April 16, 1935. A. LAUKHUFF 1,998,245

GUARD FOR POWER OPERATED MACHINES

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Fig. 1.

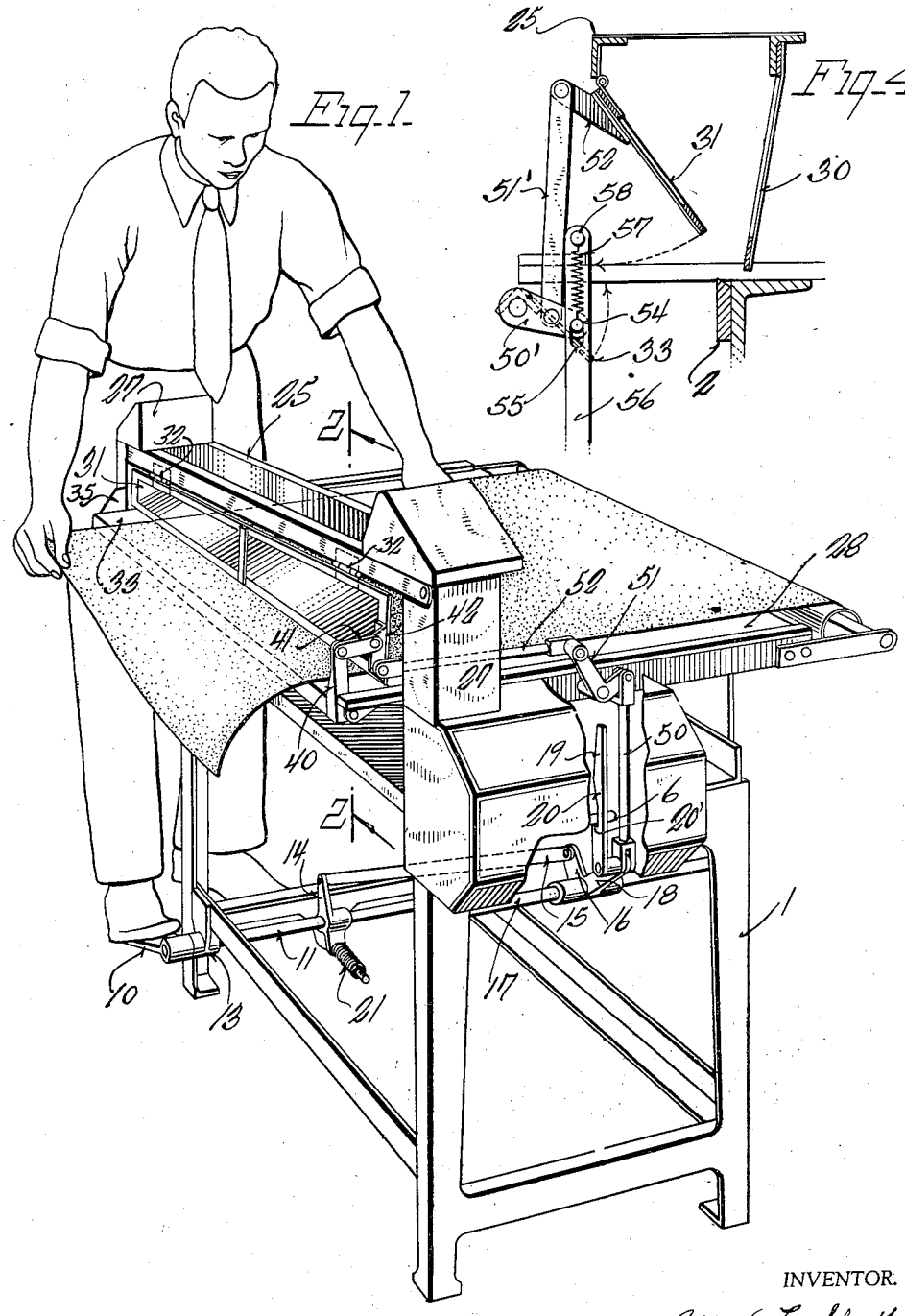


Fig. 4.

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Fig. 2.

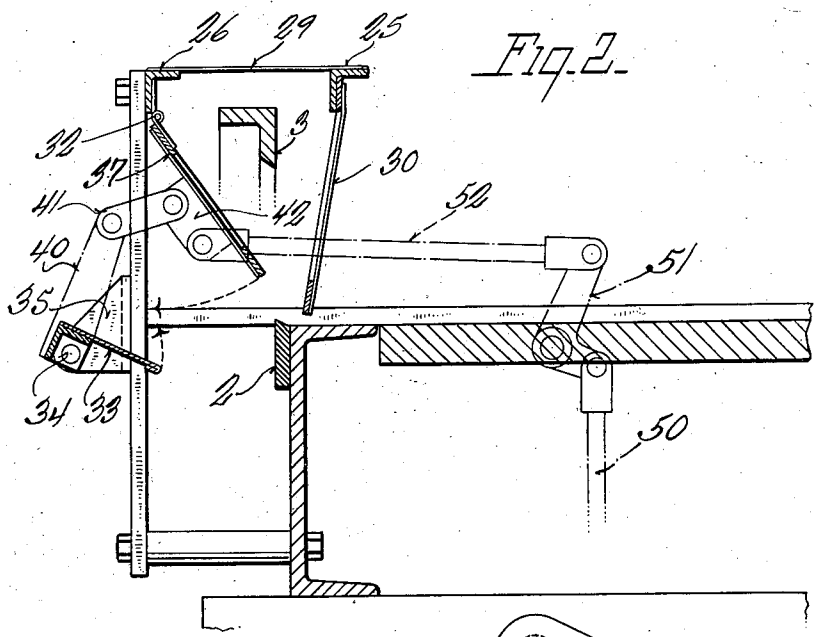
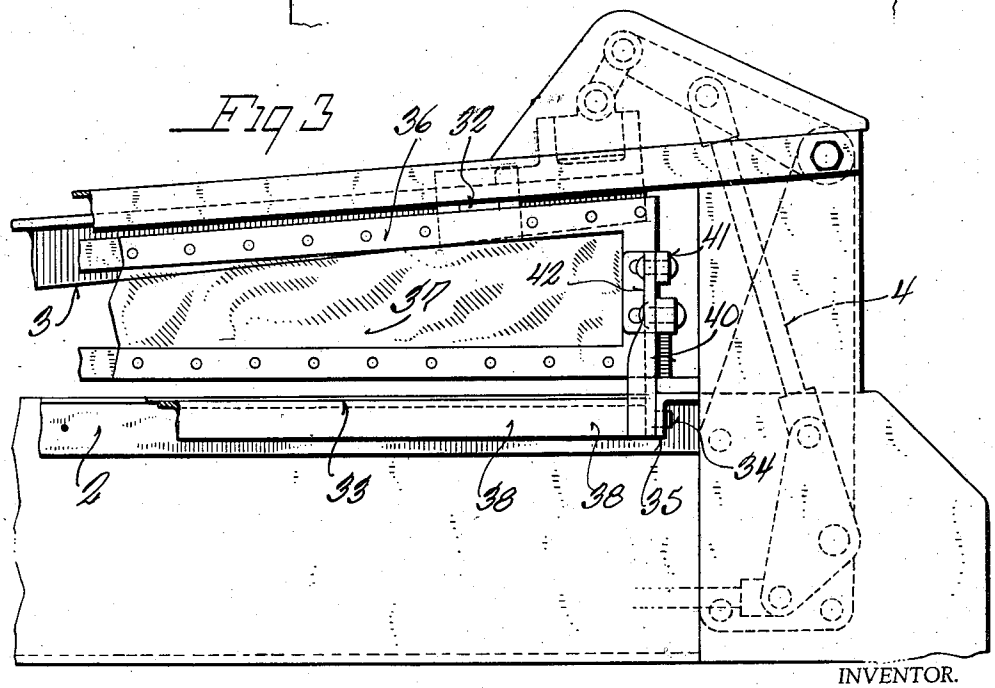


Fig 3



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1,998,245

GUARD FOR POWER OPERATED MACHINES

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9 Claims. (Cl. 164—41)

This invention relates to guards for machines having power operated parts liable to inflict serious injury to the operators thereof in the event members of the operator's body are allowed to remain in the path of movement of the power driven parts when the latter are actuated. The invention is shown as applied to a power driven cutting machine but, of course, is applicable with equal advantage to power driven presses or other types of machines.

One of the objects of the present invention is to provide a guard which sweeps from the field of action of the power driven parts, the operator's hands or other members of his body, when the power driven parts are actuated and presents an effective barrier or guard throughout the operation of the power driven parts. The action of the guard is so timed that it exerts its sweeping action and is placed in guarding or operative position at the moment of or just prior to actuation of the knife or other power driven part.

Another object is to provide a guard of this character and which is simple and durable in construction, compactly and closely organized, reliable and efficient in operation and easy and comparatively inexpensive to manufacture and install.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, and in which:

Figure 1 is a perspective view showing a guard embodying the present invention applied to a power actuated cutter;

Figure 2 is a fragmentary view in vertical section taken in the plane of line 2—2 of Figure 1;

Figure 3 is a fragmentary view of the machine shown in Figures 1 and 2 and illustrating the same in front elevation; and

Figure 4 is a view similar to Figure 2 but showing a slight modification in the operating linkage for the guard.

Referring to the drawings, the numeral 1 designates generally the frame of the cutting machine, on which a fixed knife 2 (see Figures 2 and 3) is suitably secured. A movable knife or cutting bar 3 is cooperable with the fixed knife 2 and is actuated from a suitable power source through linkage designated generally at 4 and shown in dotted lines in Figure 3, there being a clutch interposed between the power source and the movable knife, which clutch may be thrown in and out of engagement by actuation of its clutch control pin 6. The cutting machine shown is of the type disclosed and claimed in my Patent No. 1,565,654, granted December 15, 1925, and the clutch referred to is of the type disclosed in my Patent No. 1,701,327, granted February 5, 1929.

The clutch operating pin 6 is shifted to cause the clutch to be engaged by means of a foot pedal 10 fixed on a shaft 11 supported for rotation in bars 13 provided therefor on the frame 1. A crank arm 14 is fixed to the shaft 11 and connects by means of a link or connecting rod 15 with a lever 16 mounted for rotation on a shaft 17 also mounted on the frame 1. The lever 16 is of the bell crank type and has an arm 18 pivotally connected to one end of a thrust bar 19. The bar 19 is notched as at 20 and is designated to coact with the clutch control pin 6 to actuate this pin and throw in the clutch when the foot pedal 10 is depressed. A spring 21 returns the foot pedal to its normal position in which the thrust bar 19 is lowered and the clutch is disengaged.

An enclosure designated generally at 25 is provided for the movable knife 3 and its operating parts and consists of transverse angles 26 supported upon the end structures 27 of the enclosure. The end structures 27 are supported upon and extend upwardly from the table 28 of the cutting machine. A top plate 29 is fixed to these angles 26. A stationary guard 30 is secured to and depends from one of the angles whereas a swingable guard 31 is hinged or pivotally supported as at 32 on the other. A second swingable guard member 33 is provided and is pivotally mounted as at 34 on bracket lugs 35 secured to the frame of the machine. As shown in the drawings, the guard member 31 consists of a marginal metal frame 36 to which a sheet of transparent material designated at 37 is fastened. The guard member 33 may consist of a metal plate carried by an angle bar 38.

Linkage is provided between the guard members 31 and 33 to constrain them to corresponding movement, that is, to move simultaneously to guarding or operative position and also to move simultaneously to inoperative position. This linkage consists of an arm 40 secured to the guard member 33 and pivotally at its outer end to one end of a link 41, the other end of the link being pivoted to a bracket lug 42 fastened to the frame of the guard member 31. When the foot pedal 10 is depressed the lever arm 18 swings to raise the thrust bar 19 and throw in the clutch and the present invention proposes to utilize this motion of the lever arm 18 to swing the guard members 31 and 33 to closed position before the shoulder 20' of the thrust bar engages the clutch operating pin 6. For this purpose one end of a connecting rod 50 is pivoted to the outer end of the lever arm 18 and the opposite end of this connecting rod is pivotally connected to one arm of the bell crank lever 51 fulcrumed on the frame of

the machine. The other arm of this lever connects by means of a connecting rod or link 52 with the bracket 42 on the guard member 31. With this arrangement when the pedal 10 is depressed the swinging movement of the lever arm 18 is transmitted through the connecting rod 50, bell crank lever 51 and connecting rod 52 to the guard 31 thereby swinging the guard 31 to the left, as viewed in Figure 2 and as indicated by the dotted arrow. This motion of the guard 31 is transmitted to the guard 33 through the link 41 and arm 40 so that the guard 33 is raised or swung upwardly in the direction indicated by the dotted arrow. The guard 31 in swinging in the manner described will effectively sweep out of the path of movement of the knife the hand of the operator and will prevent the operator from inserting his hand into the field of action of the knife. This action of the guard occurs every time the pedal is depressed and the guard remains in guarding position as long as the pedal is held depressed.

In the embodiment of the invention shown in Figure 4, a slightly different linkage is employed between the guards in that a crank arm 50' is fixed to the guard 33 and is connected by a link 51' to a bracket lug or arm 52 secured to the guard 31. The outer end of the crank arm 50' is provided with a crank pin 54 fitted in a slot 55 provided in a connecting rod 56. A spring 57 has one end connected to the crank pin 54 and has its other end connected to a cross pin 58 secured to the bar 56 whereby the spring 57 yieldably holds the pin 54 against one end of the slot 55. The connecting rod 56 is suitably connected up with the lever 18. With this arrangement, the mechanism can be designed to have the guard 31 swing to full guarding position before the shoulder 20' engages the clutch pin 6. As the foot pedal is further depressed the clutch is thrown into engagement and this further motion is made possible by the provision of the lost motion connection constituted by the crank pin 54 and the slot 55. It will be understood that upon such further motion of the foot pedal, the bar 56 continues to move and it shifts relative to the crank pin 54, the spring 57 yielding to permit of this relative movement.

While I have shown and described typical embodiments of the invention, it is to be understood that the structures shown have been selected merely for the purposes of illustration and that various changes in the size, shape and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

The invention claimed is:

1. In a machine having a clutch controlling its operation and a foot pedal for engaging and disengaging the clutch, a shiftable guard on the machine effective to enclose dangerous parts, and means actuated from the foot pedal for shifting said guard to enclosing position prior to the engagement of the clutch whereby said clutch is prevented from engaging if said guard is not in enclosing position.

2. In a machine having a clutch controlling its operation and a control device for engaging and disengaging the clutch, a shiftable enclosing guard on the machine and means actuated from said control device for shifting the guard to enclosing position upon manipulation of said control device prior to the time it engages said clutch.

3. In a cutter having a movable knife, a power drive for said knife, a clutch in said power drive and a control device for engaging and disengaging said clutch, a partial enclosure for said knife, a pair of separately hinged guard members effective to complete said enclosure, linkage interconnecting said member to constrain them to corresponding movement and means actuated by said control device for shifting said guard members to a position completing said enclosure when said control device is operated to engage said clutch.

4. In a cutter having a movable knife, a power drive for said knife, a clutch in said power drive and a control device for engaging and disengaging said clutch, an enclosure for said knife including a shiftable guard member acting when in one position to provide for access to the material being cut while effecting a guard for the knife and operating when shifting to sweep objects away from the path of the knife and to provide a barrier between the exterior of the enclosure and the path of the knife, and means actuated by said control device for shifting said guard member when said control device is operated to engage the clutch and prior to the actuation of the knife.

5. In a machine of the character described having an operating part, a power drive for said part, a clutch in said power drive and a control device for engaging and disengaging said clutch, a shiftable guard for said operating part, said guard acting in one position to provide for access to said operating part and acting in another position to provide a barrier preventing access to said part, and means for shifting the guard to the position in which it acts as a barrier when the control device is operated to engage the clutch and prior to actual engagement of the clutch.

6. In a machine having a clutch controlling its operation, a shiftable guard on said machine, a foot pedal, motion transmission mechanism between said foot pedal and said guard and a lost motion connection between the motion transmission mechanism and the clutch whereby when the foot pedal is depressed the guard is first moved to position preventing access to a part to be guarded and the clutch is thereafter operated.

7. In a machine having power actuated parts for operating upon the work, an enclosure for said parts, certain portions of said enclosure being swingable, and means for swinging said portions from enclosure access position to enclosing position just prior to actuation of said parts.

8. In a machine having power actuated parts for operating upon the work, an enclosure for said parts, an entrance for said enclosure comprising pivotally mounted door-like members, linkage interconnecting said members to constrain them to move simultaneously to open or closed position, a power drive for said parts, a device for throwing said power drive into operation and means connecting said device with one of said members whereby the members are moved to closed position prior to the throwing in of said power drive.

9. In a machine of the character described, a guard made up of enclosing guard members, two of said members being swingable about separate axes, linkage interconnecting said swingable members to constrain them to move simultaneously to operative or inoperative position and means connected to one of said guard members for operating the same.

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