Sept. 25, 1928. 1,685,377

J. PROVINCE ET AL

CUT-OFF MECHANISM FOR METAL WORKING MACHINES

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Fig. 1.

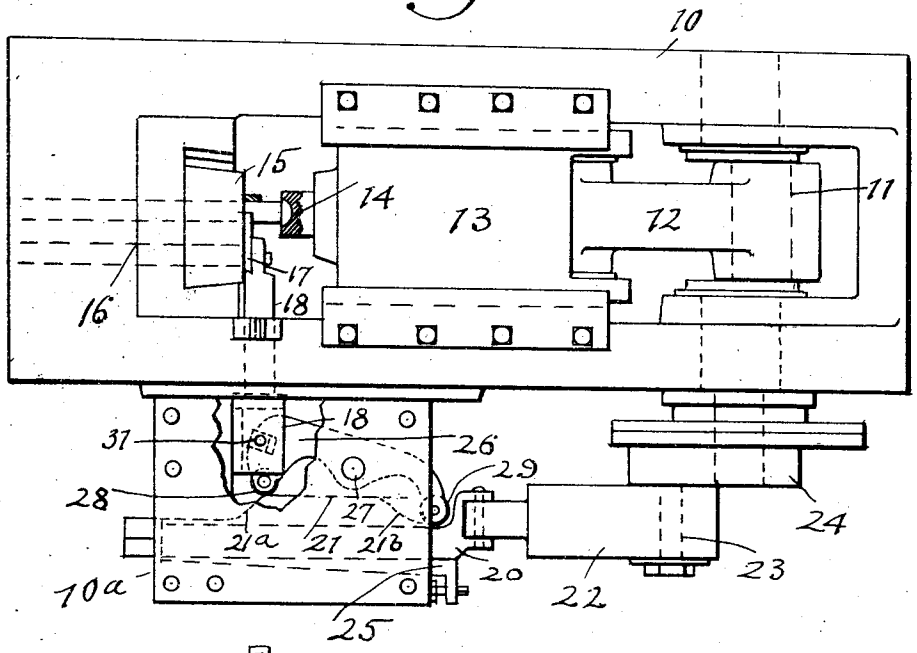

Fig. 2.

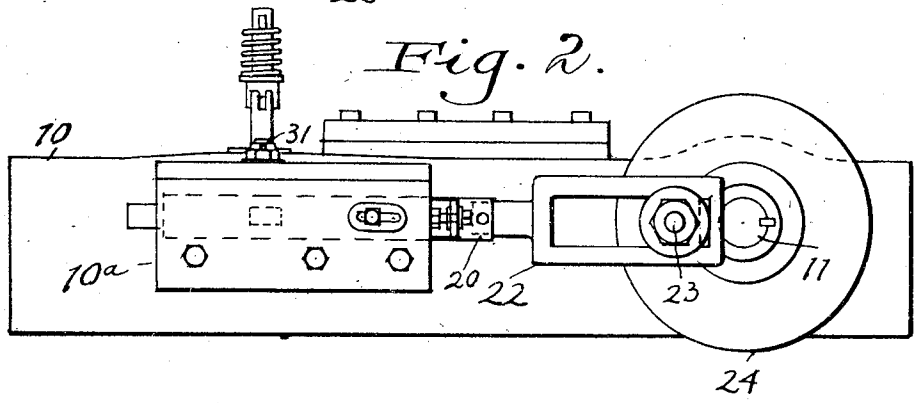

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Fig. 3.

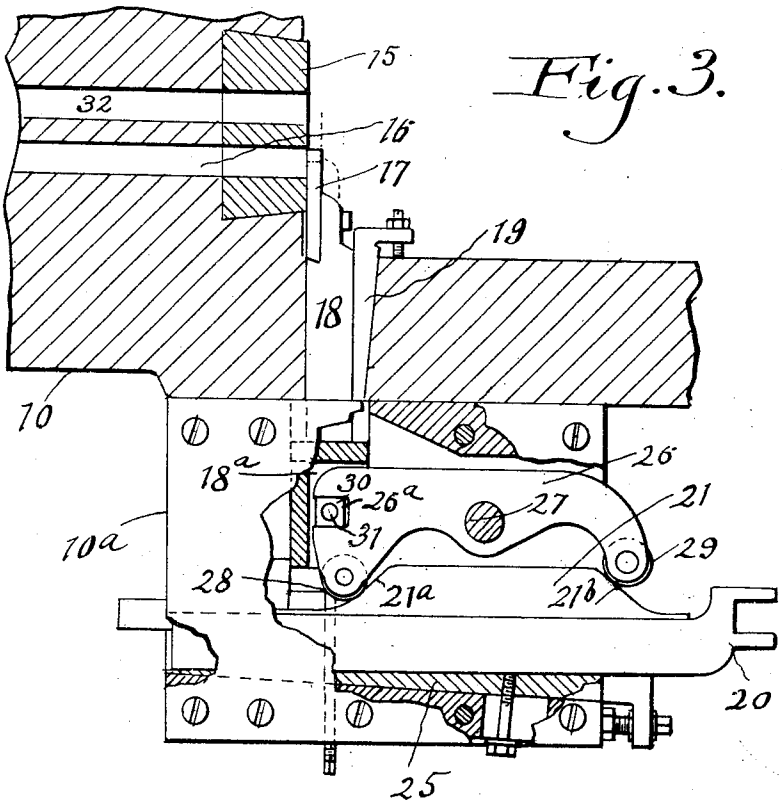
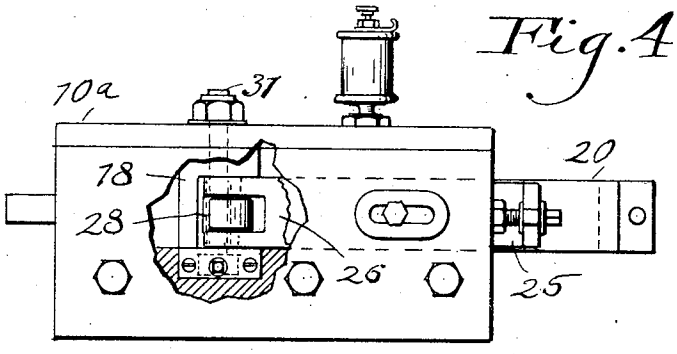


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CUT-OFF MECHANISM FOR METAL-WORKING MACHINES.

Application filed October 3, 1924. Serial No. 741,346.

This invention relates to cut-off mechanisms for metal working machines of the type wherein stock fed into the machine is cut into suitable lengths and headed, trimmed or otherwise acted upon by tools.

The principal object of the invention is to provide an improved cut-off mechanism or cut-off of the type wherein a cutter carried by a cutter bar or slide moves back and forth at right angles to the direction of feed of the stock, and the more specific objects are provided by means for positively moving the bar or slide forwardly and rearwardly so as to obtain the following advantages:—Omission of all springs in the working parts and a greater safety to the operator; better wearing qualities, greater speed of operation, accuracy in action and ease of adjustment to compensate for wear, elimination of lost motion in the working parts, and quietness in action.

The above are obtained very effectively by the present invention which may be here briefly summarized as consisting in certain novel details of construction, and combinations and arrangements of parts, which will be described in the specification and set forth in the appended claims.

In the accompanying sheets of drawings wherein I have shown an embodiment of the invention which operates effectively, Fig. 1 is a plan view of a metal working machine, in this instance a header, equipped with my improved stock cutting mechanism; Fig. 2 is a side view of the same; Fig. 3 is a view on an enlarged scale showing partly in plan and partly in horizontal section the main parts involving the invention; Fig. 4 is a side view showing a portion of Fig. 2 on a slightly enlarged scale and with parts broken away to more clearly illustrate the invention.

Referring now to the drawings, 10 represents the horizontal bed or frame of the machine which may be used for a variety of purposes such as for forming rivet or bolt blanks or the like, the only essential part of the machine being the stock cutting mechanism for cutting the stock which is fed into the machine into suitable lengths which may then be operated on by tools of any desired form.

At the forward part of the machine as here illustrated, is a crank-shaft 11 which is connected by means of a connecting rod 12 to a horizontally movable slide or plunger 13 suitably guided in the frame and provided at its forward end with a tool 14 adapted to operate on the stock after the latter has been cut into the required lengths by the stock cutting mechanism. Just forwardly of the tool 14 is a die block 15 which may be provided with suitable dies, the particular shape or purpose of which is immaterial. The stock is adapted to be fed through an opening 16 extending through the end of the machine and through the die block, and is adapted to be cut into sections when projected beyond the face of the die block.

For the purpose of cutting the stock into sections a reciprocating cutter 17 is employed, adapted to move across the face of the die block 15, this cutter being carried by a cutter bar or slide 18, movable in the passageway extending through the side of the machine, one side of the passageway being preferably formed by an adjustable gib 19 which can be adjusted to compensate for wear.

At one side of the machine there is an extension or housing which may be designated as a whole by the reference character 10^a, and slidable in this housing is a slide 20, carrying a double-acting cam 21 utilized in reciprocating the cutter bar 18. This slide can be actuated in any suitable manner, but in this instance is shown connected by a connecting rod 22 to a pin 23 carried by a crank disk 24 on crank-shaft 11. The outer side of the slide 20 bears against an adjustable gib 25 which can be adjusted to take up loose play and compensate for wear.

Motion is transmitted from cam 21 to the cutter bar 18 so as to cause a positive actuation of the latter in both directions by a lever 26 pivoted between its ends on a pin 27 carried by the housing, this lever carrying at its ends rollers 28 and 29 which are adapted to engage two cam surfaces 21^a and 21^b of the double-acting cam 21. These cam surfaces are spaced apart, and are so disposed with reference to the rollers 28 and 29 that when the slide 20 is moved inward or to the left as viewed in Fig. 3, the cam surface 21^a becomes effective, the roller 28 then riding up this cam surface, and the roller 29 riding down the cam surface 21^b, and when the slide 20 is moved outwardly or in the reverse direction, the cam 21^b becomes effective, the roller 29 then moving up this cam surface, and the roller 28 moving down the cam surface 21^a.

The rocking movement thus imparted to the lever 26 is transmitted to the cutter bar 18, and to bring this about, the inner end of the lever 26 extends into a recess 18ª of the cutter bar, and it is provided with a notch 26ª which receives a block 30, in this instance rectangular in outline and in the form of a sleeve or bushing which surrounds a vertical pin 31 carried by the end of the cutter bar 18. The jaws formed by the notch of the lever 26 receive this block 30 with a suitably close fit, and as the lever 26 is rocked, block 30 turns on pin 31, and the arcuate movement of the end of lever 26 causes a straight line reciprocating movement to be imparted to the block 30, pin 31 and therefore cutter bar 18.

It will be seen from the above that when the slide 20 is moved inward, cam surface 21ª becomes effective to move the cutter bar or slide 18 outwardly so as to shear off the stock, and carry it over into line with the tool 14. On the reverse motion of slide 20 the cam surface 21ᵇ becomes effective to retract the cutter bar and cutter. In this manner the cutter bar and cutter are positively actuated, and the necessity for springs for the retraction of the cutter bar is eliminated. Additionally it is to be noted that the force exerted in moving the cutter bar in both directions is applied directly in line with the cutter bar, and there is no tendency to twist or rock the bar in any direction.

By proper adjustment of the gib 25, loose play can be eliminated between the cam and rollers 28 and 29, with the result that one roller rides idly down one cam surface, while the other roller is actuated by the other cam surface.

Any suitable transfer or carrying mechanism may be utilized to co-operate with the cutter 17 to carry the cut-off sections of stock into line with the tool 14. Opposite the tool 14 the die block and frame will have a second opening 32, and in this opening the die block will have a suitably shaped die to co-operate with tool 14. For example, I may employ a transfer mechanism such as illustrated in Patent No. 1,239,052, granted in the name of Roy H. Smith, in which patent a common form of transfer mechanism is illustrated, and comprises a yieldingly supported pivoted finger which co-operates with the cutter to hold the cut-off section of the stock until it is moved over to the operating position. Any other suitable form of transfer mechanism may be employed with the cutter.

Having described our invention, we claim:

1. In a metal working machine of the type wherein stock is fed into the machine and cut into sections, a frame, and stock cutting mechanism comprising a reciprocating cutter, a sliding holder carrying the cutter, a double-acting cam for actuating the cutter holder arranged opposite the end thereof, and a lever having free ends engageable with said cam for transmitting motion between the cam and holder to actuate the same in both directions.

2. In a metal working machine of the type wherein stock is fed into the machine and cut into sections, a frame, and stock cutting mechanism comprising a cutter, a reciprocating and sliding holder carrying the cutter, a double-acting cam having aligned cam surfaces arranged opposite the end of the holder, and means adapted to engage both cam surfaces and connected to said holder for causing the holder to be positively actuated in both directions by movement of the cam.

3. In a metal working machine of the type wherein stock is fed into the machine and cut into sections, a frame, and stock cutting mechanism comprising a reciprocating cutter and sliding holder carrying the same, a double-acting cam for actuating the cutter holder arranged opposite the end thereof, and means comprising a pivoted lever between the cam and the cutter holder for causing the lever to be positively actuated in both directions upon movement of said cam, the free ends of said lever being engageable with said cam.

4. In a metal working machine of the type wherein stock is fed into the machine and cut into sections, a frame, and stock cutting mechanism comprising a reciprocating cutter and sliding holder therefor, a double-acting cam mounted for sliding movement opposite the end of the holder, a lever connected to the holder and provided at opposite ends with rollers which engage cam surfaces of the cam so as to be rocked in opposite directions by the actuation of the cam in opposite directions.

In testimony whereof, we hereunto affix our signatures.

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