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SAFETY MEANS FOR BLANK FEEDING MECHANISM

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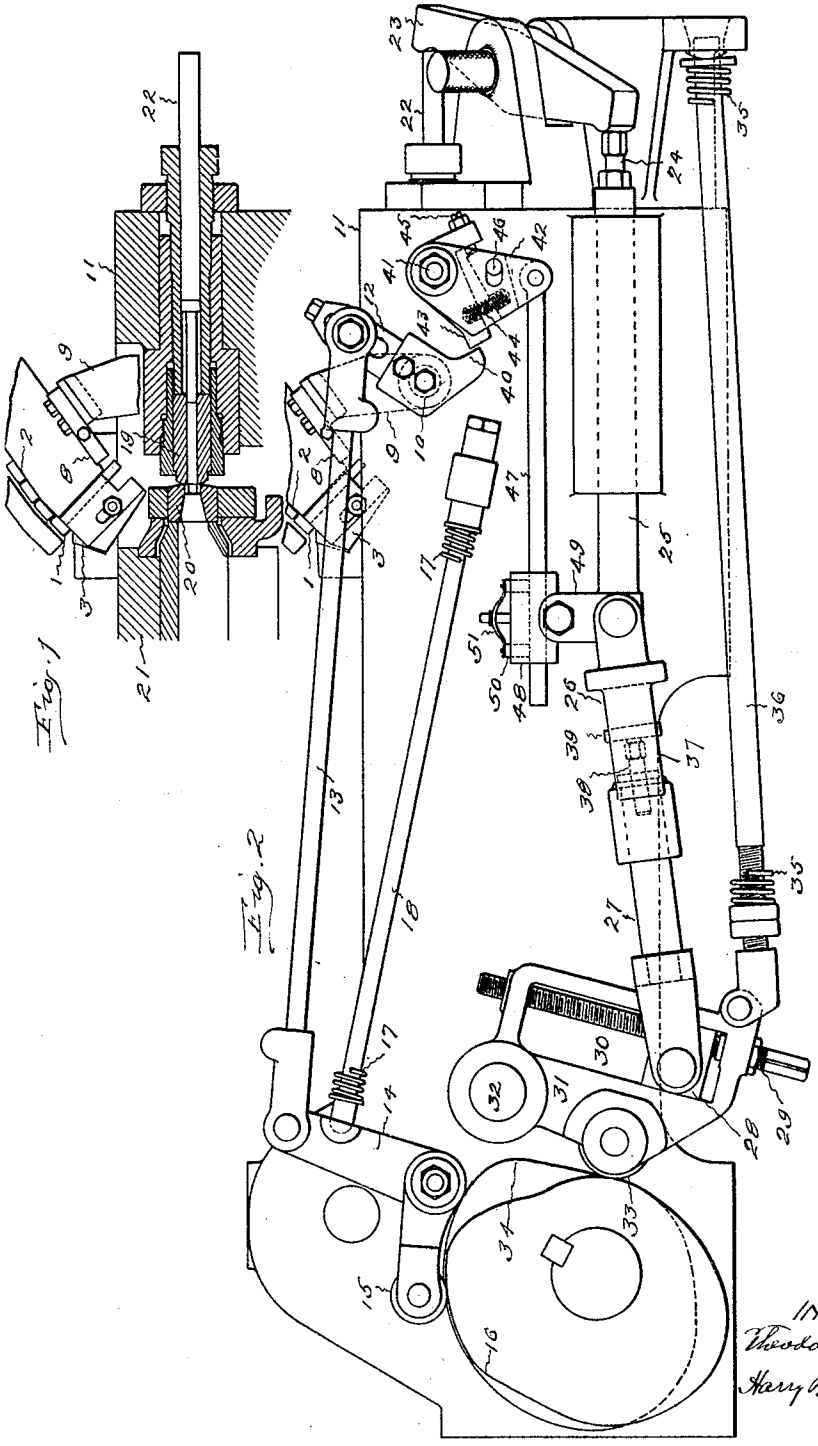


Fig. 1

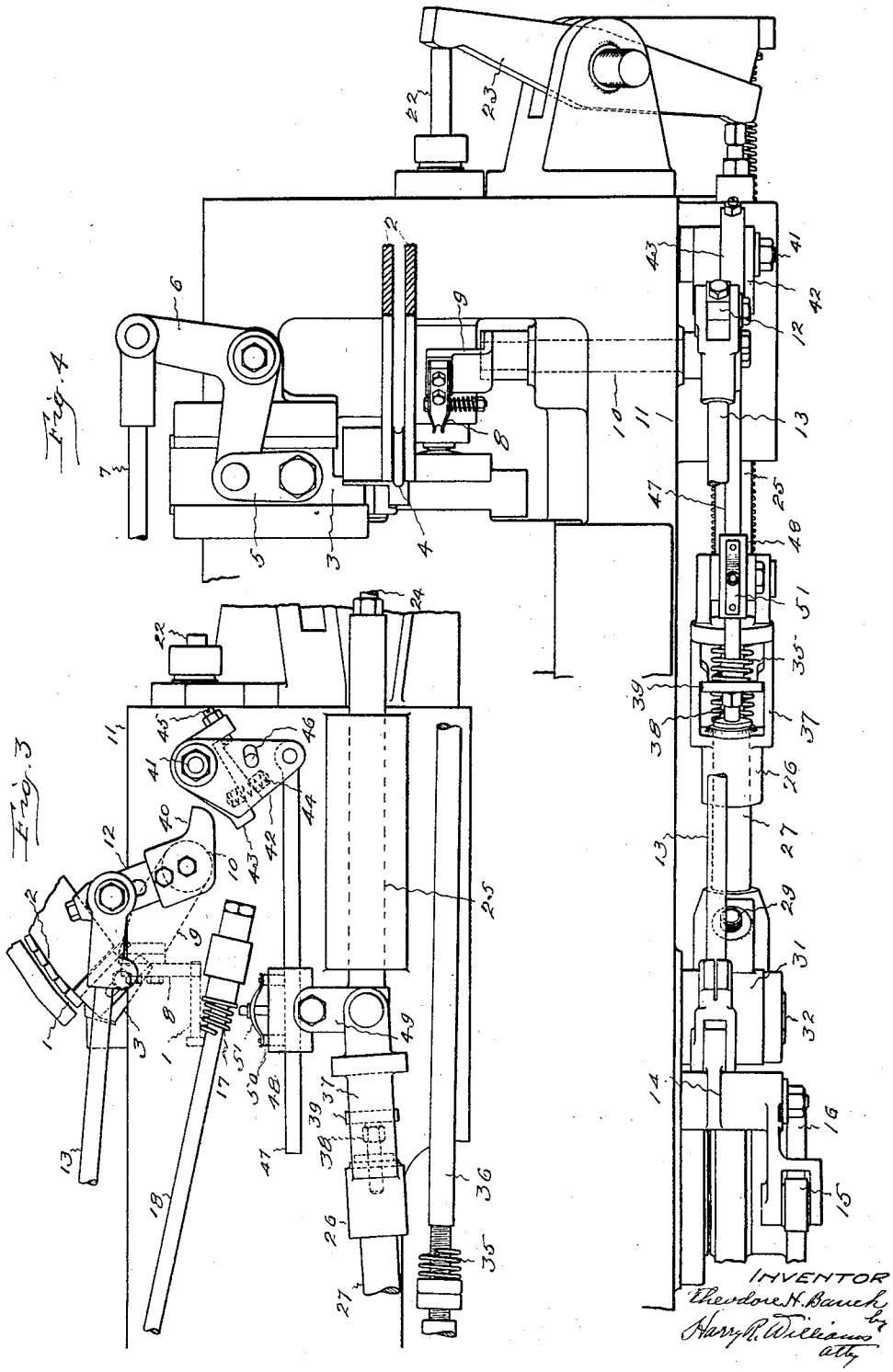
Fig. 2

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SAFETY MEANS FOR BLANK FEEDING MECHANISM

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UNITED STATES PATENT OFFICE

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SAFETY MEANS FOR BLANK FEEDING MECHANISM

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This invention relates to the mechanism which is used in connection with machines for trimming, extruding and performing like operations on headed metal blanks, of the class in which the blanks are automatically fed between a punch which receives the shanks of the blanks and a die which trims the heads of the blanks, the punch being stationary and the die being carried toward and from the punch for causing the required operations to be performed on the blanks, and a knock-out operating to eject the blanks from the punch through the die. In machines of this character occasionally a blank becomes jammed in the punch so that it will not be ejected by the knock-out, and consequently remains in the path of the blank next fed, causing such interference that the feeding mechanism becomes broken or damaged.

The object of the present invention is to interrupt the feed of the following blanks in case a blank is not correctly ejected from the punch.

This object is attained by providing means which becomes broken or yields in case the knockout mechanism fails to eject a blank from the punch, and providing means which co-acts with this that will interrupt the movement of the blank feeding mechanism before the next blank can be brought down between the punch and die.

Only so much of a bolt trimming machine as is necessary to an understanding of the application of this invention is illustrated. Fig. 1 shows a side view of the end of an inclined feed track, the transfer slide at the lower end of the track and the fingers that pick blanks from the transfer slide and carry them into line with the punch and die which are shown in section in the act of trimming the head of a blank. Fig. 2 shows a side view of the mechanism with the safety means elements in one position. Fig. 3 shows a side view of the safety means elements in another position. Fig. 4 shows a plan of the feed mechanism and the safety means.

In the mechanism illustrated the blanks 1 slide down the inclined track 2 that is located to one side of the center line of the machine. Movable across the lower end of the track is the transfer slide 3 which has a grooved head 4 that receives the blanks from the track one at a time and transfers them to the center line of the machine, this slide being reciprocated by means of the link 5, angle lever 6 and rod 7 operated from a cam in the common manner.

On the center line of the machine are yielding fingers 8 attached to an arm 9 that is fastened to a shaft 10. This shaft extends through the side of the frame 11 and at its outer end has an arm 12. A link 13 is adjustably attached at one end to the arm 12 and at its other end is connected with an angle lever 14 that has a roll 15 which is held in engagement with a cam 16 by the thrust of the spring 17 on the rod 18. The cam through these connections positively causes the fingers 8 to swing upward and allows the fingers to swing downward under the thrust of the spring, the cam being so timed that the fingers reach down and pick up a blank from the transfer slide and hold it until the slide recedes, and then carry the blank down into line with the punch 19 that is fastened in the frame, and the die 20 that is carried by the gate 21 which is reciprocated by well-known means. The fingers hold the blank in this position with its head facing the die until the die has advanced sufficiently to push the shank into the punch and then they are lifted to their upper position.

The continued forward movement of the die trims the blank head. As the operation of trimming is completed the knock-out mechanism goes into action, breaking the flash which is imposed between the punch and die and ejecting the blank from the punch and through the die.

A knock-out pin 22 extends through the end of the frame of the machine and into the punch. The outer end of this pin is engaged by one end of a lever 23. The other end of this lever is engaged by a screw 24 that is adjustable in the end of the slide 25 movable on the side of the machine frame. A link comprised of telescoping members 26 and 27 connects the slide with a block 28 that is adjustable, by means of a screw 29, in an open-

ing 30 in the lever 31. This lever turns on pivot 32 and has a roll 33 that is held in engagement with a cam 34 by means of the spring 35 on the rod 36. The link member 26 has a yoke 37 and the link member 27 is capable of movement longitudinally of this yoke, being normally held from movement by the engagement of an adjustable screw 38 with the fragile safety plate 39. The action of the cam 34 through these connections causes the knock-out pin to eject the blanks from the punch at the proper time.

Should a blank become jammed in the punch, or for any other cause fail to be ejected, the safety plate 39 breaks and the link member 27 merely slides back and forth in the link member 26, so that while the machine may continue to run the knock-out pin will remain idle.

In machines as previously constructed while the breaking of the safety plate renders the knock-out pin inactive, the feed of blanks continues with the result that a blank is brought down by the feed fingers, and being obstructed by the unejected blank, is smashed between the punch and the die as the gate comes forward, causing injury to the tools and mechanisms and putting the machine out of commission.

To avoid this, mechanism is arranged to interrupt the feed of blanks when the safety plate breaks and the ejector pin is idle. A dog 40 is attached to the arm 12 that is fastened to the finger shaft 10. Pivoted adjacent to this dog on the stud 41 is a stop lever 42 and a latch 43 that is yieldingly connected with the stop lever. A spring 44 arranged between the stop lever and latch tends to thrust the latch into the path of the dog. The separation of the stop lever and latch is limited by the screw 45 carried by the latch and the oscillations of the stop lever are limited by the stud 46.

The end of the stop lever is connected with a rod 47 that extends through a block 48 which is fastened to ears 49 that are attached to the slide 25. Pins 50 extend through the block and are pressed downward by a spring 51 in such manner as to frictionally connect the rod 47 with the block 48.

As the slide 25 moves forward and backward the stop lever and latch are oscillated. In normal operation as the slide moves forward the latch is oscillated down out of the path of the dog and when the slide moves backward the latch is oscillated into the path of the dog. When the dog turns down as the feed fingers turn up it cams the latch out of the way and when it is way down the latch is snapped past the dog by the spring.

When the machine is running properly and under normal conditions the latch is oscillated out of the path of the dog and the shaft which carries the feed fingers is oscillated by its cam and spring so that the fingers will pick up a blank from the transfer slide and carry it down into line with the punch and die. However, should a blank become jammed in the punch and the safety plate break the machine will continue in operation, but the element 27 of the link will simply telescope in the element 26 of the link and the knock-out slide will remain stationary. When this occurs the latch is not oscillated and it holds the dog from turning up. This retains the fingers in their elevated position and prevents the feed spring from turning the finger shaft and causing the fingers to bring down a blank.

This relation of the parts continues until a new safety plate is inserted in the link in place of the one which has been fractured. The frictional means which connects the stop lever rod with the block that moves forward with the slide is provided so that the parts may slip and adjust themselves according to the various positions of the knock-out rod with different lengths of blanks and knock-out motion.

With this safety mechanism all danger of injuring the tools or operating mechanisms, due to the failure of a blank to be properly ejected, is obviated.

The invention claimed is:

1. Mechanism for operating upon metal blanks comprising a fixed tubular punch adapted to receive the shanks of blanks, a reciprocatory tubular die adapted to operate upon the heads of blanks, means for feeding blanks into line with the punch and die, a pin longitudinally movable within the punch and adapted to eject blanks therefrom, mechanism for reciprocating said pin, said mechanism including fragile means designed to fracture and interrupt the action of the pin should the pin fail to eject a blank from the punch, and mechanism adapted to stop the feed of blanks into line with the punch and die, operated upon the fracture of said fragile means.

2. Mechanism for operating upon metal blanks comprising a fixed tubular punch adapted to receive the shanks of blanks, a reciprocatory tubular die adapted to operate upon the heads of blanks, means for feeding blanks into line with the punch and die, a pin longitudinally movable within the punch and adapted to eject blanks therefrom, mechanism for reciprocating said pin, said mechanism including fragile means designed to fracture and interrupt the action of the pin should the pin fail to eject a blank from the punch, and mechanism operated from the pin-reciprocating mechanism adapted to stop the blank feeding mechanism upon the fracture of said fragile means.

3. Mechanism for operating upon metal blanks comprising a fixed tubular punch adapted to receive the shanks of blanks, a reciprocatory tubular die adapted to operate

upon the heads of blanks, oscillatory fingers for feeding blanks into line with the punch and die, a pin longitudinally movable within the punch and adapted to eject blanks therefrom, mechanism for reciprocating said pin, said mechanism including fragile means designed to fracture and interrupt the action of the pin should the pin fail to eject a blank from the punch, and mechanism adapted to interrupt the oscillations of the feed fingers, operated upon the fracture of said fragile means.

4. Mechanism for operating upon metal blanks comprising a fixed tubular punch adapted to receive the shanks of blanks, a reciprocatory tubular die adapted to operate upon the heads of blanks, a reciprocatory slide for presenting the blanks, oscillatory fingers for picking blanks from said slide and carrying them into line with the punch and die, a pin longitudinally movable within the punch and adapted to eject blanks therefrom, mechanism for reciprocating said pin, said mechanism including fragile means designed to fracture and interrupt the action of the pin should the pin fail to eject a blank from the punch, and mechanism adapted to interrupt the oscillations of said fingers operated upon the fracture of said fragile means.

5. Mechanism for operating upon metal blanks comprising a fixed tubular punch adapted to receive the shanks of blanks, a reciprocatory tubular die adapted to operate upon the heads of blanks, means for feeding blanks into line with the punch and die, a pin longitudinally movable within the punch and adapted to eject blanks therefrom, a slide for reciprocating said pin, means for actuating said slide, said means including a plate designed to fracture and interrupt the action of the slide should the pin fail to eject a blank from the punch, and mechanism movable with said slide and adapted to stop the feed of blanks upon the fracture of said plate.

6. Mechanism for operating upon metal blanks comprising a fixed tubular punch adapted to receive the shanks of blanks, a reciprocatory tubular die adapted to operate upon the heads of blanks, means for feeding blanks into line with the punch and die, a pin longitudinally movable within the punch and adapted to eject blanks therefrom, a slide for reciprocating said pin, means for actuating said slide, said means including a plate designed to fracture and interrupt the action of the slide should the pin fail to eject a blank from the punch, and mechanism movable with said slide and adapted to lock the blank feeding mechanism on the interruption of the movement of said slide.

7. Mechanism for operating upon metal blanks comprising a fixed tubular punch adapted to receive the shanks of blanks, a reciprocatory tubular die adapted to operate upon the heads of blanks, oscillatory fingers adapted to feed blanks into line with the punch and die, a dog oscillating with said fingers, a pin movable within the punch and adapted to eject blanks therefrom, a slide for reciprocating said pin, means for actuating said slide, said means including a plate designed to fracture and interrupt the action of the slide should the pin fail to eject a blank, and a latch movable with said slide and adapted to engage said dog and lock the blank feeding fingers on the interruption of the movement of said slide.

8. Mechanism for operating upon metal blanks comprising a punch, a die, fingers adapted to feed blanks into line with the punch and die, a dog connected with said fingers, a pin movable within the punch, a slide for reciprocating said pin, means for actuating said slide, said means including a plate designed to fracture and interrupt the action of the slide should the pin offer abnormal resistance to movement, and a latch movable with said slide and adapted to engage said dog and lock the feed fingers on the stopping of said slide due to the fracture of said plate.

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