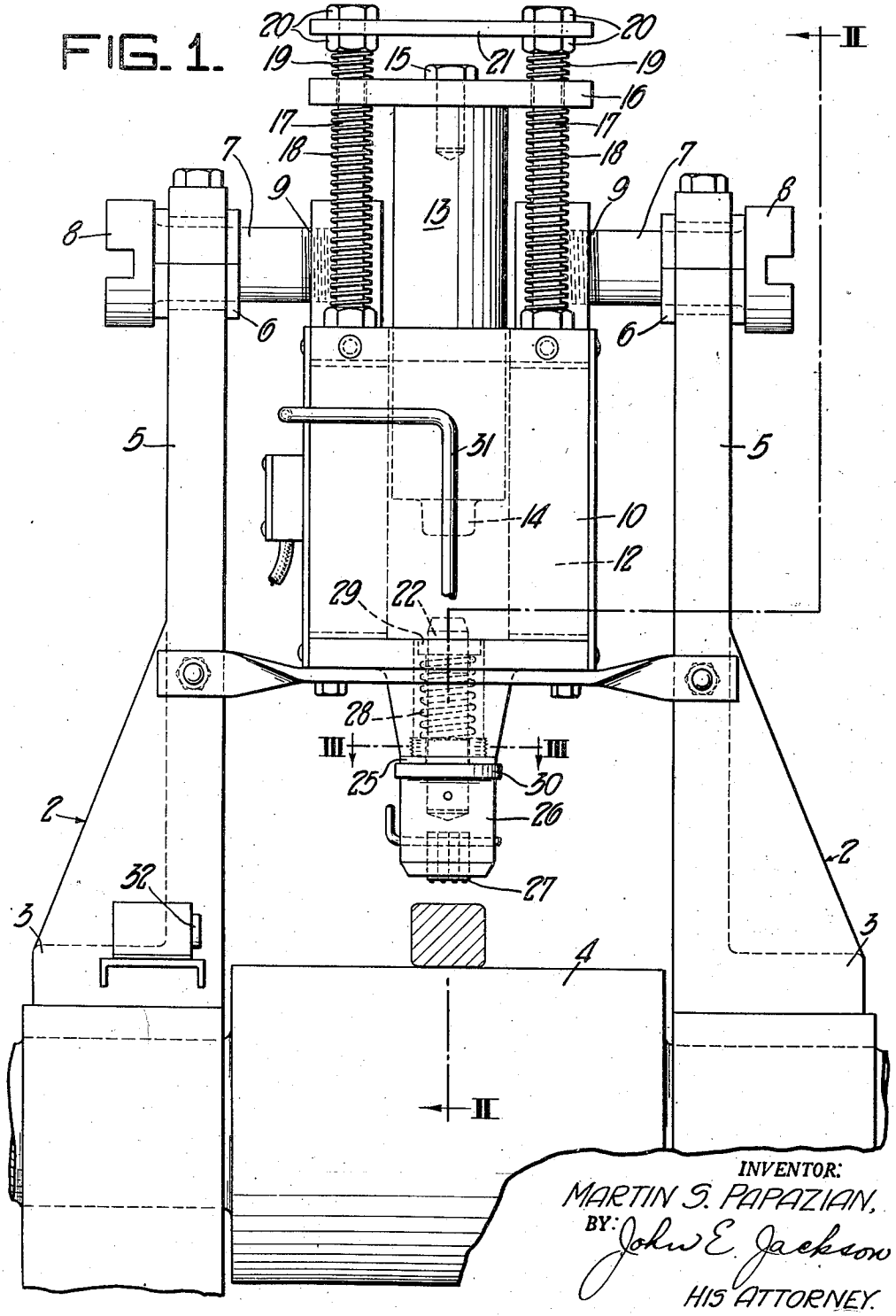
May 9, 1944. M. S. PAPAZIAN 2,348,566

APPARATUS FOR MARKING BILLETS AND THE LIKE

Filed June 9, 1943 2 Sheets-Sheet 1

FIG. 1.



INVENTOR:
MARTIN S. PAPAZIAN,
BY: John E. Jackson
HIS ATTORNEY.

May 9, 1944. M. S. PAPAZIAN 2,348,566

APPARATUS FOR MARKING BILLETS AND THE LIKE

Filed June 9, 1943 2 Sheets-Sheet 2

FIG. 2.

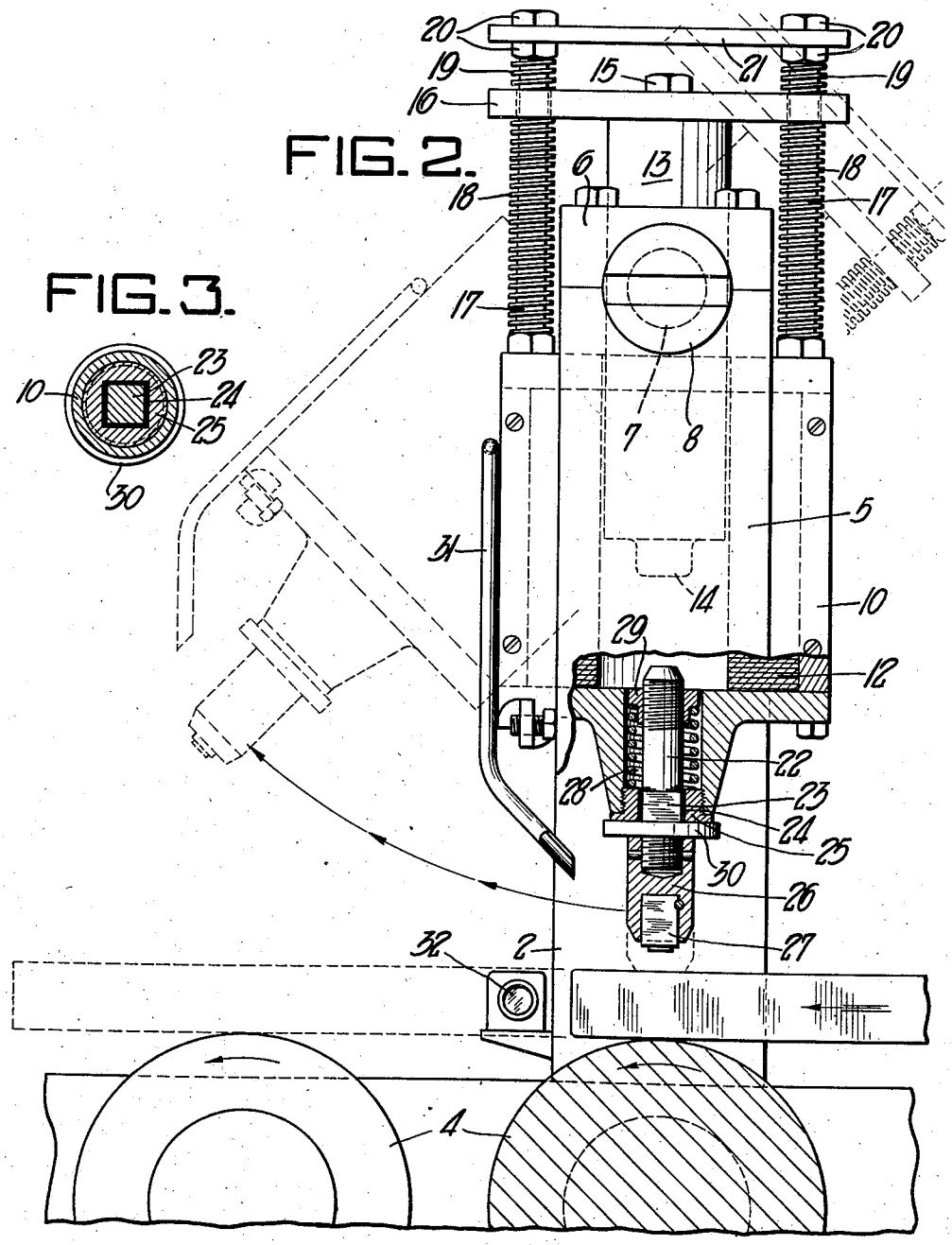


FIG. 3.

INVENTOR:
MARTIN S. PAPAZIAN,
BY: John E. Jackson.
HIS ATTORNEY.

Patented May 9, 1944 2,348,566

UNITED STATES PATENT OFFICE

2,348,566

APPARATUS FOR MARKING BILLETS AND THE LIKE

Martin S. Papazian, Worcester, Mass., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey

Application June 9, 1943, Serial No. 490,203

8 Claims. (Cl. 101—3)

This invention relates to apparatus for marking billets and the like, and particularly to an improved apparatus or device for marking or stamping billets and similar metallic articles automatically as they are continuously conveyed along.

In the steel industry, it is the general practice to mark billets, slabs, blooms, and the like with stock or heat numbers and/or with any other pertinent information which is desired. Usually such articles were marked manually by means of a punch and sledge, but such practice was tedious and inefficient and, at times, extremely dangerous to the workmen. It is to apparatus or a device for automatically marking or stamping such articles, particularly billets with stock or heat numbers as they are conveyed along that the present invention relates.

Accordingly, it is the general object of the present invention to provide an improved apparatus or device for marking or stamping billets and the like, as they are conveyed along, which is controlled automatically by the billet or workpiece as it passes therealong.

It is another object of the invention to provide an improved apparatus or device for marking or stamping automatically billets and the like as they are conveyed along which is simple and inexpensive in its construction and, at the same time, efficient and effective in its use, and which can be easily and conveniently incorporated with existing equipment.

It is a further object of this invention to provide an improved apparatus for marking automatically billets and the like as they are conveyed along which is strong and rugged in its construction, and apparatus which is safe in its use thereby eliminating any hazards to the workmen in the vicinity thereof.

Various other objects and advantages of this invention will be more apparent in the course of the following specification, and will be particularly pointed out in the appended claims.

In the accompanying drawings there is shown, for the purpose of illustration, an embodiment which my invention may assume in practice.

In these drawings:

Figure 1 is a front elevational view of the improved marking or stamping apparatus of my invention;

Figure 2 is a sectional view taken on line II—II of Figure 1; and

Figure 3 is a sectional view taken on line III—III of Figure 1.

Referring more particularly to the drawings, the improved marking apparatus or device of my invention comprises a housing or frame 2 having a base 3 which is positioned, preferably, above a roller 4 of the conveyor for conveying the billets or articles along or in any other suitable position in the path of the articles or workpieces as they are conveyed along. There is carried by the base 3, a pair of spaced apart upwardly extending bearing supports or members 5 with each having a bearing 6 arranged in the upper end thereof. There is arranged in the bearings 6 of the upwardly extending members 5, a shaft consisting, preferably of two bolt-like members 7 with each having a slotted head portion 8 arranged on the outer end thereof and a threaded portion 9 arranged on the inner end of the same. There is positioned between the upwardly extending members 5, a head 10 which is suspended from the shaft or bolt-like members 7. In other words, the threaded portion 9 of each of the bolts 7 is screwed into a threaded hole arranged in the head 10 at each side thereof, and the head is mounted thereon for limited swinging movement between the members 5 for a purpose hereinafter to be described. The bolt-like members 7 are slotted and provided so that the head may be conveniently removed and installed in its assembled position between the members 5.

There is carried by the head 10, preferably, a solenoid or coil 12 between which there is arranged a vertically disposed plunger 13 having a striking portion 14 arranged on the lower end thereof. The upper end of the plunger 13 is connected preferably by means of a cap screw 15, to a plate member 16. On top of the head 10, there is mounted preferably four upwardly extending stud-like members 17, and there is arranged around the lower end of each of the studs 17, preferably, a coil spring 18. The plate member 16 has four holes arranged therein through which the stud-like members 17 extend and the plate-like member rests normally on top of the coil spring 18 with the plunger 13 connected thereto extending into the solenoid or between the coil 12. It is the purpose of the stud-like members 17 to guide the plate 16 together with the plunger 13 connected thereto in their vertical movement, in a manner to be described. There is also arranged around each of the stud-like members 17 above the plate 16, preferably, a coil spring 19, and there is mounted on the upper ends of each of the studs 17 above the coil springs 19, preferably, a pair of lock nuts 20 and a plate 21.

In an opening arranged in the bottom of the head 10, there is arranged for reciprocable move-

ment therein and in axial alignment with the plunger 13, the punching or marking mechanism. This mechanism consists, preferably, of a vertically arranged stud shaft or punch 22 which is preferably threaded at each end thereof. Intermediate the length of the stud shaft 22, at a point directly above the lower threaded portion thereon, there is arranged, preferably, a square portion 23 which is adapted to cooperate with a square hole 24 arranged in a bushing 25 screwed into the lower end of the head 10 as more clearly shown in Figures 2 and 3 of the drawings. On the lower threaded portion of the stud shaft 22, there is arranged a die holding member 26 in which there is mounted the marking or punching dies 27. Within the lower part of the head 10 above the bushing 25, there is arranged around the stud shaft 22, preferably, a coil spring 28, and there is positioned on the upper threaded portion of the stud shaft 22, preferably, an adjustable nut 29 for adjusting the compressive force of the spring 28. It will be seen that one end of the spring 28 rests upon the upper side of the bushing 25 and the upper end of the spring abuts against the adjusting nut 29. There is also carried by the stud shaft 22, immediately above the lower threaded portion thereof, a collar 30 which normally abuts against the lower side of the brushing 25.

There is arranged, preferably, on the front side of the head 10, a downwardly extending air line 31 which is connected to a suitable source of compressed air supply. This air line is directed at the die assembly in the die holder 26 and it is provided so as to keep the die assembly cool enough to permit changing of the dies and to prolong the life thereof.

There is positioned to one side of the path of the billets or articles and, preferably, mounted on the side of the housing or frame 2, a photo-electric cell 32 for controlling the energization of the solenoid or coil 12. It will be understood that this photo-electric cell is controlled by the billets or articles as they pass through the light beam issuing forth from the photo-electric cell in a well known manner. While there is shown an electric eye or photo-electric cell for controlling the solenoid and the punching mechanism associated therewith, it will be understood that any suitable mechanical means may be provided for intermittently energizing the solenoid or coil. For example, a mechanical controlled device may be conveniently attached to the roller 4 or any other roll of the conveyor system whereby the circuit will be closed to the solenoid thereby energizing the same after a predetermined number of revolutions of the roll.

The improved apparatus or device of my invention functions in the following manner. It will be understood that the head 10, together with the punching mechanism associated therewith, assumes normally the position shown in the full lines of Figure 2 of the drawings. As the billets or workpieces to be marked or punched pass along the conveyor, it will be understood that they pass over the roller 4 centrally between the upwardly extending members 5 of the frame 2 directly below the dies 27 of the punching or marking mechanism. As the billets or workpieces pass therealong, it will be seen that they interrupt intermittently the light beam from the photo-electric cell 32. When the light beam is broken, it will be understood that the photo-electric cell operates the mechanism (not shown) for closing the circuit to the solenoid or coil 12 thereby energizing the same in a well known manner. Upon the energization of the coil 12, it will be seen that the plunger 13 will be drawn into and through the head 10 against the action of the coil spring 18 on the stud shaft 17 thereby loading the same. Upon further movement of the plunger 13, it will be seen that the striking portion 14 carried thereby will strike the upper end of the stud shaft 22 thereby forcing the same downwardly and outwardly from the head 10 against the action of the coil spring 28 associated therewith thereby loading the same. As the stud shaft 22 moves downwardly, it will be seen that the punching or marking dies 27 carried thereby will strike the upper surface of the billet or workpiece positioned in under the dies so as to mark the same.

It will be understood that the particular billet or workpiece being marked is continuously moving along during the above mentioned operations, and when the dies 27 strike the same, the entire head 10, together with the punching arrangement carried thereby, will be swung outwardly due to the momentum of the billet or workpiece which is being stamped, substantially to the position, as shown in the broken lines of Figure 2 of the drawings. After the head 10 has swung to its outermost position, it will be understood that it will swing back to its normal position due to the gravity, and in the interim the coil 12 will be deenergized as it will be understood that the energization thereof is only momentarily so as to place the plunger 13 in motion in order to obtain the required striking force for the punching mechanism. Upon the deenergization of the solenoid or the coil 12, it will be seen that the plunger 13, together with the plate 16 to which it is connected, due to the action of loaded coil springs 18, will be moved upwardly along the stud-like members 17 with the plunger moving out of the upper end of the head 10 to its retracted or normal position, as shown in the full lines of Figure 2 of the drawings. As the plunger 13, together with the plate 16, move upwardly, it will be understood that they do so with a great amount of force and it is the purpose of the coil springs 19 to absorb this force or to cushion the effect of the return movement of the plunger so that the device will be free from shocks and vibrations. As the plunger 13 moves upwardly, it will also be seen that the stud-like shaft 22, together with the punching dies 27 carried thereby, will also be moved upwardly or to their retracted position within the lower end of the head 10, as shown in the full lines of Figure 2 of the drawings, due to the action of the coil springs 28 with the collar 30 carried by the stud shaft abutting the lower end of the bushing 25. It is the purpose of the square portion 23 on the shaft 22 which cooperates with a square hole through the bushing 25 to prevent the shaft from rotating so as to maintain the punching or marking dies 27 always in one position. When the light beam from the photo-electric cell 32 is again interrupted by the next succeeding billet or workpiece, the device will function in the same manner as has been described for punching or marking the next billet or workpiece and each succeeding billet or workpiece in a like manner.

There is carried by the head 10, a transversely extending bar-like member 33 preferably having an adjustable cap screw 34 arranged adjacent each end thereof at a point directly opposite

each of the upwardly extending members 5 with which they are adapted to cooperate. The member 35 together with the cap screws 34 carried thereby are adapted to act as a bumper upon the return of the head to its normal position after a marking or punching operation. In other words, the member 33 is adapted to prevent an overswing of the head 10 when the same returns to its normal position and also maintains the head in its proper vertical position at all times. It is the purpose of the cap screw 34 to adjust the normal suspended position of the head 10, that is, these cap screws may be adjusted so that the punching dies 27 may be positioned either centrally of the upwardly extending members 5 and the billets 7, or to one side of the center thereof, as desired.

Although in the foregoing description, the punch mechanism is designed to receive the striking power from the solenoid or coil 12 with a subsequent recoil by means of the springs 18 and 28, a reverse construction may be provided, in accordance with the teachings of the present invention. In other words, the striking force may be supplied by photo-electric cell tripped springs and the return of the punching mechanism to its normal position facilitated by the solenoid or coil 12.

As a result of my invention, it will be seen that there is provided a marking or punching apparatus whereby billets or other workpieces can be automatically marked with the desired data as they are conveyed continuously along. It will be seen also that my improved marking apparatus may be easily and conveniently incorporated with existing conveyor equipment without the necessity of expensive alterations and additional equipment.

While I have shown and described one specific embodiment of my invention, it will be understood that this embodiment is merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claims.

I claim:

1. Apparatus for marking billets and similar articles as they are conveyed along including, a head suspended for a limited swinging movement above the path of travel of the articles to be marked, a marking punch reciprocably arranged on said head, means carried by said head for forcing said marking punch into engagement with the articles to be marked, and means for returning the punch to its normal position in said head after the stamping or marking operation, said head together with the marking punch carried thereby adapted to be swung outwardly in the direction of travel of the articles to be marked by the movement of the same when said marking punch is forced into engagement with an article and adapted to be returned to its normal position due to the force of gravity.

2. Apparatus for marking billets and similar articles as they are conveyed along including, a head suspended for a limited swinging movement above the path of travel of the articles to be marked, a marking punch reciprocably arranged on said head, means carried by said head for forcing said marking punch into engagement with the articles to be marked, and means responsive to the movement of the articles to be marked as they pass along for controlling said last mentioned means, said head together with the marking punch carried thereby adapted to be swung outwardly in the direction of travel of the articles to be marked by the movement of the same when said marking punch is forced into engagement with an article and adapted to be returned to its normal position due to the force of gravity.

3. Apparatus for marking billets and similar articles as they are conveyed along including, a head suspended for a limited swinging movement above the path of travel of the articles to be marked or stamped, a marking punch reciprocably arranged in said head for marking the articles, a coil spring for maintaining the punch yieldably in a retracted position within said head, and means carried by said head for striking said punch so as to cause the same to move outwardly from the head against the action of said spring into engagement with the articles to be marked, said head together with the marking punch carried thereby adapted to be swung outwardly in the direction of travel of the articles to be marked by the movement of the same when said punch is forced into engagement with an article and adapted to be returned to its normal position due to the force of gravity, said coil spring adapted to return the punch to its normal retracted position within said head after the marking or stamping operation.

4. Apparatus for marking billets and similar articles as they are conveyed along, as defined in claim 3, wherein the means for striking the marking punch so as to cause the same to move into engagement with the articles to be marked consists of a solenoid plunger which is actuated by a solenoid carried by the head.

5. Apparatus for marking billets and similar articles as they are conveyed along including, a head suspended for limited swinging movement above the path of travel of the articles to be marked or stamped, a marking punch reciprocably arranged in said head for marking the articles, a coil spring for maintaining the punch yieldably in a retracted position within said head, a solenoid carried by said head, the plunger of which is adapted to strike said punch upon the energization of the solenoid so as to force the punch into engagement with the articles to be marked, and means responsive to the movement of the articles to be marked as they pass along for controlling the energization of said solenoid, said head together with said punch carried thereby adapted to be swung outwardly in the direction of travel of the articles by the movement of the same when said punch is forced into engagement with an article and adapted to be returned to its normal position due to the force of gravity, said spring adapted to return the punch to its normal retracted position within said head after the marking or stamping operation.

6. Apparatus for marking billets and similar articles as they are conveyed along, as defined in claim 5, wherein the means responsive to the movement of the articles to be marked as they pass along for controlling the energization of the solenoid consists of a photo-electric cell the light reflection of which is controlled by the articles as they pass therealong.

7. Apparatus for marking billets and similar articles as they are conveyed along including, a head suspended for limited swinging movement above the path of travel of the articles to be marked or stamped, a marking punch reciprocably arranged in said head for marking the articles, a coil spring for maintaining the punch

yieldably in a retracted position within said head, a solenoid carried by said head, a solenoid plunger reciprocably arranged within said solenoid which is adapted to strike said punch upon the energization of said solenoid so as to force the punch into engagement with the article to be stamped, resilient means for maintaining said solenoid in its normal position, and means responsive to the movement of the articles to be marked as they pass along for controlling the energization of said solenoid, said head together with said punch carried thereby adapted to be swung outwardly in the direction of travel of the articles by the movement of the same when said punch is forced into engagement with an article and adapted to be returned to its normal position due to the force of gravity, said spring adapted to return the punch to its normal retracted position within said head, and said resilient means adapted to return said solenoid plunger to its normal position after the marking or stamping operation.

8. Apparatus for marking billets and similar articles as they are conveyed along, as defined in claim 7, wherein the means responsive to the movement of the articles to be marked as they pass along for controlling the energization of the solenoid consists of a photo-electric cell the light reflection of which is controlled by the articles as they pass therealong.

MARTIN S. PAPAZIAN.