Nov. 19, 1940. F. O. JOHNSON 2,222,101

CONTROL DEVICE

Filed Dec. 8, 1939

Fig. 1

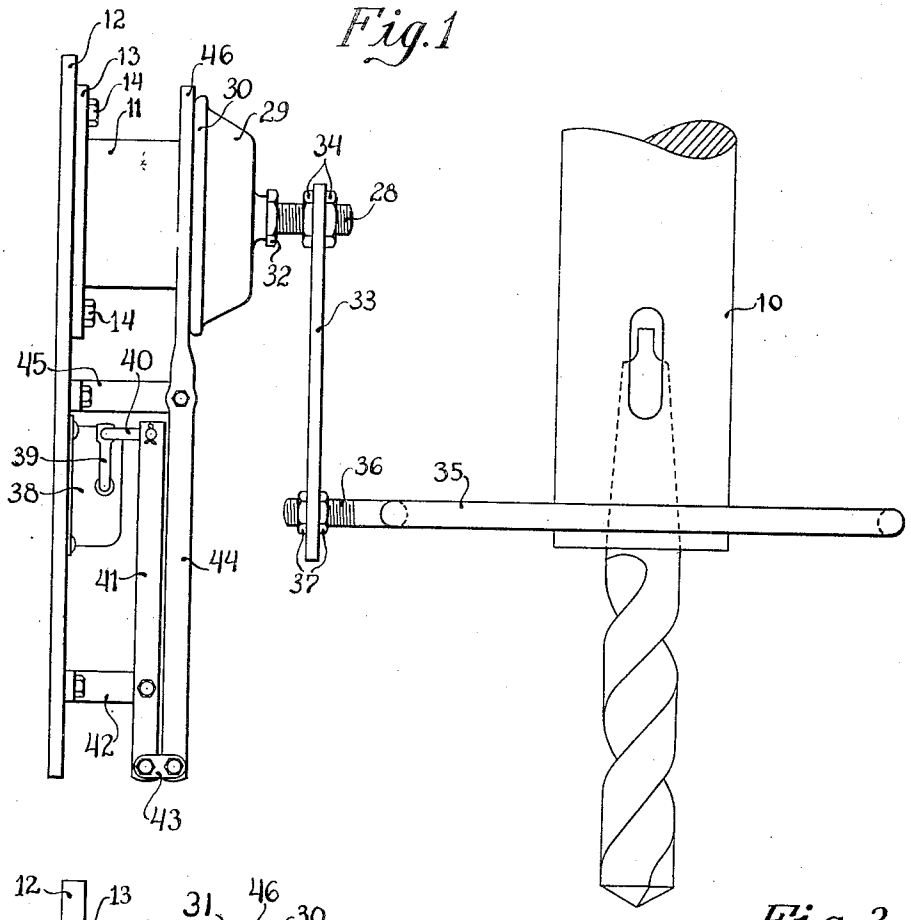


Fig. 2

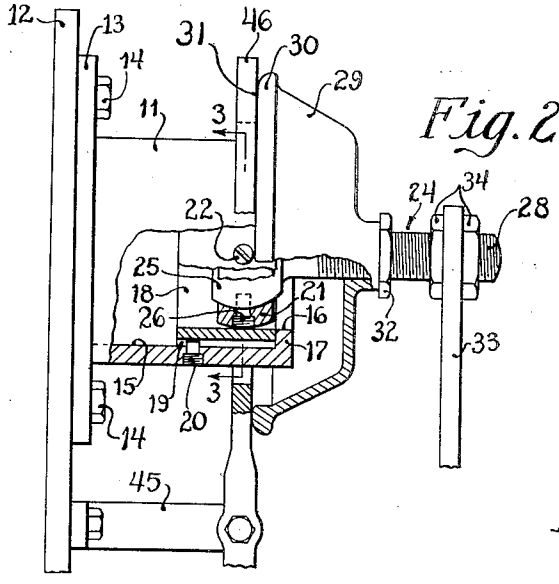
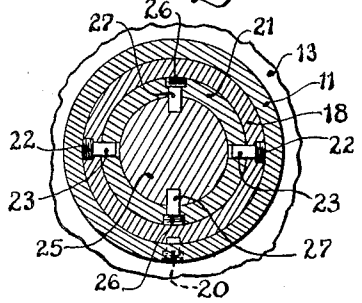


Fig. 3



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CONTROL DEVICE

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5 Claims. (Cl. 192—129)

This invention relates to a control device, and more particularly to a device adapted to be used as a safety means for causing cessation of the operation of an apparatus having a movable part.

The invention contemplates particularly the provision of a control or safety device for an apparatus of the class including drill presses and the like. In apparatuses of this class there is considerable possibility of injury to the operator as caused by entanglement of the operator's clothing with movable parts of the apparatus. In most instances, the throw-out means for stopping such moving parts are located at a considerable distance from the operator and some difficulty is experienced in reaching the throw-out means before injury or damage is done. A matter of prime importance, however, arises from a psychological aspect of the transaction inasmuch as the operator usually becomes panic stricken and is, therefore, unable to act speedily enough to prevent serious harm.

The principal object of the present invention generally is to provide a control or safety device so arranged with respect to moving parts of the apparatus as to be automatically engaged by the operator, should his clothing become entangled therein, or, in any event, to be so arranged as to be within such easy reach of the operator as to render actuation of the device practically automatic.

Another object is to arrange the device so that movement of the part engaged by the operator in any direction will result in actuating the throw-out means to stop the apparatus or machine.

Another object is to arrange the device with included linkage in the form of multiplying levers or the like, so that very slight movement of that part of the device in the vicinity of the apparatus will result in sufficient movement of remote parts to stop the operation of the apparatus.

Briefly and specifically these and other important objects are achieved in one preferred form of the invention by the provision of a support which carries thereon for universal movement with respect thereto a member having a portion arranged in the vicinity of the operating part of apparatus with which the device is used. This member includes a ring-like portion surrounding the universal pivot and is adapted to engage a similar ring-like portion arranged adjacent thereto and forming part of a system of linkage connected to a throw-out means adapted to stop operation of the apparatus. The universal connection permits movement of the first ring in any direction, and the provision of the second ring insures engagement between the rings at any points of the peripheries thereof, regardless of the direction of movement of the first ring.

A more complete understanding of the objects and important features of the invention may be had from the following detailed description taken in conjunction with the accompanying sheet of drawings, in which:

Figure 1 is an elevational view of the device as used in connection with an apparatus of the drill press type;

Figure 2 is an enlarged view, partly in section, of an upper portion of the device; and,

Figure 3 is a transverse sectional view taken substantially on the line 3—3 of Figure 2 and showing the universal connection.

In the drawing, the numeral 10 represents the spindle or chuck of a drill press of any conventional type. This drill press is only one of a number of apparatuses with which the present device may be utilized and is shown and described herein only for purposes of illustrating the invention. A support or housing 11 is rigidly carried by an element 12, which may be a part of the drill press, or such other supporting medium as proves suitable. This support or housing 11 is preferably cylindrical and includes a cylindrical flange 13, through which bolts 14 are passed to secure the housing to the element 12.

The housing is preferably formed with a cylindrical recess 15 opening at its outer end to a slightly reduced opening 16, there being thus formed at the outer end of the housing a radially inwardly extending flange 17. An annular member or collar 18 is carried in the housing 11 in the recess 15, and is provided at its periphery with an axially extending guide or keyway 19. This keyway is engaged by a key or set screw 20 carried by a cylindrical wall of the housing 11. These two parts are thus arranged for relative sliding movement; the set screw or key 20 prevents relative angular movement between the parts.

As best shown in Figure 3, the annular member or collar 18 carries a second annular member or collar 21. The member 18 carries on a diameter thereof a pair of set screws 22, each set screw including a trunnion portion 23 lying on the pivot axis formed by the aforesaid diameter. The member 21 is thus arranged for pivotal movement with respect to the member 18 and with

respect to the housing 11, and is mounted for slidable movement with the member 18.

A third member 24 is provided with a ball joint 25 at one end thereof. This ball is fitted within the member 21 for pivotal movement with respect thereto. The member 21 is provided with a pair of diametrically opposed set screws 26, each screw including a trunnion portion 27 pivotally engaging the ball 25, whereby the member 24 is pivotally mounted in the member 21 for movement with respect thereto about a pivot axis lying on a diameter thereof. These axes preferably intersect at right angles on the axis of the cylindrical recess 15 in the housing 11. The member 24, as will be seen, is thus universally mounted on the housing 11, having movement about any one of a plurality of axes with respect to the housing 11, and is also slidable axially thereof.

The unconnected end of the member 24 is formed as a threaded portion 28. This portion serves to carry thereon a member 29 in the form of a cup or bell having an annular or ring portion 30 including a circle formed about the axis common to the parts 11, 18, 21, and 24. This annular or peripheral portion 30 has an abutment surface 31 arranged closely adjacent the plane of intersection of the aforesaid axes between the parts 18, 21, and 24. A lock nut 32 is threaded on the member 24 and serves to maintain the position of the member 29. This arrangement provides also for the adjustment of the member 29 on the member 24. The outermost threaded end of the member 24 has rigidly carried thereon a downwardly extending arm 33 secured to the threaded portion 28 between a pair of nuts 34. The lower end of the member 33 rigidly carries a control member 35 which in the present instance takes the form of a guard ring encircling the drill press spindle or chuck 10. This ring includes a threaded portion 36 connected to the arm 33 by a pair of nuts 37. It will be seen, of course, that movement of the guard-ring 35 will cause movement of the member 29 about the aforesaid universal connection.

In connection with the apparatus with which the present device is capable of being used, there is provided a throw-out in the form of a switch 38. This throw-out may, of course, be any suitable device, and the switch 38 is indicated here for the purposes of illustration. This switch includes a pivoted arm 39 pivotally connected by a link 40 to the upper end of a lever or link 41. The lever 41 is carried closely adjacent its lower end on a pivoting bracket 42 secured to element 12, and at its extreme lower end is pivotally cross-connected by a link 43 to the lower end of a second lever or link 44. This lever 44 is pivoted intermediate its ends to a bracket 45 secured to the aforementioned element 12. The upper end of the lever or link 44 is preferably formed as a ring 46, this ring lying closely adjacent and, in fact, preferably abutting the surface 31 of the annular or ring portion 30 of the member 29. Movement of the member 24 in any direction permitted by the aforesaid pivot axes will result in engagement or abutment between the ring portions 30 and 46, and, because of the leverage obtained through the multiplying lever system 41, 44, the arm 39 on the switch 38 will be actuated to stop operation of the drill press spindle or chuck 10. The arrangement is such that very slight movement of the member 29 results in sufficient movement of the arm 39 to throw out the switch.

From the foregoing description it will be seen that the device may be actuated voluntarily or involuntarily by an operator of the drill press. In either event, the result is inevitable. Should the operator's clothing become entangled in the drill or bit, he will necessarily be drawn toward the guard ring 35, unless, of course, he escapes completely from entanglement with the drill or bit. However, should his clothing become so entangled as to draw him toward the machine, some portion of his body would contact the guard-ring 35, resulting in sufficient movement of the ring to cause the necessary throwing out of the switch 38. It will be understood, of course, that the parts of the device are capable of being returned again to operative position.

From an examination of the present disclosure, it will be appreciated that only a preferred embodiment of the invention has been illustrated and described, and no attempt has been made to define the number of forms which it may take or the number of uses to which it may be adapted within the spirit and scope of the appended claims.

What is claimed is:

1. Control means for use with apparatus having a regulating device, said means comprising a housing having a cylindrical recess, a member carried in said recess in the housing for sliding movement with respect thereto, means holding the housing and member against relative rotation, a second member pivoted on the first member on an axis that is a radius of the cylindrical recess, a third member carried by the second member on an axis that is a different radius of the recess, said third member including an annular portion having the recess axis as its center, and connecting linkage between the aforesaid regulating device and the third member and including an annular portion lying adjacent and engageable by the annular portion of the third member upon movement thereof, said third member including a portion engageable to move it to actuate the linkage.

2. A safety device for apparatus having a rotating part and including throw-out means for said part, said device comprising a support, a member pivotally mounted on the support for universal movement with respect thereto, said member including rigidly thereon a guard-ring surrounding the rotating part, said member further including rigidly thereon an abutment ring formed about an axis of the universal pivot, and connecting means between the abutment ring and the throw-out means and including a second abutment ring having a periphery generally equal to that of the first abutment ring and arranged closely adjacent thereto, movement of the first abutment ring moving the second ring to actuate the throw-out means.

3. A safety device for use with apparatus having a moving part and including a throw-out for said part, said device comprising a support, a member pivotally and slidably carried on said support and including a portion arranged in the vicinity of the moving part, and movable means between the member and the throw-out, said means including a portion arranged adjacent the member and adapted to be moved by said member upon either sliding or pivoting movement thereof.

4. A safety device for use with a drill press

having a rotating part and a control device, comprising a housing arranged adjacent the rotating part and having a cylindrical recess, a member carried in said recess in the housing for sliding movement with respect thereto, means holding the housing and member against relative rotation, a second member pivoted on the first member on an axis extended as a continuation of a radius of the cylindrical recess, a third member carried by the second member on an axis extended as a continuation of a different radius of the recess, said third member including an annular portion having the recess axis as its center, a fourth member including an annular portion lying adjacent and engageable by the annular portion of the third member upon movement thereof, connecting means between the fourth member and the aforesaid control device, and a safety ring rigidly carried by the third member and encircling the rotating part of the drill press and adapted to be engaged by the operator of the drill press for actuating the aforesaid control device.

5. A safety device for use with a drill press having a rotating part and including throw-out means for said part, comprising a support arranged adjacent the rotating part, a member pivotally and slidably carried on said support and including a safety ring encircling the rotating part, and movable means between the member and the throw-out means, said means including a portion arranged adjacent the member and adapted to be moved by said member upon either sliding or pivoting thereof caused by engagement with the safety ring of the operator of the drill press.

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