

Dec. 3, 1940.

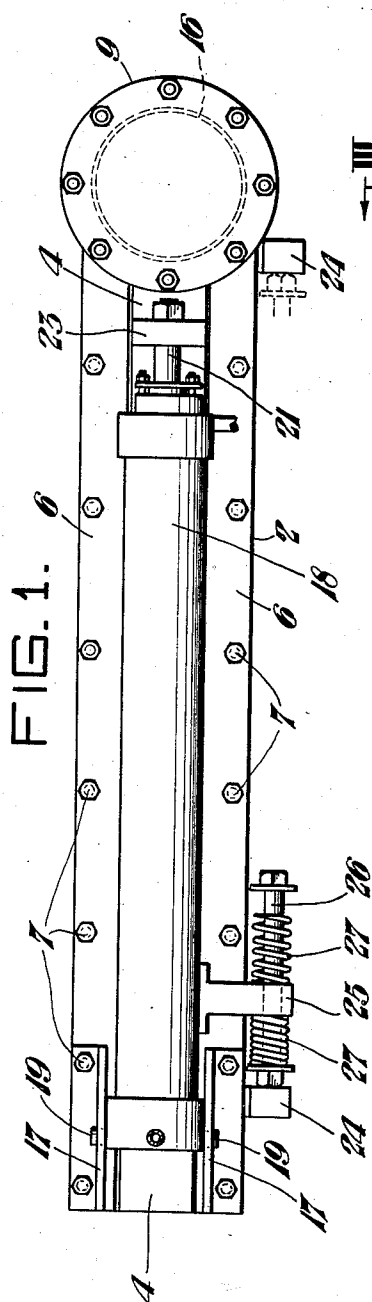
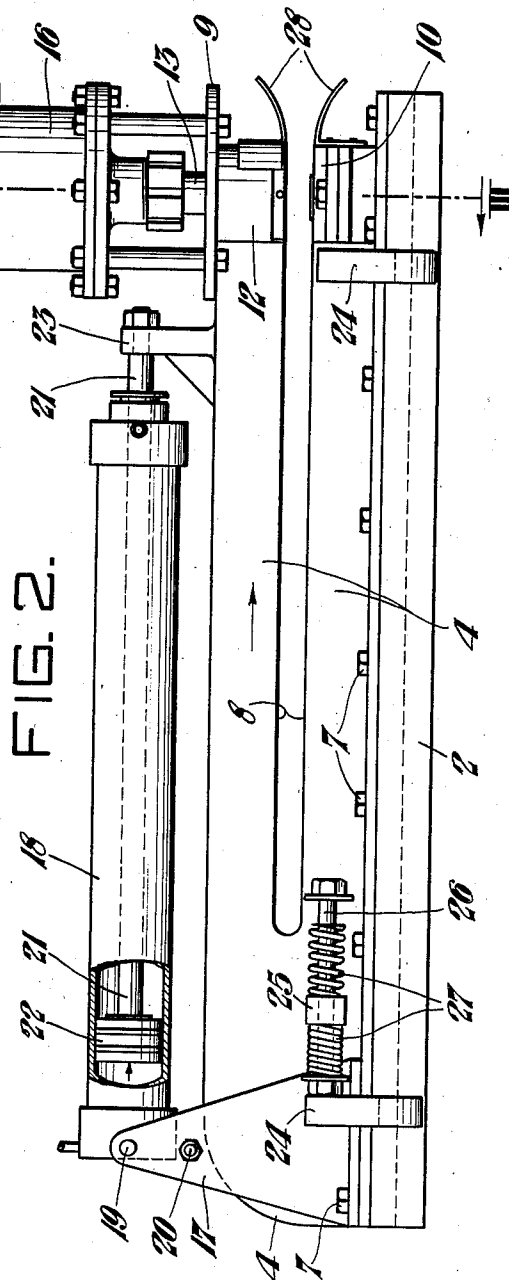
A. G. HENRY

2,224,079

PUNCHING DEVICE

Filed Sept. 12, 1939

2 Sheets-Sheet 1



INVENTOR:
ALEXANDER G. HENRY,
BY
John E. Jackson
HIS ATTORNEY.

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FIG. 3.

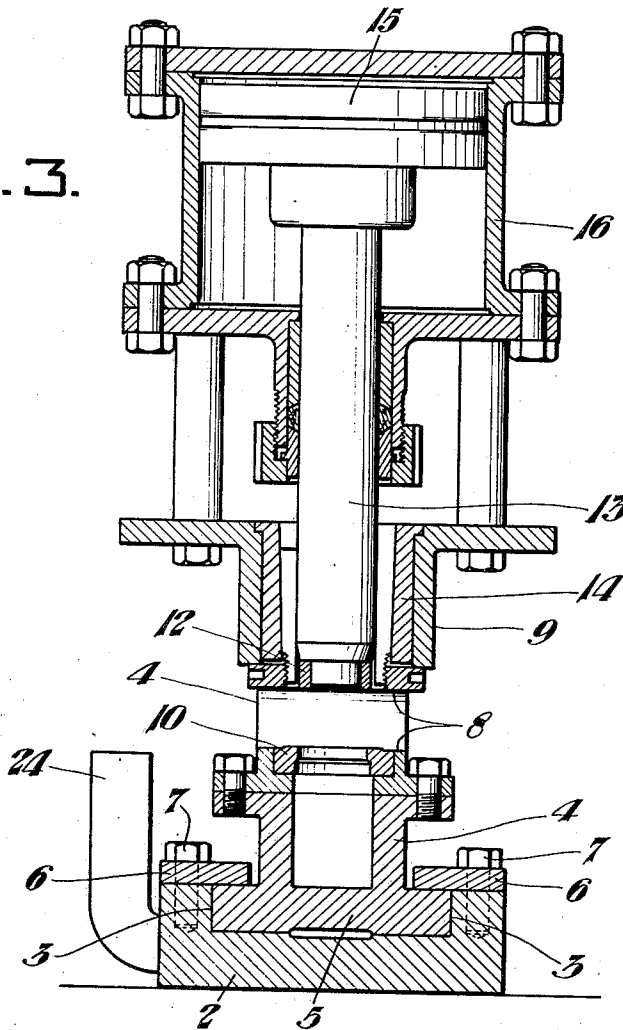
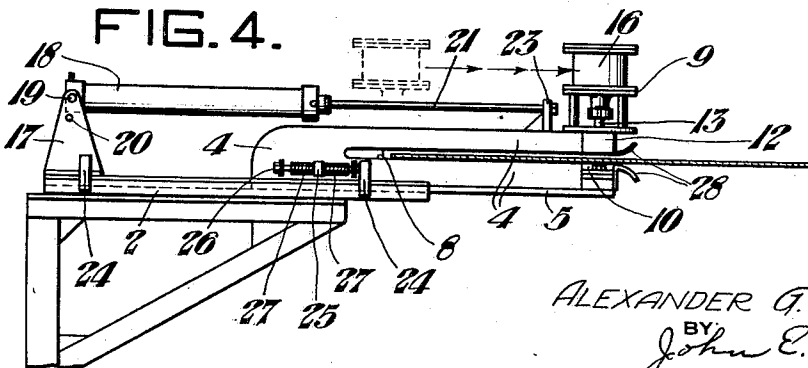


FIG. 4.



INVENTOR:
ALEXANDER G. HENRY,
BY *John E. Jackson*
HIS ATTORNEY.

UNITED STATES PATENT OFFICE

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PUNCHING DEVICE

Alexander G. Henry, Birmingham, Ala.

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2 Claims. (Cl. 164—95)

This invention relates to punches and, particularly, to an improved punching device for punching wide strip material.

In the manufacture of continuous strip steel and the like, it is usually desirable to test the strip by taking a sample therefrom. For various reasons it is desirable that this sample be taken from the center of the strip, especially in the case of wide strip tin metal, that is, a sample is cut at intervals from substantially the longitudinal center line thereof. Heretofore, these samples were taken from the center of the strip by means of hand operated punches for the reason that no other type of punch could be successfully used. Such punches were not only inconvenient to use and very inefficient but were also unsatisfactory in that they left holes in the center of the strip from which the samples were punched having burred or ragged edges which scratched and damaged the rolls of the mill or the convolutions of the strip if it were immediately coiled thereafter.

In the present invention, there is provided a punching device which will leave a clean hole in the strip from which the sample is punched, thereby eliminating any danger of the rolls or of the metal of the strip from becoming scratched or damaged by such punching operations.

Accordingly, it is one of the objects of the present invention to provide a simple and inexpensive punching device which will effectively and efficiently punch samples from the center of wide strip material.

It is still another object of the invention to provide an improved punching device which is simple and convenient to operate and, at the same time, one which will punch a clean hole in the material with which it is used.

It is a further object of the invention to provide an improved punching device which will punch holes at points spaced from the edges of extremely large metallic sheets.

Various other objects and advantages of this invention will become 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 and description, an embodiment which my invention may assume in practice.

In these drawings:

Figure 1 is a plan view of the improved punching device of my invention;

Figure 2 is a side elevation thereof partly in section;

Figure 3 is a sectional view taken on line III—III of Figure 2, and

Figure 4 is a smaller side elevational view showing my improved punching device in operation.

The punching device of the present invention is shown incorporated in its use with a continuous strip mill line as used in the manufacture of strip steel, but it will be understood that it may be used for punching samples from the center of extremely large metallic sheets or for punching holes therein for other purposes at points spaced inwardly from the edges thereof.

Referring more particularly to the drawings, the improved punching device of my invention comprises a base member 2 in the form of a longitudinally extending plate having a channeled track or guide portion 3 arranged in the top thereof and extending throughout the length thereof. There is slidably arranged on top of the base member 2, a yoke or carriage member 4 substantially equal in length to the base member 2 and having a bottom longitudinally extending plate-like runner portion 5 which is positioned in the channeled track portion 3 of the base member for guiding and supporting the yoke member in its reciprocating movement. The plate-like portion is held in the channeled portion 3 preferably by means of a flat strip or plate member 6 disposed on each side of the base member and secured thereto by means of cap screws 7.

There is arranged centrally of the yoke or carriage member 4, an elongated opening or throat 8 extending from the forward end thereof to a point intermediate the rear portion thereof. On the forward end of the yoke member at the front of the opening or throat 8 therein, there is arranged thereon a punch 9 having the lower or female die part 10 thereof disposed on the forward end of the lower portion of the yoke member below the throat 8 and the upper or male die part 12 thereof disposed on the forward end of the upper portion of the yoke member above the throat. A punching plunger 13 is arranged in a suitable bearing 14, and the upper end thereof is connected to a piston 15 disposed in a pneumatic cylinder 16 arranged on the forward end of the top portion of the yoke member 4 by means of which the punch is adapted to be operated.

There is mounted on the rear end of the base plate 2 and secured thereto preferably by means of the cap screws 7, a pair of upwardly extending bracket members 17 with one disposed on each side of the yoke member 4 and extending thereabove. There is arranged above the yoke member 4 and substantially parallel thereto an

elongated pneumatic cylinder 18 having its rear end disposed between the bracket members 17 and secured thereto, preferably by means of a pin 19 extending therethrough. The upper portions of the bracket members 17 are held in spaced relation, preferably by means of a bolt 20 extending therebetween positioned between the yoke member 4 and the pneumatic cylinder 18. On the inner end of the piston rod 21 there is arranged a piston 22 within the pneumatic cylinder 18 and the outer end thereof is connected to an upwardly extending member or bracket 23 securely mounted on the forward end of the top of the yoke member 4 adjacent the pneumatic cylinder 16.

Along one side of the base member 2 and securely attached thereto, there is preferably arranged a pair of upwardly extending stop members 24, one adjacent the forward end thereof and the other adjacent the rear end thereof. On the same side of the device on the side of the yoke member or carriage 4, adjacent the rear end thereof between the stop members 24, there is mounted an outwardly extending bracket member 25 having a bolt 26 loosely and horizontally disposed in an opening therein with a coil spring 27 arranged therearound on each side of the bracket 25. There is suitably arranged on the forward end of the punch preferably a pair of arcuately-shaped guide members 28 with one arranged on the lower or female die part 10 of the punch and the other arranged on the upper or male die part thereof for the purpose of guiding the strip therebetween into the throat or elongated opening 8 of the yoke or carriage member 4.

The punching device of the present invention is adapted to be securely positioned to one side of the mill line directly opposite the path of travel of the continuous strip, as shown in Figure 4 of the drawings, or in any other suitable place where it is adapted to be used and operates in the following manner. When it is desired to punch a sample from the strip, compressed air is introduced into air cylinder 18 in back of the piston 22, thereby forcing the same together with the piston rod 21 outwardly. The piston rod 21 in turn moves the yoke or carriage member 4 together with the punch 9 carried thereby due to its being connected thereto by means of bracket 23 so that the metallic strip enters between the guide members 28 and the female and male die parts of the punch 9 into the throat 8 of the yoke member 4. After the yoke member has been moved to the proper position so that the punch carried thereby is substantially in the center of the strip or the forward end of the bolt 26 has struck the stop member 24 on the forward end of the base member, compressed air is then introduced into the air cylinder 16 above the piston 15 thereby forcing the same downwardly together with the punching plunger 13 against the strip so as to cooperate with the female part 10 therebelow to punch the sample from the strip. After the sample has been properly punched therefrom, compressed air is introduced into the air cylinder 16 below the piston 15, thereby moving the same together with the punching plunger 13 upwardly out of engage-

ment with the strip to its retracted position. Compressed air is then introduced into the air cylinder 18 in front of the piston 22 therein, thereby forcing the same together with the piston rod 21 and the yoke member 4 and the punch 9 carried thereby rearwardly to its retracted position, as shown in Figure 2, and the rear end of the bolt 26 strikes the stop member 24 at the rear end of the base member to cushion the return movement of the carriage. The punching device is maintained in its retracted position until it is desired to again punch a sample from the strip and the operation as described is repeated.

While I have shown and described one 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 by the following claims. I claim

1. Apparatus for punching samples from continuous strip material including, in combination, a rigidly supported base member, a longitudinally extending yoke-like member reciprocally arranged on said base member for movement in a direction longitudinally of said yoke-like member transversely of the strip material, means for guiding said yoke-like member in its movement, a fluid actuated cylinder fixedly arranged parallel to said yoke-like member for actuating the same, means arranged in the outer end of said yoke-like member for punching the samples from the strip material, means for limiting the outward movement of said yoke-like member on said base member so as to position the punching means carried thereby substantially centrally of the strip material, means for limiting the inward movement of said yoke-like member, and means for actuating said punching means.

2. Apparatus for punching samples from continuous strip material including, in combination, a longitudinally extending rigidly supported base member, a longitudinally extending yoke-like member reciprocally and slidably arranged on said base member for movement in a direction longitudinally of said yoke-like member transversely of the strip material, means for guiding said yoke-like member in its movement, a pneumatic cylinder fixedly arranged substantially parallel to said base member and said yoke-like member for actuating the same, punching means arranged in the outer end of said yoke-like member for punching samples from the strip material, a pneumatic cylinder for actuating said punching means, a stop member arranged on the said base member adjacent the outer end thereof, means carried by said yoke-like member which is adapted to cooperate with said stop member for limiting the outward movement of said yoke-like member so as to position the punching means carried thereby substantially centrally of the strip material, and another stop member arranged on the base member adjacent the inner end thereof with which said last mentioned means carried by said yoke-like member is adapted to cooperate to limit the inward movement of said yoke-like member.

ALEXANDER G. HENRY.