Dec. 31, 1946. A. J. DUCKER 2,413,299

TOOL LIFTING AND LOWERING DEVICE

Filed Dec. 20, 1944 2 Sheets-Sheet 1

Fig. 1.

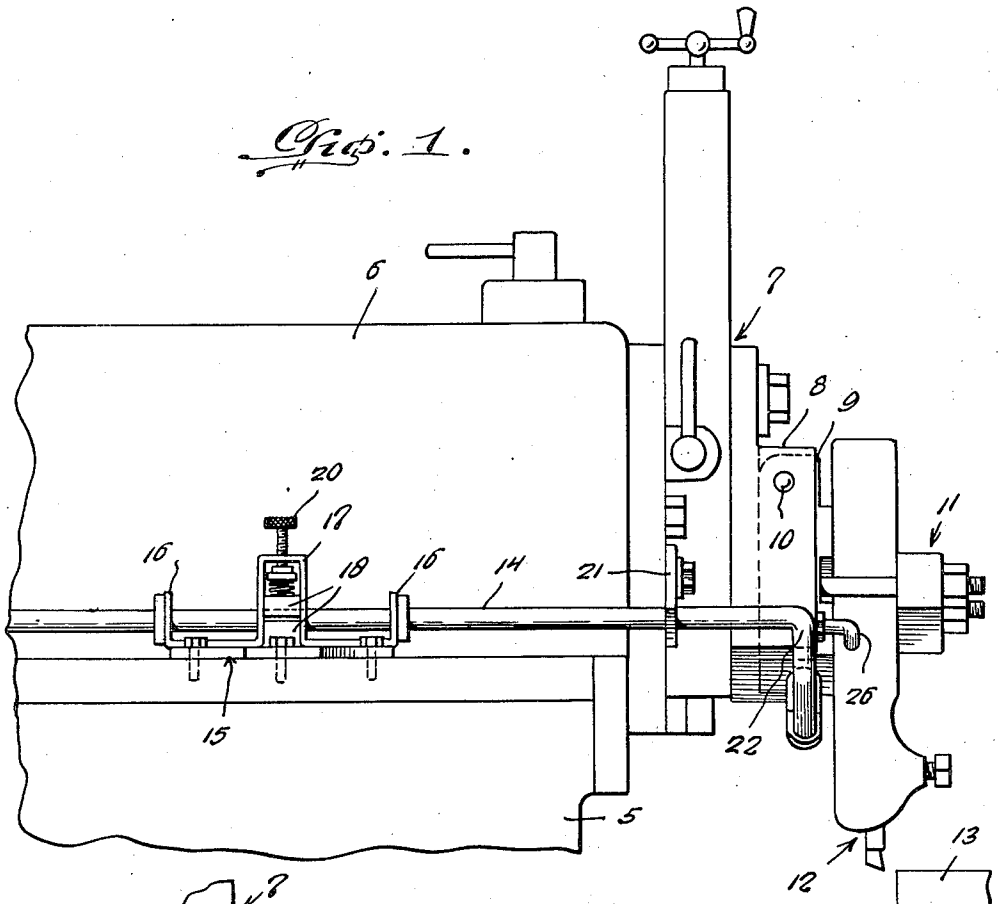


Fig. 3.

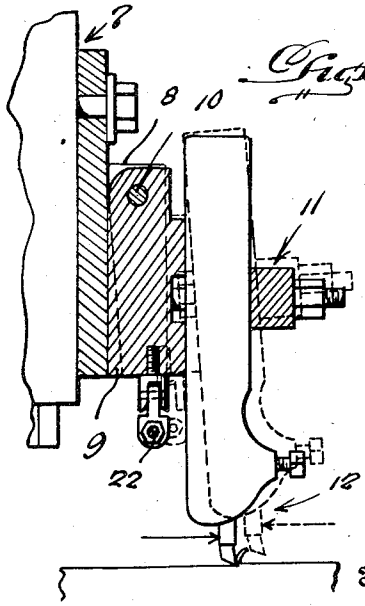
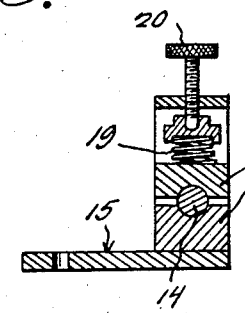


Fig. 6.



Inventor
Andrew J. Ducker,

By J. Stanley Burch
Attorney

Dec. 31, 1946. A. J. DUCKER 2,413,299

TOOL LIFTING AND LOWERING DEVICE

Filed Dec. 20, 1944 2 Sheets-Sheet 2

Fig. 2.

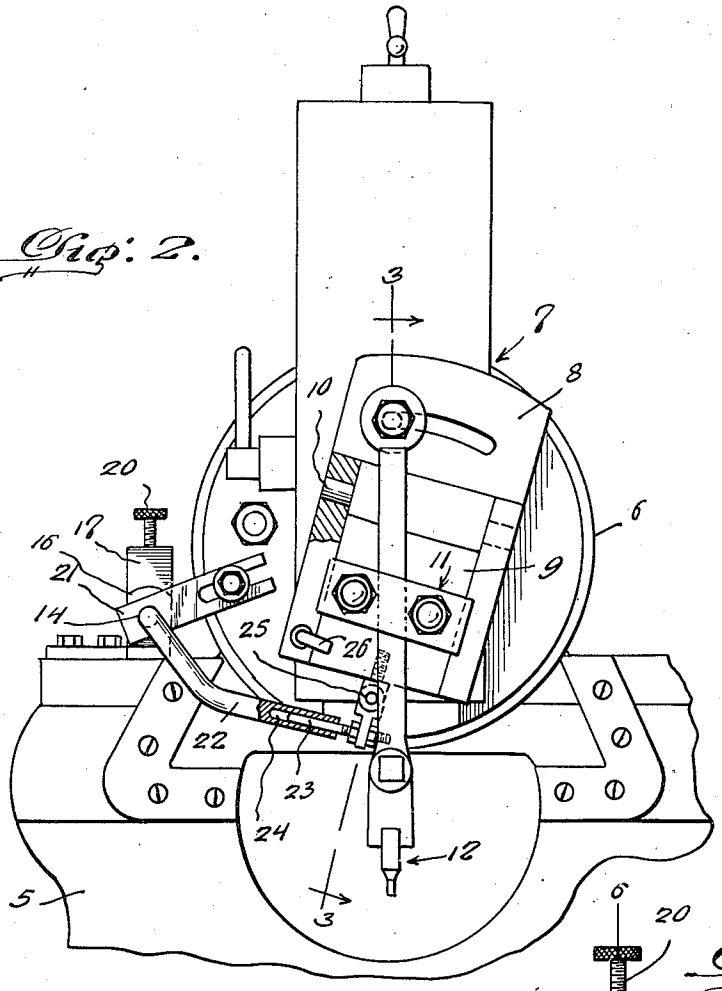


Fig. 4.

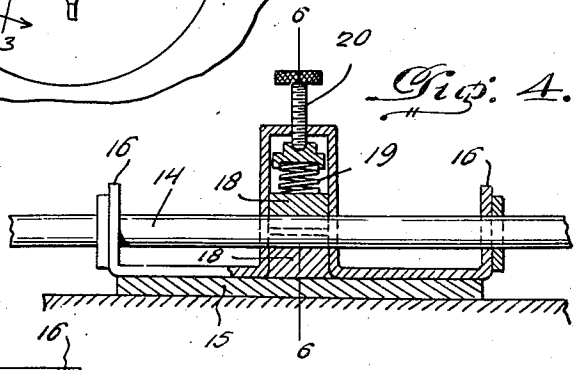
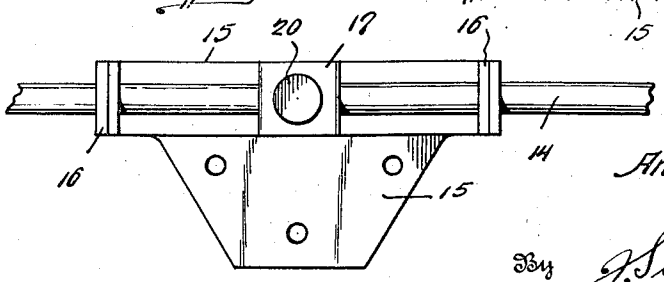


Fig. 5.



Inventor
Andrew J. Ducker,

By J. Stanley Burch
Attorney

Patented Dec. 31, 1946

2,413,299

UNITED STATES PATENT OFFICE

2,413,299

TOOL LIFTING AND LOWERING DEVICE

Andrew J. Ducker, Petaluma, Calif.

Application December 20, 1944, Serial No. 569,024

3 Claims. (Cl. 90—55)

1

This invention relates to a device for automatically lifting the tool of a shaper from the work when the tool is returned to position for a new cut and for lowering the tool into cutting position when it starts the new cut.

The primary object of the present invention is to provide a simple and efficient device of the above kind that may be readily manufactured and installed, and that will continue to operate satisfactorily over an extended period of time with a minimum amount of attention.

Specific objects and features of the invention will become apparent from the following description, when considered in connection with the accompanying drawings.

In the drawings, wherein like reference characters indicate similar parts throughout the several views:

Figure 1 is a fragmentary side elevational view of a shaper equipped with a tool lifting and lowering device constructed in accordance with the present invention.

Figure 2 is an end elevation, partly in section, looking to the left of Figure 1.

Figure 3 is a fragmentary section taken on line 3—3 of Figure 2.

Figure 4 is an enlarged fragmentary view, partly in side elevation and partly in section, showing the operating rod and the main guide and friction brake for said rod.

Figure 5 is a top plan view of the construction shown in Figure 4.

Figure 6 is a section taken on line 6—6 of Figure 4.

Referring in detail to the drawings, 5 indicates the base of a shaper on which is mounted the cylinder 6 of a ram whose plunger carries a tool head 7. The head 7 includes an adjustable clapper box 8 having a clapper 9 hinged thereto as at 10 for limited forward and rearward swinging movement. The usual means 11 is provided to mount the tool 12 on the clapper.

Ordinarily, the tool simply slides back on the work 13 to the position where it starts a new cut, the tool being reciprocated parallel with the work by the ram and swinging forwardly during the backward stroke and backwardly to operative position during the cutting stroke.

In accordance with the present invention, a rod 14 is slidably mounted on the base 5 at one side of the ram cylinder 6 and has its forward end directed laterally and loosely connected to the clapper 9, friction means being provided to resist free longitudinal movement of said rod so that the clapper will be swung forwardly and upwardly to lift the tool from the work when moved by the ram toward the left of Figure 1 to a position for starting a new cut, and so that the clapper may swing backwardly and downwardly to operatively position the tool when the latter is moved to the right of said figure in making a new cut.

2

A bracket 15 is rigidly secured on the base 5 and has upstanding apertured ends that provide spaced alined guides 16 for the rod 14, the latter being parallel with the ram plunger. Bracket 15 has an upwardly offset intermediate portion 17 in which is mounted friction blocks 18 disposed above and below an engaging rod 14. A spring 19 rests on the upper block 18, and a set screw 20 is carried by the portion 17 and is operable to adjustably compress the spring 19 to regulate the frictional engagement of said blocks 18 with said rod. A further guide 21 is secured to the forward end of ram cylinder 6 to assist in supporting and guiding the rod 14.

The forward end of rod 14 is directed laterally as at 22 and has a pin 23 freely slidable in a bore 24 provided in this end. Pin 23 is secured to a laterally swinging arm of a hinge unit 25 whose other arm is secured to the clapper 9. This simply allows a necessary slight amount of lost motion.

Forward and upward swinging movement of clapper 9 is limited by an angular stop pin 26 fixed to box 8 and having an end disposed in the path of said clapper.

In operation, the ram moves the head 7 and parts carried thereby to the right of Figure 1, and a similar movement of rod 14 is frictionally resisted, said rod causes the clapper 9 to swing downwardly and backwardly against the box 8. This positions the tool to make the cut as it continues to move to the right. At the end of the cut, the head 8 is moved to the left of Figure 1 by the ram, but similar movement of rod 14 is frictionally resisted so that the latter swings the clapper forwardly and upwardly to lift the tool from the work. When the clapper strikes pin 26, the rod 14 is positively caused to move with the ram plunger until the tool is brought into position for making a new cut. This cycle of operation continues as long as the shaper is in use.

Minor changes may be made in details shown and described such as fall within the scope of the invention as claimed.

What I claim is:

1. In combination with a shaper having a reciprocable tool head embodying a hinged tool-

carrying clapper, said clapper having limited swinging movement to position the tool for cutting when the head is moved in one direction and to permit elevation of the cutter from the work when the head is moved in the opposite direction, an operating rod slidably mounted on the shaper for movement parallel with said head, friction means resisting free movement of the rod, means operatively connecting the rod to the clapper for automatically elevating the tool from the work and for positioning the tool for cutting respectively upon movement of the head in the second-named and first-named directions, and a bracket fixed to the shaper and having upstanding spaced apertured ends slidably receiving and guiding said rod and provided with an upwardly offset intermediate portion, said friction means including a friction block mounted in said offset portion above said rod, a spring on said block, and a set screw carried by said offset portion for adjusting the compression of said spring.

2. In combination with a shaper having a reciprocable tool head embodying an angularly adjustable clapper box and a tool-carrying clapper

hinged to said clapper box, said clapper having limited swinging movement to position the tool for cutting when the head is moved in one direction and to permit elevation of the cutter from the work when the head is moved in the opposite direction, an operating rod slidably mounted on the shaper for movement parallel with said head, friction means resisting free movement of the rod, and means operatively connecting the rod to the clapper for automatically elevating the tool from the work and for positioning the tool for cutting respectively upon movement of the head in the second-named and first-named directions, said rod having a laterally directed forward end, said means operatively connecting the rod to the clapper including a lost motion connection between the clapper and said laterally directed end.

3. The construction defined in claim 2, wherein said laterally directed end is provided with a bore, said lost motion connection including a pin slidable in said bore and a hinge unit having an arm secured to the clapper and a second laterally swinging arm secured to said pin.

ANDREW J. DUCKER.