Oct. 10, 1944. R. L. WILCOX 2,359,815

TRIP MECHANISM

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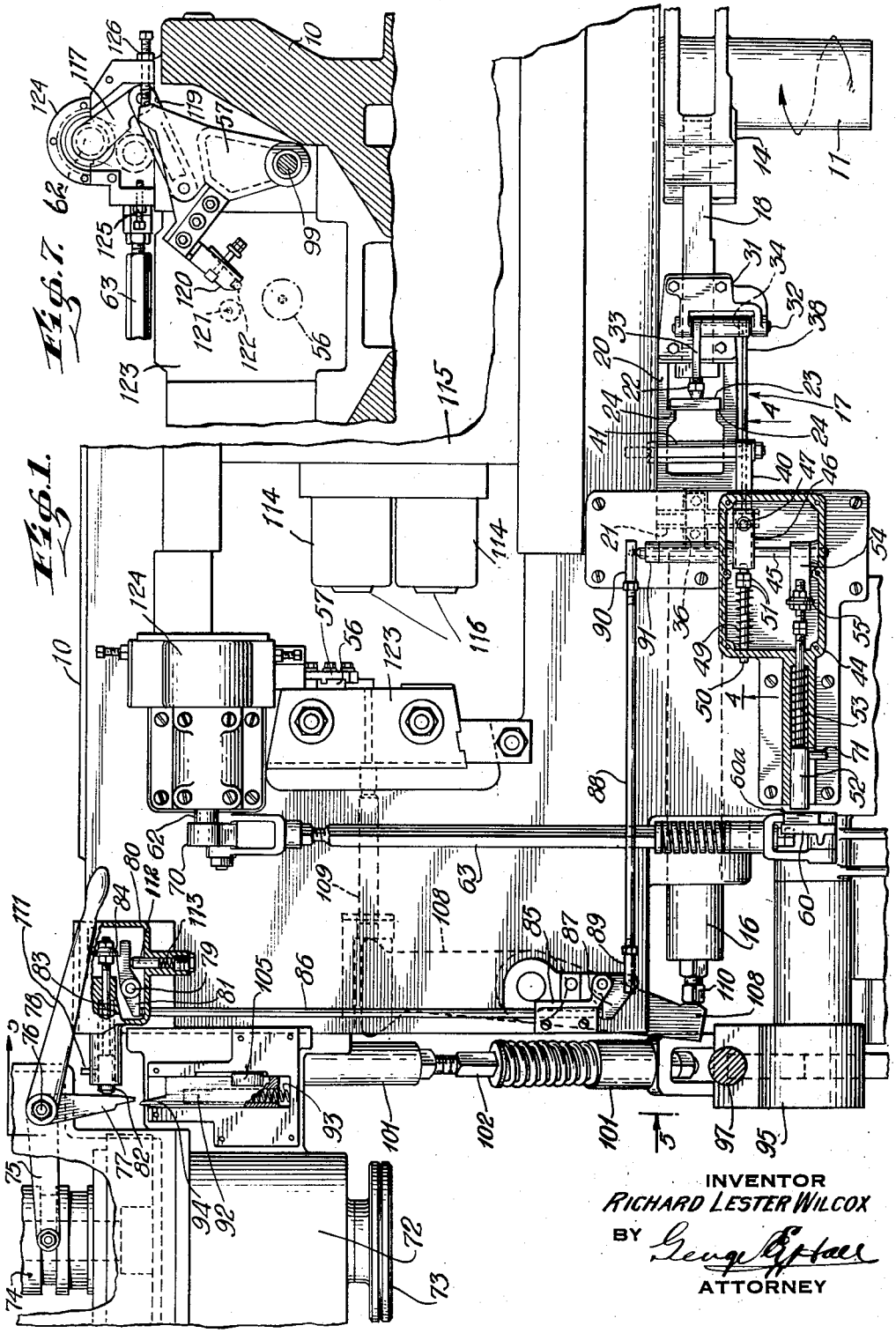


Fig. 1.



Fig. 7.

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TRIP MECHANISM

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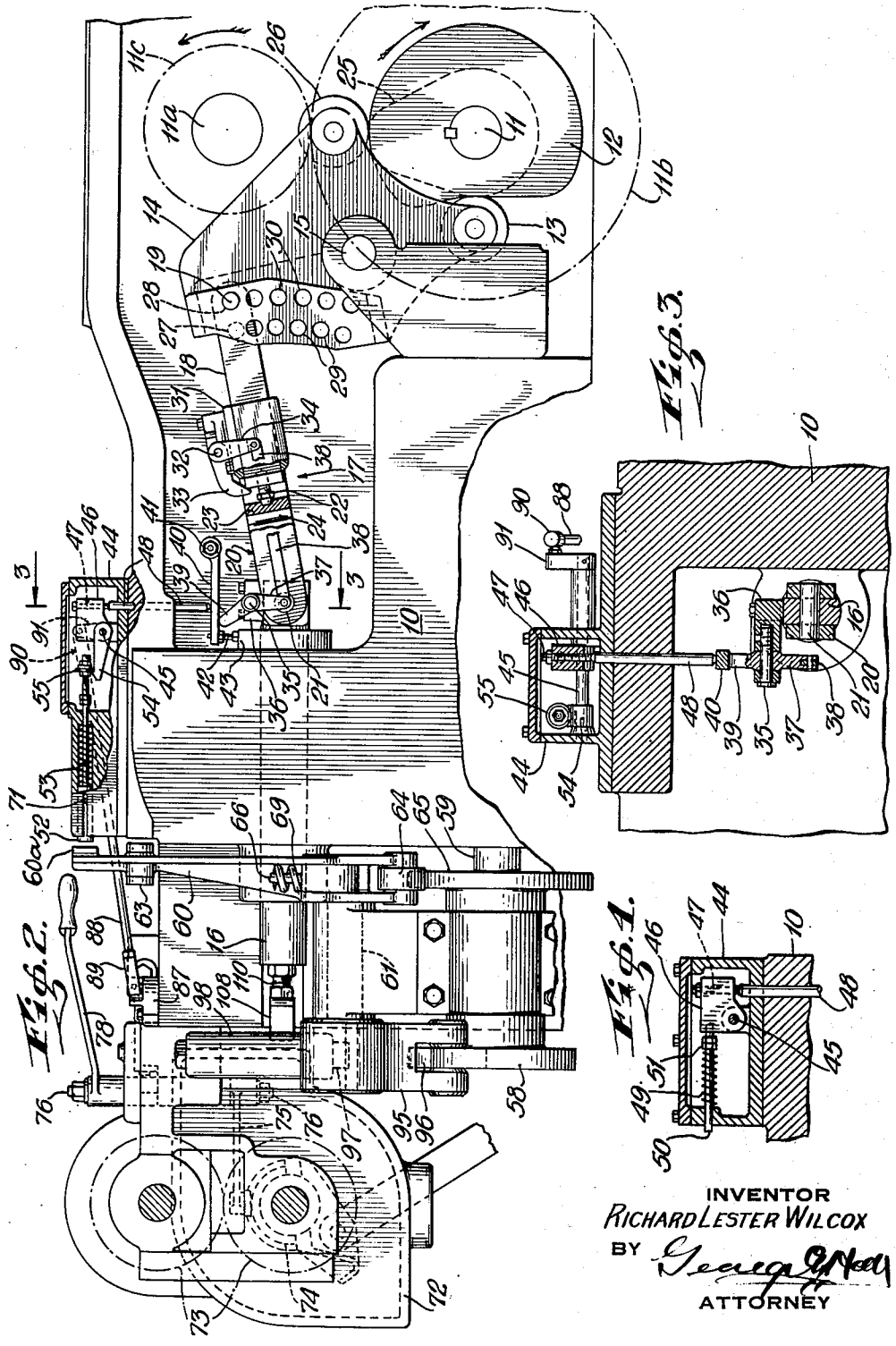


Fig. 2.



Fig. 3.



Fig. 4.

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TRIP MECHANISM

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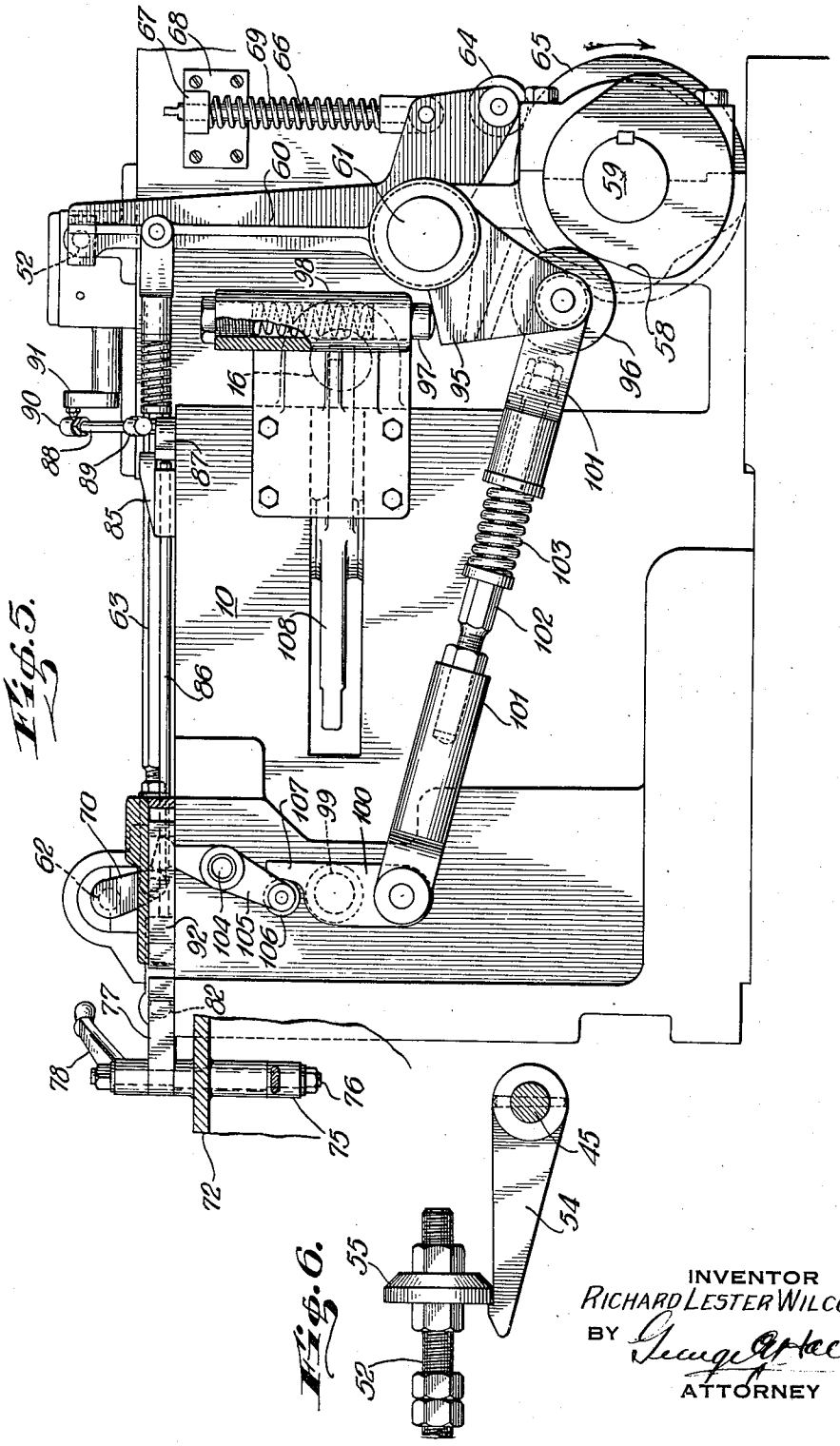



Fig. 5.

Fig. 6.

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2,359,815

# UNITED STATES PATENT OFFICE

2,359,815

## TRIP MECHANISM

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Application December 10, 1942, Serial No. 468,476

30 Claims. (Cl. 10—23)

This invention relates to trip mechanism, particularly associated with metal working machines, such as a header, upsetting machine or the like, to automatically disengage and stop operating parts when conditions are abnormal.

It is conventional in a header, upsetting machine or the like, to intermittently feed a length of stock, such as a wire or rod, into the machine and successively sever portions thereof, which portions are transferred to tools, where, after one or more operations are performed thereon, they are ejected therefrom.

Breakage of one or more parts, or faulty operation thereof, results in damage to the tools, workpieces, etc. One such faulty operation is the failure or improper functioning of the knockout mechanism, due either to a jammed workpiece, an obstruction, breakage, or otherwise. When such condition occurs it is desirable that some or all of the mechanisms that unite in their function to produce the finished product, be stopped and remain at rest until normal conditions are restored. If only part is stopped it is preferable that such part be the feeding and transfer mechanisms. A watchful attendant may discover an abnormal condition such as referred to and stop the machine manually, but this desirable result is rarely attained. In the invention herein such action is automatic.

It is an object of this invention to provide means whereby the feed and transfer mechanisms will be stopped and brought to rest instantly upon the development of a condition that prevents normal operation of the machine. This object is accomplished by mechanism that may be readily assembled with a conventional type of machine and that will immediately stop the operation of the feed and transfer mechanisms when normal condition ceases to exist.

With these objects in view, the invention resides in the combination and arrangement of parts and in their details of construction, as hereinafter set forth, and from which other objects of the invention will be apparent.

In mechanism of this character, after a portion of the stock is severed, the cut-off portion, now a workpiece, is carried by transfer mechanism to a die or the like. This latter has an opening therein slightly larger than the workpiece, that is, just sufficient to permit the workpiece to be readily projected therein. While in this die the workpiece is upset by one or more pressure operations, which have a tendency to swell that portion of the workpiece within the opening in the die and thereby cause it to fit tightly therein. This slight swelling does not prevent the ejection of the workpiece from the die by the knockout mechanism. If the walls of the opening in the die become roughened or scored, which may result from successive ejections of tight fitting workpieces, ejection of the workpiece may become difficult. In such case the knockout mechanism, and particularly the knockout pin, are subjected to an overload and occasionally will break without ejecting the workpiece from the die. When the workpiece remains in the die the next succeeding workpiece is prevented thereby from entering. This may result in possible damage to the tool or tools. In this invention when a condition occurs, such as hereinbefore outlined, an abnormal strain is placed upon the breaker plate whether the knockout mechanism is broken or not. The plate is fractured thereby, and not only further damage to the knockout mechanism is prevented, but also the feed and transfer mechanisms are disconnected from their operating mechanisms, come to rest and so remain until normal conditions are again restored. The fracture, if any, of the breaker plate will occur as the knockout mechanism moves to eject the workpiece from the die. By such action, the feed of stock is stopped and without injury or damage to the machine or to the tools, inasmuch as the failure to eject the workpiece from the die through fracture of the breaker plate does not prevent the punch or punches from continuing their operations, and damage, if any, will only be to the workpiece still in the die. The relative timing of the feed mechanism is such that it is upon its return stroke after having made a complete forward feed of the stock and a workpiece has been pushed into the fingers of the transfer mechanism.

The trip mechanism described is in part disclosed in the three following patents: 2,311,903, for Feed mechanism; 2,318,825 for Cut-off and transfer mechanism; and 2,328,699 for Transfer mechanism; dated respectively, February 23, May 11 and September 7, 1943.

The header or upsetting machine to which the inventions disclosed in said patents are applied is equally adapted to illustrate this invention. In this form of machine the stock is intermittently fed into the machine at a station in register with the wire line, a portion is cut off the end thereof, and now as a workpiece is carried to another station where the workpiece is pushed out of the carrying element into fingers of a transfer mechanism, which carries it into regis-

ter with a fabricating tool or die at another station. At this latter station the workpiece is projected from the transfer fingers into the die, where it is subjected to the action of pressure tools or punches. During this action the transfer mechanism is returned and the transfer fingers again brought into line with the pushout station to receive the next workpiece. The punches, after performing their operation upon the workpiece are withdrawn and a knockout pin ejects the upset workpiece from the fabricating tool or die. These operations are repeated during the continued normal functioning of the machine.

Referring to the drawings, in which like numerals of reference indicate like parts in the several figures;

Figure 1 is a fragmentary plan view of a header or upsetting machine with the improved mechanism herein disclosed applied thereto;

Figure 2 is a fragmentary side elevation thereof;

Figure 3 is a sectional view of a portion of this mechanism, the parts in section being taken generally upon line 3—3 of Figure 2;

Figure 4 is a view similar to Figure 3, the parts in section being taken generally upon line 4—4 of Figure 1;

Figure 5 is an end view thereof;

Figure 6 is a detail view of the latch mechanism; and Figure 7 is a view of a portion of the transfer mechanism.

In the drawings, the numerals 10 indicate the frame or body of the machine, 11 and 11a continuously rotating shafts journaled therein 11b and 11c intermeshing gears by which motion is transmitted to the shaft 11 from the shaft 11a, and 12 and 25 cams upon the shaft 11, the former cam being the knockout cam and the latter the follower cam. These cams are engaged by rolls 13 and 26, carried by a rockably mounted knockout lever 14 journaled on a stud 15, fixed in the frame 10.

Mounted to reciprocate in the body 10 is the gate 115 carrying the punch holders 114, which are moved by mechanism, not shown, so as to successively present each of the two fabricating punches 116 in line with the fabricating die 56.

The header illustrated is of the two blow type, with the movement of the punches in substantially a horizontal line. The improvements herein are equally applicable however to a header having only one punch or more than two punches, or when the shifting thereof is in a vertical as distinguished from a horizontal plane. Movable within the frame 10 is a knockout slide 16, between which and the rockably mounted knockout lever 14 is a coupling or connection member 17. This member comprises in part a slide 18 connected with the rockably mounted knockout lever 14 by a pin 19, and a body 20 pivotally connected with the slide 16 by a pin 21. A pressure screw 22 is threaded in the inner end of the slide 18, with its head against a breaker plate 23 held by the pressure screw against the walls 24 of an opening in the body 20. Through the connection 17 reciprocatory motion is given the slide 16 in one direction by the knockout cam 12 through the rockably mounted knockout lever 14 and in the opposite direction by the follower cam 25. If anything should interfere with the normal operation of the slide 16, then the pressure of the pressure screw 22 against the breaker plate 23 fractures the same and the slide 18 moves within the body 20 without imparting movement to the slide 16, thus preventing damage either to the machine or injury to the workpiece. In one end of the slide 16 is a screw 110 that engages one end of a knockout lever 108 that actuates the knockout pin 109 to eject a workpiece in a tool, as is usual.

The mechanism immediately hereinbefore described is old in the art and not claimed as part of this invention.

The slide 18 is provided at its outer end with companion openings 27 and 28 to receive the pin 19. The rockably mounted knockout lever 14 is provided with a plurality of staggered openings substantially parallel with each other, those on one side being designated 29 and those on the other side 30.

Shifting the relative position of the slide 18 with the rockably mounted knockout lever 14, through positioning the pin 19 in any of the holes 29 and 30, and either of the holes 27 and 28, provides a fine degree of graduation for the length of stroke of the slide 16, and the knockout pin 109. Fixed on the body 20 is a bracket 31, in which is a shaft 32. On this shaft is a rock lever 33, the outer end of which projects over the end of the slide 18 (Fig. 2), and maintains such position during normal movement of the parts. However, as the breaker plate is fractured the slide 18 moves independently within the body 20 and by lifting the outer end of the rock lever 33 rocks the arm 34 on the hub thereof.

Journaled on a stud 35 in the bracket 36, fixed to the slide 16, is a rock lever, one arm 37 of which is connected with the arm 34 by the rod 38. The center of the pin connecting the rod 38 with the arm 37 and the center of the pin connecting the body 20 with the slide 16 are substantially coincident. There is no relative motion of arm 37 when conditions are normal. The arm 39 of this rock lever is in contact with the lever arm 40 supported at one end by a stud 41 in the frame 10. This lever arm is substantially parallel with the slide 16 and the arm 39 moves in slight contact therewith and whereby it may act upon the lever irrespective of its relative lengthwise position. An adjustable screw 42 in the outer end of this plate which engages a lug 43 on the frame when in one of its positions, maintains the substantially parallel position of the lever arm.

A rock shaft 45 having a rock arm 46 thereon, carrying an adjusting screw 47, is journaled in the fixed box 44. Between the adjusting screw 47 and the lever arm 40 is a movably mounted pin or actuator 48. Pressure of a coil spring 49, upon a pin 50, applied to the rock arm 46 holds the pin 48 in engagement with the lever arm 40. The tension of this spring is variable by the nuts 51 threaded on the pin 50. A plunger or stop element 52, slidably mounted in the box 44, is urged outwardly by a spring 53. This plunger 52 is held in one of its positions by a trip latch or holding member 54 on the rock shaft 45, the hook end of which, in one of its positions, engages a disk 55 adjustably held on the plunger 52. When the breaker plate 23 is fractured, the rock lever 33 and the lever arm 39 are given independent rocking motions and the lever arm 40 and pin 48 are lifted, thereby actuating the rock arm 46.

The transfer mechanism herein is shown in detail in said application for Transfer mechanism, Serial Number 437,418.

Movable parallel with the face of the die block 123, and journaled on the rock shaft 99 is the swinging arm 57 forming part of the transfer

mechanism. Adjustably connected with the swinging arm 57 is the finger 120.

On the rock shaft 62 is an arm 117 which is connected with the swinging arm 57 by a link 119. The extent of movement of the swinging arm 57, and through it, the finger 120 is adjustable by the stop screws 125 and 126. Upon the shaft 59 is the transfer cam 65. Journaled upon a pin 61 is a rockably mounted member 60 connected by an adjustable connection 63 with the rock shaft 62. Through the rock shaft 62, rock arm 117, link 119 and swinging arm 57, the finger 120 is caused to swing upon its pivot mounting. In one direction through this mechanism a workpiece is carried from the push-out station 122 into register with the fabricating die 56.

The cam roll 64 upon lever 60 is held against the cam 65 by a spring 69 on a rod 66 slidable within a nut 67 in a fixed bracket 68. During its movement the stop lug 60a on and near the upper end of the rock lever 60 moves adjacent to and opposite the outer end of the plunger 52, while the breaker plate is intact. However, when the breaker plate is fractured the hook end of the trip latch 54 is disengaged from the disk 55 and the spring 53 moves the plunger 52 outwardly into the path of the stop lug 60a, which upon engagement therewith, prevents further movement of the rock lever 60 and thereby action of the transfer mechanism. The plunger 52 is manually moved inwardly out of the path of the stop lug 60a and against the tension of the spring 53, by pressure upon the pin 71, until the disk 55 is again engaged by the trip latch 54.

Fixed to the frame 10 is the feed roll bracket 72, having associated therewith feed rolls 73. These feed rolls are intermittently rotated by well known mechanism not shown, through a clutch mechanism 74, moved axially through a yoke member 75 fixed on a shaft 76 mounted in the bracket. One form of such rotating means is disclosed in said application for Feed mechanism, designated by the Serial Number 321,261. Upon the shaft 76 is a lever arm 77 and a hand lever 78.

Journaled on the stud 79, in the fixed box 80, is a rock lever or holding member 81. A plunger 82 is also movably mounted in this box, being urged in one direction by the coil spring 83. The outer end of this plunger contacts the lever arm 77. Upon the inner end of the plunger 82 is a disk 84, adjustably held thereon by suitable nuts. The hook end of the rock lever 81 is urged toward the disk 84 by spring 113 and pin 112. Supported in the box 80 and bracket 85, fixed to the frame or body 10, is a rod 86, at one end engaging the rock lever 81 and at the other end a rock lever 87 journaled in the bracket 85.

The numerals 88 designate a connection rod having a conventional type universal joint connection 89 with the rock lever 87 at one end and a similar universal joint connection 90 with the rock arm 91 upon the shaft 45. Thus, as the shaft 45 actuates the trip latch 54 to release the plunger 52, the lever 81 is actuated to release the plunger 82 through the connection 88, rod 86, and associated parts. When released, the plunger 82 is urged outwardly by the spring 83 and applies sufficient pressure to the lever arm 77 to rotate the shaft 76, and through the yoke member 75 shift the clutch 74 to disengage the driving mechanism from the feed rolls. This same result is obtained through the manual actuation of the lever 78. The plunger 82 is manually moved inwardly, by pressure upon the pin 111, against the tension of the spring 83 until the disk 55 is again engaged by the trip latch 54.

Within the feed roll bracket 72 is a gagger plate 92, held against displacement by a plate, not shown, the finger 94 thereon being movable into and out of the path of the lever arm 77 (Fig. 1). Journaled on the pin 61 is a rock lever 95, carrying a roll 96 held against the face of the cam 58 on shaft 59 by a spring plunger 97 within a fixed bracket 98. On the rock shaft 99 is a rock arm 100, which is connected with the rock lever 95 by the connection yokes 101, which are united at their inner ends by the rod 102 threaded into one yoke and slidable within the other yoke by sufficient excess pressure to compress the spring 103. This spring is sufficiently strong to assure proper action of the connection without relative movement of the parts, but the spring 103 will be compressed if the predetermined pressure is abnormal, and thus prevent damage or injury to other parts.

Journaled on a stud 104 is a rock lever 105, carrying a roll 106 that rides against an arm 107 on the rock arm 100. One end of this rock lever is in a notch in one wall of the gagger plate (Fig. 1). Thus, as the shaft 99 moves in one direction, the arm 107 actuates the rock lever 105, and through it moves the gagger plate 92 in one direction, that is, away from the lever 77. This gagger plate is moved in the direction toward the lever 77 by the spring 93, the pressure of which maintains the roll 106 in engagement with the arm 107. When normal conditions prevail, the gagger plate is reciprocated at each rotation of the shaft 59, and the finger 94 will at times go on one side of the outer end of lever arm 77 and at other times upon the other side.

When a complete feed of stock has been made the position of the gagger finger 94 is as shown in Figure 1, that is, in a rear position out of the path of the lever arm 77, at which time the shaft 76 may be oscillated manually by the hand lever 78 or through pressure of the plunger 82 and thereby stop action of the feed mechanism. When the gagger finger 94 is in the position indicated, the lever 60 is in its back or rearmost position and the plunger 52 may be projected outwardly into the path of travel of the stop lug 60a. If so projected, the plunger prevents movement of the transfer mechanism and the transfer fingers are in such position that the workpiece is held out of the path of the pressure tool, substantially as shown in Figure 7 to receive a workpiece at the push-out station. Thus, the instant the breaker plate 23 is fractured, the trip mechanisms function and the plungers 52 and 82 are simultaneously released. This release occurs at the correct time for the plunger 52 to interrupt the travel of the lever 60 and the plunger 82 to actuate the shaft 76. When the feed mechanism is advancing the stock, the hand lever 78, arm 77 and gagger plate 92 are substantially in the position shown in Figure 1 with the finger 94 reciprocating on the left of the arm 77, and the plunger 82 is withheld from motion by the latch 81. During the rotation of the shaft 59, regardless of the position of other parts, the gagger plate 92 makes one complete reciprocation at each revolution of the shaft; thus the finger 94, when stock is being fed, will move on the left side of the lever arm 77, preventing oscillation of the shaft 79, either by hand lever 78 or plunger 82, while the gagger plate is in a forward position. When the gagger plate 92 is moved to a rear position the hand lever 78 may be actuated. When

so actuated the lever arm 77 is moved to a position whereby the gagger finger 94, while continuing its reciprocation, will move on the right side of lever arm 77 and prevent movement of hand lever 78 to engage the feed, except when the gagger finger 94 is in a rear position. The tripping of the latch 81 occurs when the gagger finger 94 is in a rear position. The operator is free at any time, regardless of the trip mechanism, to either start or stop the feed manually through the hand lever 78 whenever the gagger plate 92 is in a rear position, which is the correct time to engage the feed and insure a full length feed of stock.

The relative timing of the several mechanisms is such that when the gagger plate 92 is in a forward position on either side of the lever arm 77, the feed mechanism is locked against manual control for either engagement or disengagement of the feed. Thus, the correct time to manually engage or disengage the feed is when the gagger plate 92 is in a rear position and the finger 94 thereon out of the path of the lever arm 77. Also, the timing is such that the plunger 82 is only released to apply pressure to the lever 77 when the gagger plate is in a rear position, which is the only time that the breaker plate is fractured.

The wire or stock is advanced at the same time that the workpiece is being projected into the transfer mechanism at the push-out station. Thus the workpiece is held out of the path of a punch 116 at its next movement toward the fabricating die 56, and there remains until a new breaker plate has been substituted.

If a workpiece should become clogged in the die or its exit therefrom prevented by an obstruction, then the knockout pin 109 will be held against forward movement. This non-action will result in fracture of the breaker plate 23 because the slide 16 cannot move forward but the slide 18 continues its movement. When conditions are as indicated, that is, when the breaker plate 23 is fractured, instantly, the plungers or stop members 52 and 82 are released and are projected outwardly. This causes a full stop of the transfer mechanism, with the workpiece held out of the path of the die and pressure tools; also, a full stop of the feed mechanism through the action of this trip mechanism.

Within the scope of the appended claims, changes and alterations may be made within the spirit of this invention.

What is claimed is:

1. In a metal working machine having a continuously operating driving mechanism, means actuated thereby for intermittently feeding stock into the machine, for successively cutting off portions of said stock, transferring such portions to a stationary tool, and for ejecting said portions from said tool; and normally inoperative means including a movably mounted stop member for automatically and positively stopping the feeding and transfer mechanisms independently of the driving means if and when the ejecting means is restrained from normal action.

2. In a metal working machine having a stationary apertured tool, means for transferring a workpiece to said tool, and a knockout pin for ejecting the workpiece from the tool; the combination therewith of a normally inoperative movably mounted element for positively stopping the transfer mechanism at a predetermined point in advance of the tool if and when the ejecting mechanism is restrained from normal action by a workpiece remaining in the tool.

3. The combination with a tool for a metal working machine, of a knockout member for ejecting a workpiece from the tool, means for moving the knockout member relative to the tool, comprising in part a rockable element, a movable member engaging and actuating the rockable element in one direction, said rockable element and movable member being upon a stationary part, a rockable lever having a plurality of spaced and staggered openings, and a connection between the movable member and rockable lever; and means cooperating with said openings for separably and operatively securing the connection and rockable lever at various places.

4. In a machine of the character described, a rockable member having a plurality of substantially parallel openings spaced from and staggered in relation to each other, and a reciprocating member, the combination therewith of a connection element between said members; and means for operatively joining said element with the rockable member at various places, comprising a removable member adapted to engage any one of said openings, and whereby the extent of movement of said reciprocating member is variable.

5. In a header, the combination with transfer mechanism for carrying a workpiece from one station to another, comprising in part a rockable member; of a stationary tool adapted to receive a workpiece; a knockout pin for ejecting the workpiece from the tool; mechanism, comprising in part a normally inoperative stop element between the knockout pin and transfer mechanism and a breaker plate for holding said stop element in its normally inoperative position, whereby if and when the normal action of the knockout pin is restrained, the breaker plate is fractured and the stop element is projected into the path of the rockable member when the transfer mechanism is at a predetermined position in advance of the tool to thereby prevent further advance movement of the transfer mechanism.

6. The combination with transfer mechanism for carrying workpieces from one station to another; of a tool adapted to receive a workpiece; means for ejecting the workpiece from the tool; and mechanism between the ejecting mechanism and transfer mechanism whereby if and when the normal action of the ejecting mechanism is restrained a stop member forming a part thereof is projected into the path of a moving element of the transfer mechanism and thereby prevents further travel thereof, said mechanism between the ejecting and transfer mechanisms comprising in part a yieldable coupling that holds the stop member against movement during the normal action of the ejecting mechanism, and elements, action of which is initiated by the coupling when it yields by excess pressure, that cause the stop member to move into its projected position.

7. The combination with transfer mechanism for carrying workpieces from one station to another; of a tool adapted to receive a workpiece; means for ejecting the workpiece from the tool; and mechanism between the ejecting mechanism and transfer mechanism whereby if and when the normal action of the ejecting mechanism is restrained a stop member forming a part thereof is projected into the path of a moving element

of the transfer mechanism and thereby prevents further movement thereof, said mechanism between the ejecting and transfer mechanisms comprising in part a yieldable coupling that holds the stop member against movement during the normal action of the ejecting mechanism, an element carried by the coupling, and mechanism that normally restrains the stop member from movement but which is released and permits the stop member to move into its projected position through the action of the coupling when it yields by reason of excess pressure.

8. In a machine of the character described, the combination with a driving element; of a tool adapted to receive a workpiece; means for ejecting the workpiece from the tool, comprising in part a reciprocating member, a yieldable connection between the driving element and reciprocating member composed of plural parts held against movement relative to each other during normal movement of the ejecting mechanism and relatively to each other when the ejecting mechanism is restrained against normal action by an obstruction or otherwise; a transfer mechanism for carrying a workpiece to the tool; and means for stopping movement of the transfer mechanism when the normal action of the ejecting mechanism is restrained, comprising in part a member movable into the path of the transfer mechanism; and releasable means between the said connection and member for holding the member against movement while the connection parts operate as a unit.

9. In a machine of the character described, the combination of a driving element, a transfer mechanism, a slide, a connection between the driving element and slide having plural parts held together as a unitary structure by a breakable element, a movable element connected with one of said parts and having engagement with said breakable member, an arm connected therewith, a movable member connected with the slide, a connection member between the arm and movable member whereby movement is imparted to the movable member through said connection member when said breakable element is fractured.

10. In a machine of the character described, the combination of a driving element, a transfer mechanism, a slide, a connection between the driving element and slide having plural parts held together as a unitary structure by a breakable element, a movable member connected with one of said parts and having engagement with said breakable member, an arm connected therewith, a movable element connected with the slide, a connection member between the arm and movable element whereby movement is imparted to the movable element through said connection member when said breakable element is fractured, the axis of the joint between the slide and connection being substantially coincident with the axis of the joint between the connection member and the movable element connected with the slide while the said connection is a unitary structure.

11. The combination with transfer mechanism for carrying workpieces from one station to another; a tool adapted to receive a workpiece; means for ejecting the workpiece from the tool; and mechanism between the ejecting mechanism and transfer mechanism whereby if and when the normal action of the ejecting mechanism is restrained a stop member forming a part thereof is projected into the path of a moving element of the transfer mechanism and thereby prevents further travel thereof, said mechanism between the ejecting and transfer mechanisms comprising in part a yieldable coupling, releasable elements that hold the stop member against movement during the normal action of the ejecting mechanism, and an element on the ejecting mechanism actuated through the coupling when the same yields by reason of excess pressure which frees said releasable elements and whereby the stop member moves into the path of a part of the transfer mechanism.

12. In a metal working machine having a continuously operating driving mechanism, means actuated thereby for intermittently feeding stock into the machine, for successively cutting off portions of said stock, transferring such portions to a tool, and for ejecting said portions from the tool; means for automatically stopping the feeding mechanism if and when the ejecting means is restrained from normal action, comprising in part a clutch, an oscillating shaft, a connection between the shaft and clutch, a gagger plate or the like, means for imparting movement to the gagger plate, an arm on the oscillating shaft which moves in a path opposite the gagger plate, a plunger movable in a fixed part having engagement with said arm, a yieldable coupling, releasable means between the coupling and plunger that holds the plunger against movement during the normal action of the ejecting mechanism, but permits its independent movement when the ejecting means is restrained from normal action.

13. In a metal working machine having a continuously operating driving mechanism, means actuated thereby for intermittently feeding stock into the machine, for successively cutting off portions of said stock, transferring such portions to a tool, and for ejecting said portions from the tool; means for automatically stopping the feeding mechanism if and when the ejecting means is restrained from normal action, comprising in part a clutch, an oscillating shaft, a connection between the shaft and clutch, a gagger plate or the like, means for imparting a reciprocating movement to the gagger plate, an arm on the oscillating shaft which moves in a path opposite the gagger plate, a plunger in a fixed part having engagement with said arm, a yieldable coupling that holds the plunger against movement during normal action of the ejecting mechanism, and means for actuating the oscillating shaft, and through it shifting the clutch to disengage the feed, action of which is initiated by the coupling when it yields by reason of undue pressure as the ejecting means is restrained from normal action.

14. In a metal working machine having a continuously operating driving mechanism, means actuated thereby for intermittently feeding stock into the machine, for successively cutting off portions of said stock, transferring such portions to a tool, and for ejecting said portions from the tool, the ejecting means comprising in part a plural part connection held together as a unitary structure by a breakable element; means for automatically stopping the feeding mechanism if and when the ejecting means is restrained from normal action, comprising in part a clutch, an oscillating shaft, a connection between the shaft and clutch, a gagger plate or the like, means for imparting movement to the gagger plate, an arm on the oscillating shaft which moves in a path opposite the gagger plate, a plunger in a fixed

part having engagement with said arm, a coupling that holds the plunger against movement during the normal action of the ejecting mechanism, and means, actuated by the ejecting means for releasing the coupling when the ejecting means is restrained from normal action and the said breakable element is fractured, whereby all of the parts of the connection move relatively to the other parts.

15. The combination with mechanism of the character described having a feed station, a push-out station, and a fabricating station having a forming tool thereat, of means for transferring a workpiece from the push-out station to the fabricating station, means as a knockout pin for ejecting a workpiece from said tool, pressure actuated means, and mechanism connected to said pressure actuated means for actuating the latter for stopping the movement of the knockout pin and work transferring means if and when normal action of the knockout pin is prevented by jamming of a workpiece in said tool, whereby to stop the transferring means when a workpiece carried thereby is advanced toward the fabricating station during the jamming thereof by a previously operated upon workpiece.

16. The combination with mechanism of the character described having a feed station, a push-out station and a fabricating station, of means for transferring a workpiece from the push-out station to the fabricating station, means, as a knockout pin, for ejecting a workpiece from the fabricating station, and means for stopping the movement of the ejecting means and the transfer means when the pressure required to eject a workpiece from the fabricating station exceeds a predetermined degree, said stopping means including mechanism to prevent further movement of the transfer means when a workpiece carried thereby is in substantial register with the push-out station.

17. In a header, a stationary tool; mechanism for feeding stock into the header; mechanism for cutting off portions of the stock; mechanism for transferring the cut-off portions to the tool; mechanism for ejecting the workpiece from the tool, comprising in part a connection member or coupling, having a breaker plate that will fracture with excess pressure from the ejecting mechanism; an actuating member for the feed mechanism; a stop member for the transfer mechanism; means for holding said members in an inactive position; mechanism between the connection member or coupling and each of said members to release said members; and means to move said members to stop further action of the feed and transfer mechanisms when said breaker plate is fractured.

18. In a header, a stationary tool; mechanism for feeding stock into the header; mechanism for cutting off portions of the stock; mechanism for transferring the cut-off portions to the tool; mechanism for ejecting the workpiece from the tool, comprising in part a connection member or coupling, having a breaker plate that will fracture with excess pressure from the ejecting mechanism; an actuating member for the feed mechanism; a stop member for the transfer mechanism; means, comprising in part a latch for each of said members that hold the member in an inactive position; mechanism between the connection member or coupling and each of said latches, which will actuate the latches and release the members, whereby the springs will move said members into position to stop further action of the feed and transfer mechanisms, when the breaker plate is fractured.

19. In a header, a stationary tool; mechanism near one side thereof for feeding stock into the header; mechanism for cutting off portions of the stock; mechanism for transferring the cut-off portions to the tool; mechanism for ejecting the workpiece from the tool, comprising in part a connection member or coupling on the side of the header opposite to the feed mechanism, having a breaker plate that will fracture with excess pressure from the ejecting mechanism; an actuating member for the feed mechanism; a stop member for the transfer mechanism; means for holding said members in an inactive positon; mechanism between the connection member or coupling and each of said members to release said members; and means to move said members to stop further action of the feed and transfer mechanisms when said breaker plate is fractured.

20. In a header, a stationary tool; mechanism for feeding stock into the header; mechanism for cutting off portions of the stock; mechanism for transferring the cut-off portions to the tool; mechanism for ejecting the workpiece from the tool, comprising in part a connection member or coupling, having a breaker plate that will fracture with excess pressure from the ejecting mechanism; an actuating member for the feed mechanism; a stop member for the transfer mechanism, said members being upon opposite sides of the header; means for holding said members in an inactive position; mechanism between the connection member or coupling and each of said members to release said members; and means to move said members to stop further action of the feed and transfer mechanisms when said breaker plate is fractured.

21. In a header, the combination with a driving element; of a reciprocating slide; a connection between the driving element and slide, having a breaker plate as part thereof; a trip device carried by the connection, inactive while the breaker plate is intact and actuated when the breaker plate is fractured; a rockable lever mounted on the slide and movable therewith; a rod or the like connecting the trip device and rockable lever; a lever arm positioned so as to be in contact with the rockable lever throughout its entire reciprocation; and an actuator movable in a fixed part and having engagement with the lever arm.

22. In combination; a slide; a driving element; a connection between the driving element and slide, said connection having parts movable in relation to each other; a breaker plate that holds said parts against relative movement; a lever mounted on the connection, one end of which projects over the breaker plate; a rockable lever movable with the slide; and a rod connecting the lever and rockable lever.

23. In a header having a driving element; a tool, means for feeding stock into the header, transfer mechanism to carry workpieces to the tool, and means for ejecting a workpiece from the tool; the combination therewith of means for actuating said mechanisms from the driving element comprising in part a connection having members that are held against relative movement by a breaker plate or the like, a stop member to limit the movement of the transfer mechanism, a plunger in engagement with a part of

the feed mechanism, means for holding the stop member out of the path of the transfer mechanism, means for holding the plunger in one position, and means, set in motion by the fracture of the breaker plate to release said stop member and plunger, said means including as part thereof a lever arm and an actuator moved thereby.

24. In a header; a tool; means for transferring a workpiece to the tool, having as a part thereof a rockable lever; mechanism to eject the workpiece from the tool; means for actuating the ejector mechanism, comprising in part a connection having a breaker plate forming part thereof; a trip mechanism on the connection and held against movement while the breaker plate is intact; a plunger or the like movable into the path of the rockable lever to prevent movement thereof; a member for holding the plunger in its retracted position; means between the holding member and trip mechanism, whereby the holding member will be moved to release the plunger when the breaker plate is fractured and the trip mechanism actuated as a result thereof; and means for projecting the plunger into the path of the rockable lever when released from the latch.

25. In a header; a tool; means for transferring a workpiece to the tool, having as a part thereof a rockably mounted member; mechanism to eject the workpiece from the tool; means for actuating the ejector mechanism, comprising in part a connection having a breaker plate forming part thereof; a trip mechanism on the connection and held against relative movement while the breaker plate is intact; a plunger or the like movable into the path of the rockably mounted member to prevent movement thereof; a member for holding the plunger in its retracted position; means between the holding member and trip mechanism, whereby the holding member will be moved to release the plunger when the breaker plate is fractured and the trip mechanism actuated as a result thereof, said means comprising in part a rock lever; a connection between the rock lever and trip mechanism; an intermediate plate with which the rock lever is in engagement and actuated thereby irrespective of its relative endwise position therewith; an actuator between the intermediate plate and holding member; and means for projecting the plunger into the path of the rockably mounted member when released from the holding member.

26. In a header, a driving element, a feed mechanism for moving stock into the header having feed rolls, a make and break mechanism for transmitting and cutting off power to the feed rolls, an oscillating shaft having a part thereon connected with the make and break mechanism, an arm fast on the oscillating shaft, mechanism cooperating with the oscillating shaft to prevent stopping the feed rolls prior to the completion of a full length feed of stock into the header, a connection or coupling having a breaker plate through which power is transmitted, an actuating member positioned to engage a part on the oscillating shaft, means for holding the actuating member against movement while the breaker plate is intact, and means for releasing the holding means to permit movement of the actuating member when the breaker plate is fractured.

27. In a metal working machine having a continuously operating driving mechanism, means actuated thereby for intermittently feeding stock into the machine for successively cutting off portions thereof, for transferring said cut-off portions to a forming tool, and for ejecting formed portions from said tool; normally inoperative stop mechanism for automatically stopping the feeding and transfer mechanisms independently of the continuously operating driving mechanism, and pressure responsive means for holding the stop mechanism in inoperative position, said pressure responsive means being adapted to release the stop mechanism to operative position when the pressure thereon exceeds a predetermined degree.

28. A machine of the character described, including a cut-off mechanism, a transfer mechanism, a stock forming tool, a knockout pin, means for actuating said elements in timed sequential relation, normally inoperative stop means for the transfer mechanism and knockout pin, and pressure responsive means directly connected to said stop means for moving the latter to operative position when the pressure thereon exceeds a predetermined degree.

29. A machine of the character described, including a driving mechanism, stock transfer mechanism, stop means normally biased to inoperative position adjacent the path of movement of the knockout mechanism, yieldable means connecting the driving and knockout mechanisms, and means operable by the connecting means upon yielding of the latter to cause the stop means to be projected into the path of movement of the knockout mechanism for stopping the further movement of the latter independently of the continued movement of the driving mechanism.

30. A machine of the character described, including a driving mechanism, a forming tool, means to transfer a workpiece to said tool to be operated upon, means for removing a completed workpiece from said tool, normally inoperative stop means disposed adjacent the path of movement of the transfer means and the workpiece removing means, and pressure responsive means interposed between the stop means and driving mechanism, said last named means being normally inoperative to release the stop means when the pressure thereon is below a predetermined degree, and being operative to release the stop means for projection into the path of movement of the transfer and the workpiece removing means so as to stop the same independently of the continued movement of the driving mechanism, when the pressure thereon exceeds said predetermined degree.

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