March 10, 1964 E. LOEFFEL 3,124,026

MISFEED DETECTORS

Filed May 8, 1961

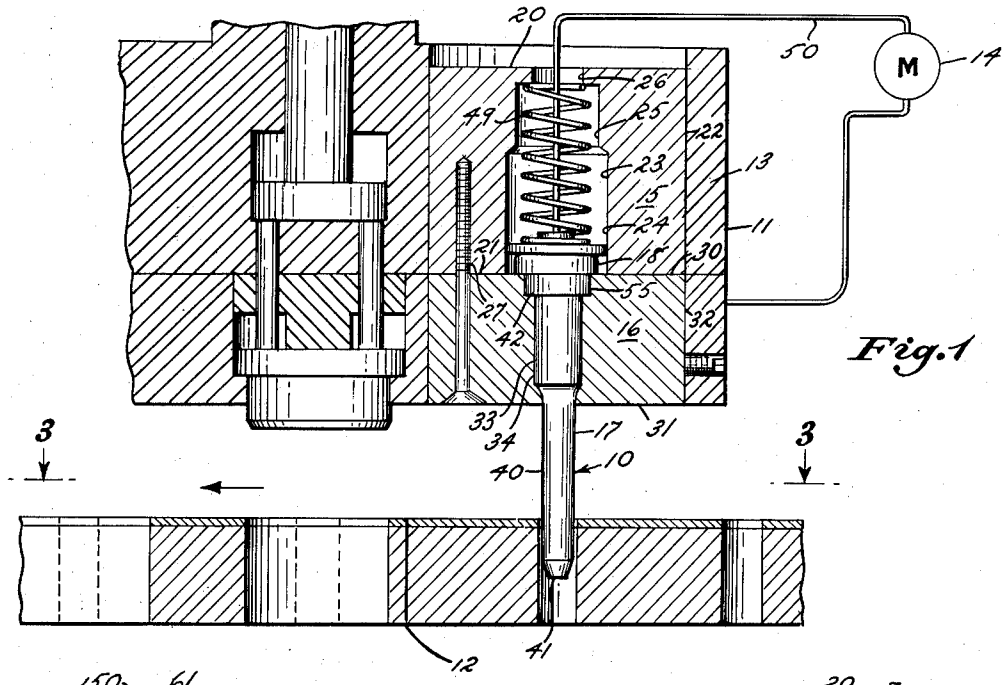


Fig. 1

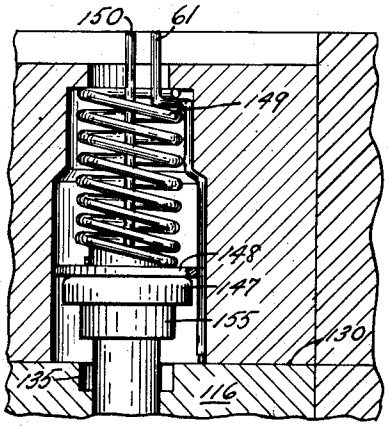
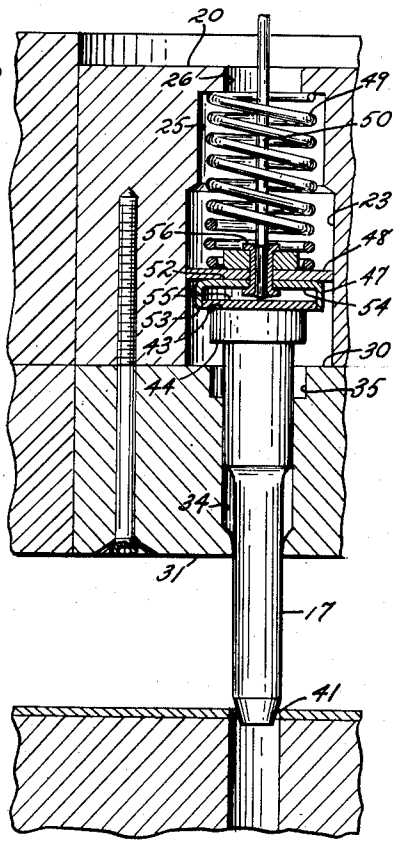


Fig. 4

Fig. 2



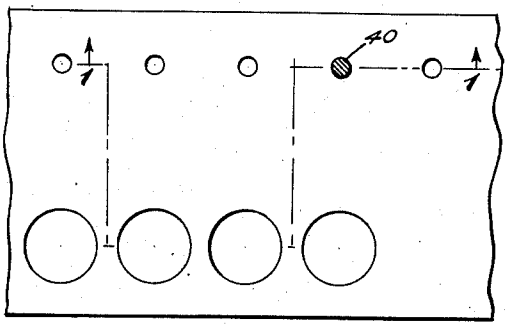


Fig. 3

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3,124,026

MISFEED DETECTORS

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This invention relates generally to the field of machine tools, and more particularly to an improved form of misfeed detector suitable for use in conjunction with feed mechanisms operating in conjunction with progressive die-forming devices and similar applications.

In the formation of articles of manufacture by means of progressive dies, normally a series of stations are arranged in a straight line at substantially equal intervals, whereby a furtherance of the forming operation is performed at each station. All of the stations are usually located on a common press, and after the completion of a stamping operation, a strip of material from which the articles are formed is advanced a single station for a subsequent operation. In order that proper forming occur, it is vital that the strip of material from which the progressive dies form the finished article be advanced in a uniform incremental manner, so that a previous forming operation will not be improperly distorted. In order to assure proper feeding, it is common to provide the strip of material or stock with a series of pilot holes, and the press is fitted with a corresponding projecting finger or other alignment means which will successively enter each of the holes on the strip to assure proper alignment. Normally, the projecting finger is provided with a camming surface on the outer end thereof, so that a small degree of misalignment may be corrected as the pilot descends through the hole. However, should a breakdown of the feed mechanism occur, it is possible that the pilot will miss the pilot hole completely, in which case it will normally break or be moved within a supporting bore in which it is disposed to avoid such breakage, but in the event that the feed is not interrupted, a substantial amount of damage may occur to the dies before the misfeed can be detected and the feed mechanism stopped.

It is among the principal objects of the present invention to provide detector means incorporated into the pilot in such manner that the pilot will perform its original function, and in addition will be capable of interrupting the feeding means with which it is associated upon the instant a misfeed occurs to a degree which cannot be corrected by the normal operation of the pilot.

Another object of the invention lies in the provision of an improved misfeed device which may be separately manufactured as a component to be installed into a progressive die press by merely machining a space in the die block to accommodate it, which space may be of standard dimensions.

A further object of the invention lies in the provision of a misfeed detector in which the cost of fabrication may be so low as to permit a permanent installation of an individual misfeed detector within a die block, to be removed with removal of the die block at the completion of a run.

A further object of the invention lies in the provision of an improved misfeed detector which will function upon the occurrence of axial movement of the pilot of as little as a few hundredths of an inch, so that the interruption of the feed means with which the press is associated may be practically instantaneous, and before any substantial volume of stock material is wasted.

A feature of the invention lies in the fact that the inventive structure may be formed as either a single-wire or a

double-wire electrical connection depending upon the requirements of an individual installation.

Another feature of the invention lies in the fact that the operation of the pilot is in no way interfered with by the function of the misfeed detector.

These objects and features, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawing, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIGURE 1 is a fragmentary vertical offset sectional view of the first embodiment of the invention as seen from the plane 1—1 in FIGURE 3.

FIGURE 2 is a fragmentary sectional view corresponding to that seen in FIGURE 1 but showing certain of the corresponding parts in altered relative position.

FIGURE 3 is a horizontal fragmentary sectional view as seen from the plane 3—3 in FIGURE 1.

FIGURE 4 is a vertical fragmentary sectional view corresponding to that seen in FIGURE 3, but showing an alternate form thereof.

In accordance with the first embodiment of the invention, the device, generally indicated by reference character **10**, is illustrated in installed condition upon a progressive die press **11**, which may be of conventional type including a lower fixed member **12**, and an upper reciprocating member **13**, as well as a plurality of progressive dies (not shown), the details of the press **11** forming no part of the present invention or disclosure. The device **10** comprises: a first or upper casing element **15**, a second or lower casing element **16**, a pilot member **17**, and a contact element **18**.

The first or upper casing element **15** may be in the form of a machined metallic cylinder, bounded by an upper surface **20**, a lower surface **21**, and an outer cylindrical surface **22**. Extending from the lower surface is an axially arranged bore **23**, including a first portion **24**, and counterbored portions **25** and **26**, all of which are axially aligned. A threaded eccentrically disposed bore **27** provides for the interconnection of the first casing element **15** with the second casing element **16** upon assembly of the device **10**.

The second or lower casing element **16** is of generally similar configuration, and is bounded by an upper surface **30**, a lower surface **31**, as well as a cylindrical outer surface **32** preferably of the same diameter as that of the surface **22**. A centrally disposed bore **33** includes a first portion **34** and a counterbored portion **35**. The casing element **16** is preferably formed of electrically conductive material, or portions of the same, namely the upper surface **30** must be treated to make the same so conductive.

The pilot member **17** may be of conventional configuration, including an elongated shank **40** having a tapered lower end **41** forming a cam surface, and an upper enlarged portion **42** having planar parallel lower and upper surfaces **43** and **44**, respectively.

The contact element **18** includes a cup-shaped contact member **47**, preferably of copper or brass so as to be readily formed, an insulating washer **48**, a coil spring **49**, and an insulated conductor **50**.

The contact member **47** is bounded by an outer surface **52**, an annular edge surface **53**, and an inner surface **54** defining a recess. An insulating member **55** of diameter substantially corresponding to that of the recess formed by the surface **54** is frictionally positioned within the recess. The insulating washer **48** is of a diameter slightly greater than that of the contact member **47**, in order to

prevent the same from contacting the sides of the bore 23, and is secured to the outer surface 52 by means of a rivet or grommet 56. The insulated conductor 50 is soldered to the grommet to provide for electrical continuity to the edge 53. The spring 59 is maintained within the bore 23, and normally urges the contact member 47 in a direction toward the second casing element 16 to complete an electrical circuit therebetween. It will be observed that the upper surface 44 of the pilot member 17 is of a diameter less than the recess formed by the surface 44, and is positioned so as to contact only the insulating member 55.

During operation, the pilot member 17 will be maintained in extended condition under the action of the coil spring 49 which is of relatively heavy modulus. Upon the occurrence of a misfeed, the downward force of the reciprocating member 13 of the press 11 will overcome the force of the spring 49, causing the contact member 47 to be unseated with respect to the upper surface of the casing element 16.

Where using a single-wire system as illustrated in the first embodiment of the invention, the motor operating the feed means, generally indicated by reference character 14, may be wired through the framework of the press 11, so that the current operating the motor must pass through the contact member 47. Thus, the unseating of the contact member 47 immediately interrupts operation of the motor 14.

In the alternative, the device 10 may be connected to a switch (not shown) which will cause opening of a clutch which interconnects a motor with a feed means, or a clutch transmitting motion for the raising and lowering of the press, the last-mentioned alternative permitting instantaneous cessation of operation of the press, thereby keeping die damage to a minimum.

In the alternate form of the invention, as illustrated in FIGURE 4, parts corresponding to those of the principal embodiment have been designated by similar reference characters with the additional prefix "1."

The alternate form of the invention differs from the principal embodiment in the provision of an additional conductor 61 positioned in electrical continuity with respect to the upper surface 130 of the casing element 116, for installation where a two-wire system is desired, as, for example, where the motor (not shown) is operating on alternating current.

I wish it to be understood that I do not consider the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

I claim:

1. A misfeed detector device for use in conjunction with a multistage progressive die press construction in which stock is fed in uniform increments beneath a die block, said device comprising: an upper casing element of generally cylindrical configuration and having a first bore axially extending therethrough, a second cylindrical casing element formed of electrically conductive material and having a second bore axially extending therethrough, said second bore being coaxially aligned with respect to said first bore in said first casing element; a pilot member arranged for limited sliding movement within said second bore and having a portion thereof extending outwardly of said second casing element; a generally cup-shaped contact member disposed within said first bore, resilient means within said first bore normally urging said contact member in a direction to contact a portion of said second casing element, insulated electrical conductor means extending in an opposite direction outwardly from said contact member; said cup-shaped contact member defining a recess, an insulating member disposed in said recess, said pilot member having an upper terminal of diameter smaller than said recess and positioned to selectively contact said insulating member; whereby upon the transmission of a force along the axis of said pilot member, contact of said upper terminal with said insulating member serves to interrupt contact of said contact member with said second casing element against the action of said resilient means.

2. A misfeed detector device for use in conjunction with a multistage progressive die press construction in which stock is fed in uniform increments beneath a die block, said device comprising: an upper casing element having a first bore axially extending therethrough, a second casing element formed of electrically conductive material and having a second bore axially extending therethrough, said second bore being coaxially aligned with respect to said first bore in said first casing element; a pilot member arranged for limited sliding movement within said second bore and having a portion thereof extending outwardly of said second casing element; a generally cup-shaped contact member disposed within said first bore, resilient means within said first bore normally urging said contact member in a direction to contact a portion of said second casing element, insulated electrical conductor means extending in an opposite direction outwardly from said contact member; said cup-shaped contact member defining a recess, an insulating member disposed in said recess, said pilot member having an upper terminal of diameter smaller than said recess and positioned to selectively contact said insulating member; whereby upon the transmisison of a force along the axis of said pilot member, contact of said upper terminal with said insulating member serves to interrupt contact of said contact member with said second casing element against the action of said resilient means.

3. A misfeed detector device for use in conjunction with a multistage progressive die press construction in which stock is fed in uniform increments beneath a die block, said device comprising: an upper casing element having a first bore axially extending therethrough, a second casing element formed of electrically conductive material and having a second bore axially extending therethrough, said second bore being coaxially aligned with respect to said first bore in said first casing element; a pilot member arranged for limited sliding movement within said second bore and having a portion thereof extending outwardly of said second casing element; a generally cup-shaped contact member disposed within said first bore, resilient means within said first bore normally urging said contact member in a direction to contact a portion of said second casing element, insulated electrical conductor means extending in an opposite direction outwardly from said contact member; said cup-shaped contact member defining a recess, an insulating member disposed in said recess, said pilot member having an upper terminal of diameter smaller than said recess and positioned to selectively contact said insulating member, a second insulated electrical conductor connected to said second casing and extending outwardly of said first bore; whereby upon the transmission of a force along the axis of said pilot member, contact of said upper terminal with said insulating member serves to interrupt contact of said contact member with said second casing element against the action of said resilient means.

4. A misfeed detector device for use in conjunction with a multistage progressive die press construction in which stock is fed in uniform increments beneath a die block, said device comprising: an upper casing element having a first bore axially extending therethrough, a second casing element formed of electrically conductive material and having a second bore axially extending therethrough, said second bore being coaxially aligned with respect to said first bore in said first casing element, threaded means interconnecting said first and second casing elements; a pilot member arranged for limited sliding movement within said second bore and having a portion thereof extending outwardly of said second casing element; a generally cup-shaped contact member disposed

within said first bore, resilient means within said first bore normally urging said contact member in a direction to contact a portion of said second casing element, insulated electrical conductor means extending in an opposite direction outwardly from said contact member; said cup-shaped contact member defining a recess, an insulating member disposed in said recess, said pilot member having an upper terminal of diameter smaller than said recess and positioned to selectively contact said insulating member, a second insulated electrical conductor connected to said second casing and extending outwardly of said first bore; whereby upon the transmisison of a force along the axis of said pilot member, contact of said upper terminal with said insulating member serves to interrupt contact of said contact member with said second casing element against the action of said resilient means.

5. A misfeed detector device for use in conjunction with a multistage progressive die press construction in which stock is fed in uniform increments beneath a die block, said device comprising: a first element of generally cylindrical configuration and having a first bore extending therethrough, a second element formed of electrically conductive material and having a second bore axially extending therethrough, said second bore being coaxially aligned with respect to said first bore in said first element; a pilot member arranged for limited sliding movement

within said second bore and having a portion thereof extending outwardly of said second bore, a generally cup-shaped contact member disposed within said first bore, resilient means within said first bore normally urging said contact member in a direction to contact a portion of said second element, insulated electrical conductor means extending in an opposite direction outwardly from said contact member; said cup-shaped contact member defining a recess, an insulating member disposed in said recess, said pilot member having an upper terminal of diameter smaller than recess and positioned to selectively contact said insulating member; whereby upon the transmission of a force along the axis of said pilot member, contact of said upper terminal with said insulating member serves to interrupt contact of said contact member with said second element against the action of said resilient means.

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