

March 21, 1933.

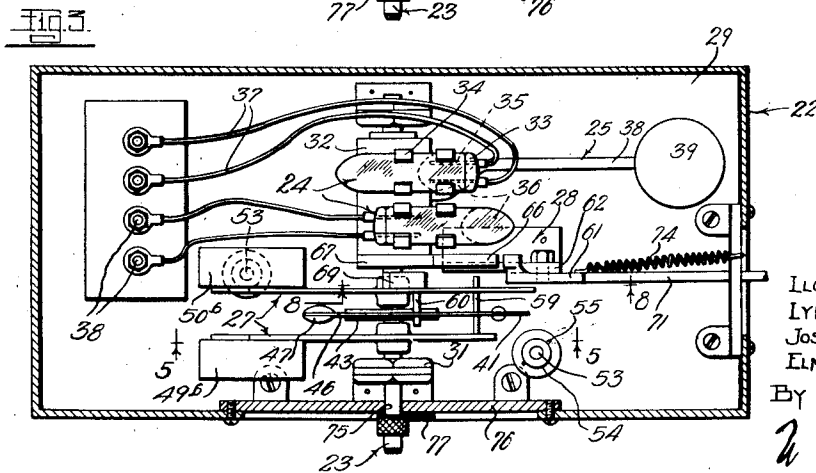
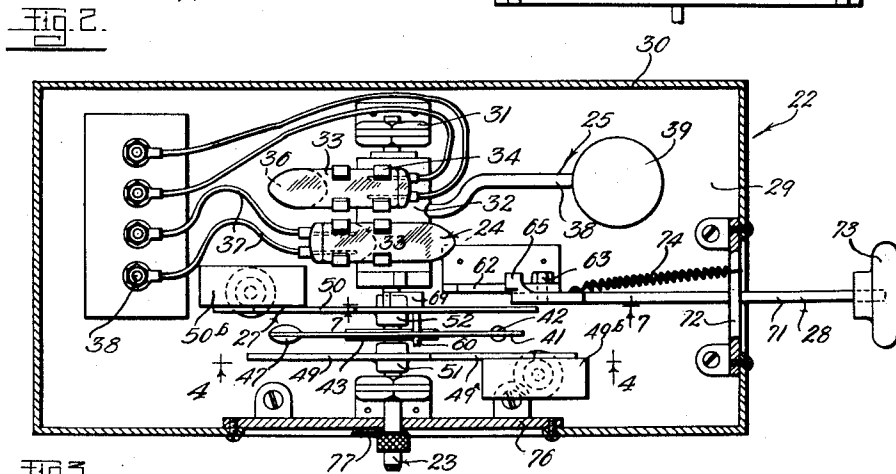
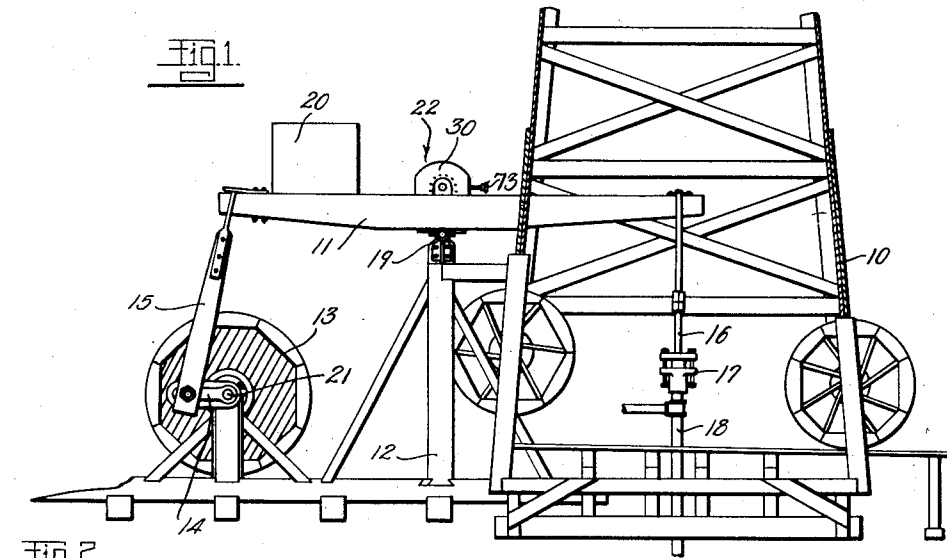
L. M. MILLER ET AL

1,902,371

CONTROL FOR PUMP ACTUATING MECHANISMS AND THE LIKE

Filed April 25, 1931

2 Sheets-Sheet 1



INVENTORS
 LLOYD M. MILLER
 LYNN M. GREEN
 JOSEPH G. MILLER
 ELMER E. CALKINS

By
W. H. Maxwell
 THEIR ATTORNEY

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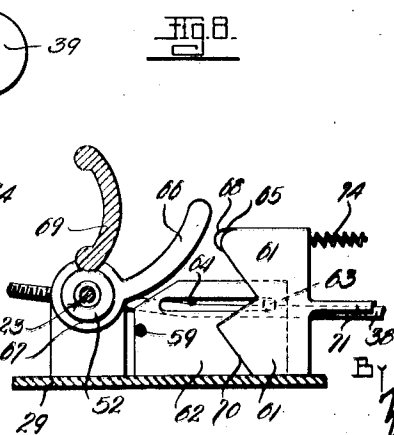
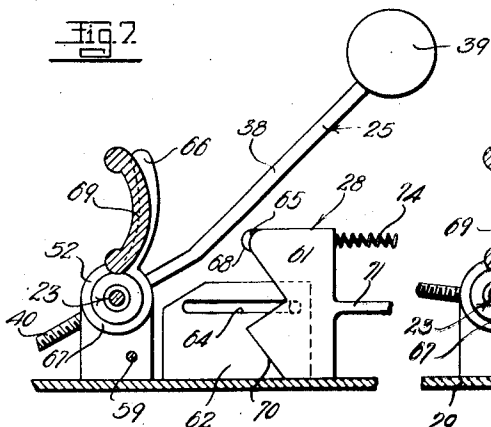
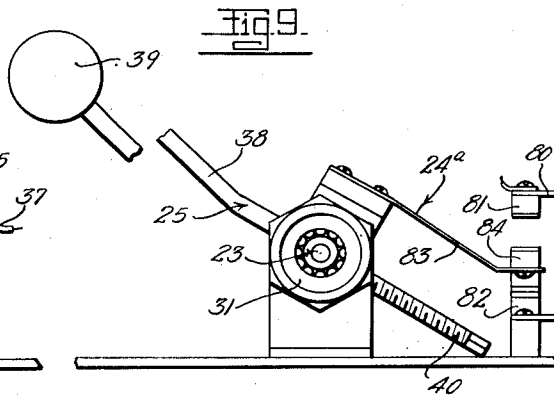
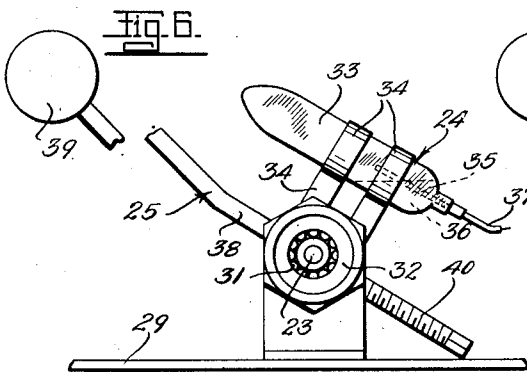
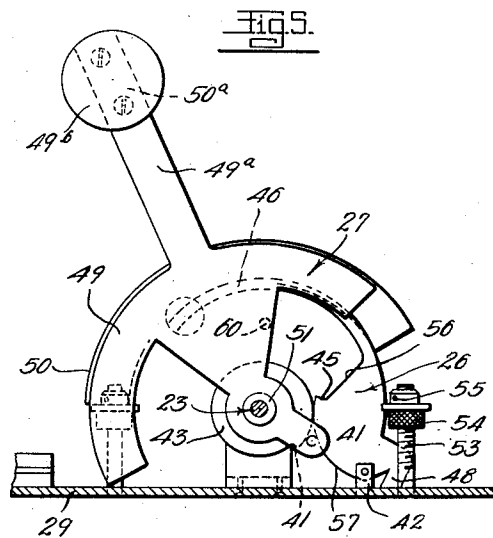
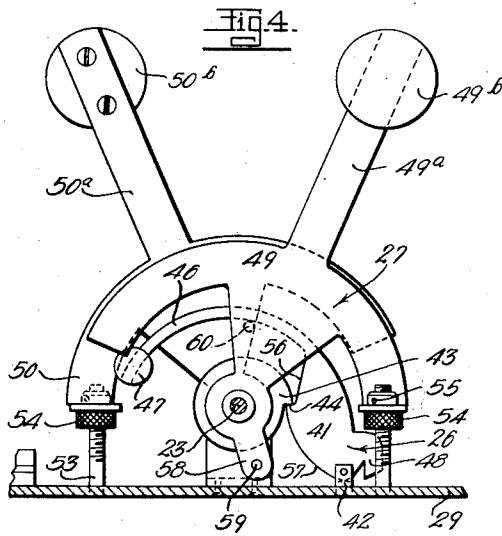
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CONTROL FOR PUMP ACTUATING MECHANISMS AND THE LIKE

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2 Sheets-Sheet 2



INVENTORS
LLOYD M. MILLER
LYNN M. GREEN
JOSEPH G. MILLER
ELMER E. CALKINS

By *Wm. H. Hapwell*
THEIR ATTORNEY.

UNITED STATES PATENT OFFICE

LLOYD M. MILLER, OF LOS ANGELES, LYNN M. GREENE, OF WHITTIER, JOSEPH G. MILLER, OF LOS ANGELES, AND ELMER E. CALKINS, OF WHITTIER, CALIFORNIA

CONTROL FOR PUMP ACTUATING MECHANISMS AND THE LIKE

Application filed April 25, 1931. Serial No. 532,771.

This invention relates to an automatic control, and relates more particularly to a control for automatically stopping the operation of a pump actuating mechanism, or the like, in the event that the speed of the mechanism becomes accelerated or irregular, due to the failure of or displacement of parts of the mechanism or the pump. It is a general object of the present invention to provide a safety control for use in connection with a pump actuating mechanism involving a walking beam that is operable to make and/or break an electrical contact or contacts to stop the power means actuating the mechanism in the event that the speed of the walking beam suddenly increases because of failure of the pump rod, displacement of a counter-weight, breakage of a belt, breakage of the pitman, or for other like reasons.

The control device provided by this invention is adapted for use in connection with various types of mechanisms involving a walking beam or a part operating in a manner similar to a walking beam. Throughout the following detailed description, the invention will be described in forms for use in connection with a typical well pump actuating mechanism including a walking beam. It is to be understood that the invention is not to be taken as restricted to the particular embodiments about to be described, nor to the references to their application, as the invention is capable of embodiment in forms for use on mechanisms of various characters.

An object of the invention is to provide a safety control or device that is adapted to be connected with a walking beam of a pump actuating mechanism, and that is operable to automatically make or break one or more electrical contacts to provide for the stopping of the power means of the mechanism and to give an alarm or signal when the movement of the walking beam becomes irregular or accelerated, due to failure of a part or parts of the mechanism or pump or to similar causes.

It is another object of the invention to provide an automatic control or device of the character mentioned that is positive and dependable in operation.

It is another object of the invention to provide a device of the character mentioned that may be mounted directly on the walking beam to be tripped or actuated by the irregular or excessive movement of the beam.

It is another object of the invention to provide a device of the character mentioned that may be embodied in forms for controlling one or more electrical circuits, for example, for controlling a circuit to an electro-magnetic switch for cutting out an electric motor driving the pump mechanism, or a circuit to an electrically controlled valve for stopping a steam engine driving the pump mechanism, or a circuit in relay with the ignition system of a gas engine driving the pump mechanism, and/or a circuit to a signal device, such as a light, bell, horn, or the like.

It is another object of the device to provide a device of the character mentioned that is operable to complete or break the electrical circuits without the formation or passage of sparks or open arcs that might be dangerous in situations where there are inflammable vapors or substances present.

It is another object of the invention to provide a control device of the character mentioned that is entirely automatic in its operation and that may be easily and quickly reset for operation after being tripped or actuated.

It is a further object of the invention to provide a device of the character mentioned that is in the form of a single compact device and that is simple and inexpensive of manufacture.

Other objects and features of the invention will be best and more fully understood from the following detailed description of typical preferred forms and applications of the invention, throughout which description reference will be had to the accompanying drawings, in which:

Fig. 1 is a side elevation of a portion of a typical well pump actuating mechanism, illustrating the device provided by the present invention arranged on the walking beam of the mechanism.

Fig. 2 is an enlarged horizontal detailed sectional view of the device, being a view

showing the principal parts in plan elevation and illustrating them in the normal or unactuated position.

Fig. 3 is a view similar to Fig. 2, showing the parts in the tripped or actuated positions.

Fig. 4 is a vertical detailed sectional view taken substantially as indicated by line 4—4 on Fig. 2, illustrating the releasable latch means and the releasing means in the normal positions.

Fig. 5 is a view similar to Fig. 4, illustrating the parts in the actuated position, being a view taken substantially as indicated by line 5—5 on Fig. 3.

Fig. 6 is an enlarged side elevation of the contact mechanism embodied in one form of the invention.

Fig. 7 is a vertical detailed sectional view taken substantially as indicated by line 7—7 on Fig. 2, showing the parts in the normal position.

Fig. 8 is a view similar to Fig. 7, showing the parts in the actuated positions, being a view taken substantially as indicated by line 8—8 on Fig. 3.

Fig. 9 is an enlarged side elevation of another type of contact mechanism that may be embodied in the invention.

The portion of the typical well pump actuating mechanism illustrated in Fig. 1 of the drawings includes the well derrick 10, a walking beam 11 pivotally mounted on the upper end of a Sampson post 12, a band wheel 13, a crank 14 on the band wheel shaft, a pitman 15 operatively connecting the crank 14 and an end of the walking beam 11, a polish rod 16 connected with the inner end of the walking beam 11 and extending through a packing device or stuffing box 17 at the upper end of the oil tubing 18, and various other parts common to equipment of this general character. The walking beam 11 is supported on the Sampson post 12 through a suitable fulcrum 19, and a counter-weight 20 is carried by the outer end part of the walking beam. It may be considered that the band wheel shaft 21 is operated by any typical or common power means, for example, it may be considered as being operated by an electric motor, a steam engine, a gas engine, or other power means. The power may be transmitted to the shaft 21 in any manner, for example, through a "pump power", or the like.

The device provided by our present invention includes, generally, a suitable casing 22 adapted to be mounted on the walking beam 11, a shaft 23, a contact means or mechanism 24 operable by the shaft, weight means 25 normally tending to turn the shaft 23, latch means 26 for releasably holding the shaft against operation, means 27 for releasing the latch means 26 upon an increase in speed of the walking beam 11 or upon the walking beam 11 assuming an excessively tilted position,

and means 28 for manually re-setting the device after actuation.

The casing 22 is provided to enclose the various other parts of the device, and may be of any suitable construction. The casing 22 may be mounted on the upper side of the beam 11 or at either vertical side of the beam. It is preferred to mount the casing 22 on the walking beam 11 at a point adjacent the fulcrum 19. In the particular arrangement illustrated in the drawings, the casing 22 is mounted on the top or upper side of the beam 11 directly over the fulcrum 19. The casing 22 includes a base 29 and a cover 30. The base 29 operates to support the various parts of the device and may be rectangular, as illustrated throughout the drawings. The cover 30 extends over the base 29 to completely enclose the working parts of the device, and is such that it may be removed from the base 29.

The shaft 23 is arranged transversely in the casing 22 to have its longitudinal axis parallel to the axis of pivotal movement of the walking beam 11. Suitable anti-friction bearings 31 are provided on the base 29 to rotatably support the opposite end parts of the shaft 23. The shaft 23 is spaced a suitable distance above the base 29.

The contact means 24 is operable by turning or partial rotation of the shaft 23, and is provided to control an electrical circuit for controlling the power means operating the pump actuating mechanism and a circuit for operating a signal or signals to indicate to the operator that the mechanism has stopped operation. The contact means 24 may be varied considerably in construction without departing from the spirit of the invention. Further, the contact means 24 may be such that it is operable to complete and/or break any desired number of electrical circuits for controlling or actuating controls, valves, switches, etc., of a power means and various types of signal devices.

In Figs. 2, 3, and 6 of the drawings, we have illustrated a contact means 24 for controlling two circuits and that may be operated without the production of sparks or outside arcs. In Fig. 9 of the drawings, we have illustrated a modification of the invention which includes a contact mechanism 24^a in the form of a simple mechanical make and break switch.

The contact means 24 illustrated in Figs. 2, 3, and 6 of the drawings includes a collar 32 fixed on the shaft 23. The collar 32 is preferably arranged adjacent one of the bearing brackets 31. Two mercooid tubes 33 are carried by the collar 32. Clips 34 project from the collar 32 to detachably carry the tubes 33. The clips 34 support the tubes 33 in inclined positions. Each of the tubes 33 has spaced terminals 35 extending into one

end to project into its interior. Mercury 36 is provided in the tubes to submerge or partially submerge the terminals 35 when the tubes are in, what we will term, the closed position to complete the circuit through the leads extending from the terminals. In the drawings we have illustrated one mercurial tube 33 in the closed position where the mercury 36 completes the circuit between the terminals 35 and the other tube in the open position where the mercury is not in contact with the terminals and the circuit is broken. The leads or conductors 37 connecting with the terminals 35 extend from the tubes to suitable binding posts 38. It will be apparent that suitable leads or conductors may be connected with the posts 38 and extend to the control means of the power device and to the alarm or signal device.

The means 25 for normally tending to turn or operate the shaft 23 is in the nature of a gravity or weight means. The means 25 includes an arm 38 attached to or connected with the shaft 23 and a weight 39 on the outer end of the arm. In the preferred construction illustrated in the drawings, the arm 38 projects outwardly from the collar 32 which is fixed on the shaft 23. The arm 38 normally projects outwardly from the collar at a suitable angle. Upon release of the latch means 26, the weight 39 falls down to the base 29 and causes operation or turning of the shaft 23 to actuate the contact means 24. A stop pin or stop screw 40 projects from the collar 32 to engage the base 29 and limit upward movement of the weight arm 38 when the device is re-set, as will be hereinafter described.

The weight means 25 normally tends to turn the shaft 23, and the latch means 26 is provided to releasably hold the shaft against movement in a position where the contact means 33 is in the normal condition. The latch means 26 is adapted to be released by the means 27 and includes a latch or trigger 41 pivotally mounted on the base 29. The lower end of the latch or trigger 41 is pivotally supported by a bracket 42 at a point offset from the shaft 23. A cam or catch 43 is provided on the shaft 23 to cooperate with the trigger 41. The catch 43 is provided with a radial shoulder 44 which normally faces downward to cooperate with the normally upward facing shoulder 45 on the trigger 41. The shoulders 44 and 45 are related so that they are adapted to cooperate to hold the shaft 23 against turning by the weight means 25.

The latch trigger 41 is counter-balanced so as to normally remain in a position where its shoulder cooperates with the shoulder 44 and so as to automatically return to the holding position upon re-setting of the mechanism, as will be hereinafter described. A curved arm 46 projects from the upper end of the

trigger 41 to pass over and project beyond the shaft 23. A weight 47 is provided on the outer end of the arm 46. A stop lug or stop projection 48 is provided at the lower end of the trigger 41 to engage the base 29 to limit upward movement of the trigger upon actuation of the device. It will be apparent how the pivoted trigger 41 normally cooperates with the shouldered catch 43 to releasably hold the shaft 23 against operation.

The means 27 for releasing the latch means 26 is controlled or governed by gravity and by centrifugal force or momentum developed by motion of the walking beam 11. The means 27 includes two like sectors 49 and 50 loosely or freely mounted on the shaft 23. The sectors 49 and 50 project out from or are carried by hubs 51 and 52 freely mounted on the shaft 23. The hubs 51 and 52 are arranged on the shaft at opposite sides of the shouldered catch 43. An arm 49^a projects radially outward from the sector 49 and carries at its outer end a weight 49^b. An arm 50^a projects radially outward from the sector 50 and carries a weight 50^b. The sectors 49 and 50 are normally arranged or positioned so that their centers of gravity or their centers of greatest mass are at opposite sides of the longitudinal axis of the shaft 23.

The invention provides means for adjustably supporting the sectors 49 and 50 in their normal or unactuated positions. Posts or threaded studs 53 project upwardly from the base 29 and carry nuts 54. The nuts 54 are adapted to be releasably set in the desired positions by set screws 55. The opposite ends of the respective sectors 49 and 50 are adapted to be normally supported on the nuts 54 at opposite sides of the shaft 23. By adjusting the nuts 54 vertically on the posts 53, the centers of greatest mass of the sectors 49 and 50 may be positioned as desired relative to the pivotal centers of the sectors so that the sectors will be acted upon by centrifugal force in the desired manner.

Cam means is provided to operate or trip the trigger 41 upon movement of either one of the sectors 49 and 50 to a position where its center of gravity passes over the axis of the shaft 23. A cam face 56 is provided on the inner edge of the trigger 41. The cam face 56 extends downwardly and inwardly along the inner edge of the trigger to join the base of the shoulder 45. A lower cam face 57 is provided on the inner edge of the trigger 41. The lower cam face 57 is curved and extends downwardly and outwardly from the outer edge of the shoulder 45. A lug 58 projects radially downward from the hub 51 of the sector 49. A pin 59 projects axially from the lug 58 and is adapted to engage or cooperate with the cam face 57 to disengage the trigger 41 from the catch 43 upon the sector 49 moving to a position where its center of gravity passes

over its axis of pivotal movement. A pin 60 projects axially from the sector 50 and is adapted to move downwardly into engagement with the cam face 56 to release the trigger 41 upon the sector 50 being operated to a position where its center of gravity passes over the axis of pivotal movement of the sector. From the above it will be apparent how the means 27 is operable to release the trigger 41 from the catch 43 in the event that either end of the walking beam 11 moves upwardly at an accelerated speed to cause one of the sectors 49 or 50 to be acted upon by centrifugal force and moved to a position where its center of greatest mass passes over the shaft 23 in the direction of the downwardly-moving end of the beam.

The re-setting means 28 is adapted to be manually operated to re-set the device in the normal condition after being actuated or tripped. The means 28 is operable to simultaneously re-set the contact means 24, the weight means 25, the tripping means 27, and the latch means 26. In the preferred form of the invention illustrated in the drawings, the re-setting means 28 includes a slidable cam plate 61. The cam plate 61 is vertically disposed and its lower end is slidable on the base 29. The slidable cam plate 61 is guided by a bracket or guide 62. A pin or screw 63 projects laterally from the plate 61 and is slidable in an elongated horizontal opening or slot 64 in the guide 62. A plurality of cam parts are provided on the inner edge of the cam plate 61. The cam plate 61 is manually operable toward the shaft 23 and the cam parts on its inner edge are adapted to engage parts or elements on the various means arranged on the shaft.

An upper cam part 65 projects laterally from the plate 61 at its upper inner corner. The cam part 65 has a rounded inner face. A cam arm 66 projects outwardly from the shaft 23. The arm 66 may be provided on a collar 67 fixed on the shaft at the inner end of the collar 32. Upon actuation or release of the weight means 25, the shaft 23 is turned to a position where the cam arm 66 projects outwardly from the shaft toward the cam plate 61 in the manner illustrated in Fig. 8 of the drawings. The upper cam part 65 is adapted to engage or cooperate with the arm 66 to cause turning of the shaft 23 to its normal position when the cam plate is shifted inwardly toward the shaft. A second cam face 68 is provided on the plate 61. A cam arm 69, similar, generally, to the arm 66, is provided on a side of the sector 50. The sector 50 after actuation assumes a position where its cam arm 69 is engageable by the cam part 68. The cam part 68 is adapted to cooperate with the arm 69 to return the sector 50 to its normal position upon movement of the cam plate 61 toward the shaft 23. A lower cam part 70 is provided on the inner edge of the

cam plate 61. The lower or active edge of the part 70 is inclined downwardly and outwardly. When the sector 49 has been actuated or shifted by the action of the walking beam 11, it assumes a position where the pin 59 is engageable by the lower cam part 70. The cam plate 61 is adapted to be shifted inwardly so that its cam part 70 cooperates with the pin 59 to return the sector 49 to its normal position. It is to be noted that actuation of the cam plate 61 causes the re-setting or returning of the shaft 23 and its associated contact means and weight means and either one or both of the sectors 49 and 50 to their normal positions. Upon return of the shaft 23 to its normal position where the weight 39 is elevated, the counter-weight 47 on the trigger 41 automatically returns the trigger to a position where its shoulder 45 cooperates with the shoulder 44 to releasably hold the shaft 23 in the re-set position.

A sliding rod 71 projects outwardly from the cam plate 61. The rod 71 is slidably supported by a bracket 72 and projects outwardly from the casing 30. A suitable handle or knob 73 is mounted on the outer end of the rod 71. Spring means is provided to automatically return the cam plate 61 to its normal inactive position after manual actuation. A helical spring 74 is arranged under tension between the plate 61 and the bracket 72 to automatically return the cam plate to the out position after operation.

The invention provides means for indicating the condition of the control device for indicating whether the parts are in their normal operative positions or whether they have been tripped to actuate the contact means 24. The shaft 23 extends outwardly through an opening 75 in a plate 76 to project from the casing 30. An indicating finger or hand 77 is mounted on the projecting end of the shaft 23. Suitable markings may be provided on the outer side of the plate 76 to be read in connection with the arm 77 to determine the condition of the device.

Fig. 9 of the drawings illustrates a modified form of contact mechanism 24^a. The contact mechanism 24^a is in the nature of a mechanical make and break contact device and is operable to break one circuit and complete another upon actuation or turning of the shaft 23. The mechanical contact means 24^a includes a contact bracket 80 mounted on the base 29. The bracket 80 has vertically spaced arms which carry contacts 81 and 82. A contact arm 83 projects outwardly from the collar 32. A double-faced contact block 84 is mounted on the outer end of the arm 83 to cooperate with the contacts of the bracket 80. The arm 83 projects from the collar 32 so that the contact 84 engages the lower contact 82 when the device is in the normal or unactuated position. Upon actuation of the device and turning of the shaft 23, the

contact 84 is brought into cooperation with the upper contact 81 and is disengaged from the contact 82. It will be apparent how the electrical leads or contacts may be connected with the contacts 81, 82 and 84 to provide for the desired operative relation between the control device and the power means and signal.

During operation, the parts of the control device are arranged in their normal unactuated positions illustrated in Figs. 2 and 4 of the drawings. The weighted segments 49 and 50 are normally supported by the adjustable nuts 54 in positions where the momentum or impetus given them by the normal motion of the walking beam 11 does not carry them over their pivotal centers. The nuts 54 may be adjusted vertically on the posts 53 so as to support the weighted segments 49 and 50 in positions where any appreciable acceleration of motion of the walking beam 11 will cause a weighted segment to throw over center and trip the mechanism. It may be assumed that the control device is mounted on the walking beam 11 so that the segment 49 is disposed where its weight-carrying arm 49^a projects upwardly and toward the inner pump rod carrying end of the beam 11 and so that the weight-carrying arm 50^a of the segment 50 projects upwardly and toward the outer or pitman end of the walking beam. In the event that the pump rod 16 or the pump rod fails or becomes disconnected from the walking beam 11, the load is removed from the inner pump rod end of the walking beam and the upward movement of the inner end of the beam is accelerated. When the upward motion of the inner end of the beam 11 is appreciably accelerated, due to failure of the pump rod, or the like, the weighted sector 49 gains sufficient impetus or momentum to carry it over center, that is, to move it so that its weight 49^b passes over its pivotal axis. When the sector 49 throws over center in the manner just described, the pin 59 comes into engagement with the cam edge 57 of the trigger to release the trigger from the catch 43. Upon the shoulders 44 and 45 becoming disengaged, the weight 39 falls to the base 29 and turns the shaft 23 to actuate the contact means 24.

Assuming that the pitman 15 fails or becomes disconnected from the beam 11 or that the counter-weight 20 becomes displaced from the beam or that a belt, or the like, of the mechanism connecting the power means with the shaft 21 fails or slips, the outer pitman end of the walking beam 11 will be drawn upward with considerable speed due to the weight of the string of pump rod, etc., carried on its inner end. When the outer end of the walking beam 11 moves upward with accelerated speed, the sector 50 gains sufficient momentum from the accelerated motion of the walking beam to throw over center. Upon

the arm 50^a passing over the pivotal axis of the sector 50, the weight 39 carries the sector to a position where its pin 60 cooperates with the upper cam face 56 of the trigger to release the trigger from the catch 43.

Upon the release of the latch or trigger 41 from the catch 43, the weight 39 moves or turns the shaft 23 to actuate the contact mechanism. The contact means 24 may be such as to control a control circuit to the power means driving the pump actuating mechanism so that its actuation causes the power means to stop upon actuation of the contact means. Further, the contact means 24 may be operable to complete a circuit to a suitable alarm or signal device such as a light, bell, horn, etc. In the embodiment of the invention illustrated in Figs. 2, 3, and 6 of the drawings, the two mercoïd tubes are oppositely disposed so that the mercury 36 of one tube is normally at the terminals 35, while the mercury in the other tube is removed from the terminals 35. When the mercoïd tubes are arranged in this manner, the means 24 is operable to make or complete one electrical circuit, for example, a circuit to the signal device and to break the other circuit, for example, the circuit in relay with the ignition system of a gas engine operating pumping mechanism. It will be obvious that the contact mechanism 24, as well as the contact mechanism 24^a, may be varied to adapt the control device for use in various situations and for controlling various electrically controlled or actuated power control devices and signals.

When it is desired to re-set the control device after it has been actuated, the rod 71 may be manually pushed inwardly so that the cam plate 61 cooperates with the cam arm 69 or the pin 59 to re-set the shaft 23 and its associated parts in their normal positions and to re-set the sector that has been thrown over center. The spring 74 operates to automatically return the cam plate 61 after its manual actuation and to yieldingly hold it in the out position where it does not interfere with the tripping or actuation of the device. The indicating hand 77 is adapted to indicate the condition of the device. When the cam part 65 cooperates with the arm 66 to return the shaft and weight means 25 to their normal positions, the counter-weight 47 of the trigger 41 holds the trigger in a position where its shoulder 45 comes into cooperation with the shoulder 44 to releasably hold the shaft 23 in the normal position. The adjustable supporting nuts 54 may be set or adjusted to support the weighted sectors 49 and 50 in positions where they will throw over center upon a given acceleration of movement of the walking beam. In this manner the device is capable of use in various situations and on walking beams having different strokes and speeds of motion.

The contact means 24, embodying the mer-
coid tubes 33, operates without the produc-
tion of sparks or open arcs, which might be
dangerous in situations where there are in-
flammable vapors or substances present.

Having described only typical preferred
forms of our invention, we do not wish to
limit ourselves to the specific details set forth,
but wish to reserve to ourselves any changes
or variations that may appear to those skilled
in the art or fall within the scope of the fol-
lowing claims:

Having described our invention, we claim:

1. A device of the character described
adapted to be mounted on a walking beam
which includes, a contact mechanism, a shaft
for operating the contact mechanism, means
normally tending to operate the shaft, means
for releasably holding the shaft against op-
eration, and means for releasing said releas-
able means upon acceleration of the motion
of the beam.

2. In combination, a walking beam, and a
control device carried by the walking beam
including, a contact mechanism, and means
for actuating the contact mechanism upon the
speed of the motion of the walking beam be-
ing accelerated.

3. In combination, a walking beam, and a
control device carried by the walking beam
including, a contact mechanism, and means
for actuating the contact mechanism upon the
speed of the motion of the walking beam be-
ing accelerated, said means including, means
normally tending to actuate the contact
means, releasable means normally holding
the last-mentioned means against actuation,
and means operable by momentum gained by
acceleration of the walking beam for releas-
ing the said releasable means.

4. In combination, a walking beam, and a
device carried by the walking beam includ-
ing, a contact mechanism, and means for ac-
tuating the contact mechanism upon the speed
of the motion of the walking beam being ac-
celerated, said means including, means nor-
mally tending to actuate the contact means,
releasable means normally holding the last-
mentioned means against actuation, and
means operable by momentum gained by ac-
celeration of the upward movement of either
end of the walking beam.

5. A device of the character described for
use on walking beam which includes a contact
means, means normally tending to operate
the contact means, releasable means holding
the second-mentioned means against opera-
tion, and means governed by momentum
gained from movement of the beam for re-
leasing said releasable means.

6. In combination, a walking beam, and a
control device on the walking beam which in-
cludes a contact means, means normally tend-
ing to operate the contact means, releasable
means holding the second-mentioned means

against operation, means operable by momen-
tum gained from excessive acceleration of
motion of the walking beam for releasing said
releasable means, and resetting means.

7. In combination, a walking beam, and a
control device on the walking beam which in-
cludes a contact means, means normally tend-
ing to operate the contact means, releasable
means holding the second-mentioned means
against operation, means operable by momen-
tum gained from excessive acceleration of
motion of the walking beam for releasing said
releasable means, and means for re-setting
the contact means, the second-mentioned
means, the releasable means, and the last-
mentioned means after actuation.

8. In combination, a walking beam, and a
control device on the walking beam which
includes a contact means, weight means nor-
mally tending to operate the contact means,
releasable means holding the second-ment-
ioned means against operation, means op-
erable by momentum gained from excessive
acceleration of motion of the walking beam
for releasing said releasable means, and
means for re-setting the contact means, the
second-mentioned means, the releasable
means, and the last mentioned means after
actuation.

9. A device of the character described for
use on walking beam which includes a con-
tact means, means normally tending to op-
erate the contact means, releasable latch
means holding the second-mentioned means
against operation, and means governed by
momentum gained from movement of the
beam for releasing said releasable means.

10. In combination, a walking beam, and a
control device on the walking beam which
includes a contact means, means normally
tending to operate the contact means, releas-
able means holding the second-mentioned
means against operation, and means governed
by momentum gained from movement of the
beam for releasing said releasable means, the
last-mentioned means including a pivotally
mounted element having its center of great-
est mass related to its pivotal axis so that it
pivots to release said means upon motion of
the beam being accelerated.

11. In combination, a walking beam, and a
control device on the walking beam which in-
cludes a contact means, means normally tend-
ing to operate the contact means, releasable
means holding the second-mentioned means
against operation, and means governed by
momentum gained from movement of the
beam for releasing said releasable means, the
last-mentioned means including two pivotally
mounted elements having their centers of
greatest mass related to their axes of move-
ment so that one is operable to pivot to re-
lease said means upon the upward movement
of one end of the beam being accelerated, and
the other is operable to pivot and release said

means upon the upward movement of the other end of the beam being accelerated.

12. In combination, a pumping mechanism having a walking beam, and a control for the pumping mechanism including contact means for controlling a control circuit, means normally tending to operate the contact means, releasable means holding the said means against operation and including a latch trigger, and means for releasing the releasable means including a pivotally mounted element operable by accelerated motion of the beam to release the trigger.

13. In combination, a pumping mechanism having a walking beam, and a control for the pumping mechanism including contact means for controlling a control circuit, means normally tending to operate the contact means, releasable means holding the said means against operation and including a latch trigger, and means for releasing the releasable means including two pivotally mounted elements, one being operable by accelerated upward movement of one end of the beam to release the trigger, the other being operable by accelerated upward movement of the other end of the beam to release the trigger.

14. A control for a pumping mechanism having a walking beam which includes contact means for controlling a control circuit, a shaft for operating the contact means, means for operating the shaft, releasable means holding said means against operation, and means operable by accelerated motion of the walking beam for releasing the releasable means.

15. A control for a pumping mechanism having a walking beam which includes contact means for controlling a control circuit, a shaft for operating the contact means, means for operating the shaft, releasable means holding said means against operation, means operable by accelerated motion of the walking beam for releasing the releasable means, and manually operable cam means for re-setting the shaft, the releasable means, and the last-mentioned means after acceleration.

16. A device for use on a walking beam including, a shaft, a mercoide tube carried by the shaft and operable by the shaft between the open circuit and closed circuit positions, means for operating the shaft, releasable means holding the said means against operation, and means operable by accelerated motion of the walking beam to release the releasable means.

17. A device for use on a walking beam including, a shaft, a mercoide tube carried by the shaft and operable by the shaft between the open circuit and closed circuit positions, weight means for operating the shaft in one direction, a trigger releasably holding the shaft against operation by the weight means, means for automatically releasing the trigger upon the motion of the walking beam

being accelerated, and means for operating the shaft in the other direction and for re-setting the weight means and the releasing means after actuation.

18. A device for use on a walking beam including, a shaft, a mercoide tube carried by the shaft and operable by the shaft between the open circuit and closed circuit positions, weight means for operating the shaft in one direction, a trigger releasably holding the shaft against operation by the weight means, means for automatically releasing the trigger upon the motion of the walking beam being accelerated, manual means for operating the shaft in the other direction and for re-setting the weight means and the releasing means, and means for automatically re-setting the trigger.

19. A device of the character described for use on walking beam which includes a contact means, means normally tending to operate the contact means, releasable means holding the second-mentioned means against operation, means for indicating the condition of the device, and means governed by momentum gained from movement of the beam for releasing said releasable means.

20. A device of the character described for use on walking beam which includes a contact means operable to control a circuit for controlling action of a power means and a circuit for operating a signal, and means governed by the speed of the motion of the beam for actuating the contact means.

21. A control device for use on a walking beam including, a contact mechanism for a control circuit, releasable means normally holding the contact mechanism against operation, means responsive to the speed of movement of the walking beam for releasing the releasable means upon acceleration of the movement of the beam, and means for adjusting the last mentioned means.

22. A control device for use on a walking beam including, a contact mechanism for a control circuit, releasable means normally holding the contact mechanism against operation, a pivotally mounted element having its center of greatest mass related to its pivotal axis so that it pivots to release said means upon excessive acceleration of the walking beam, and means for adjusting the position of the element.

In witness that we claim the foregoing we have hereunto subscribed our names this 8th day of April, 1931.

LLOYD M. MILLER.
LYNN M. GREENE.
JOSEPH G. MILLER.
ELMER E. CALKINS.