Jan. 1, 1935. J. E. KILKENNY 1,985,930

AUTOMATIC STOPPING DEVICE

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Fig. 3

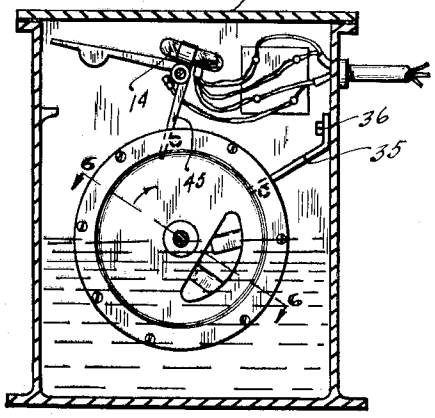
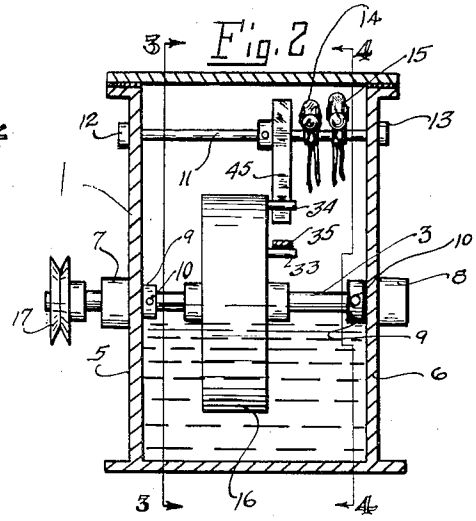


Fig. 2



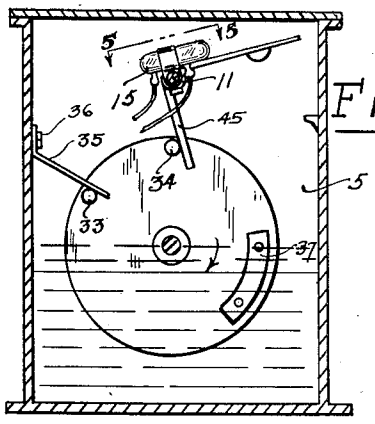


Fig. 4

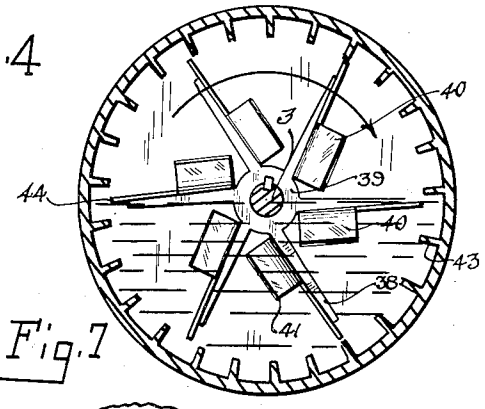


Fig. 7

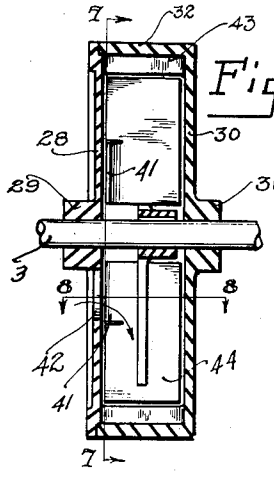


Fig. 6

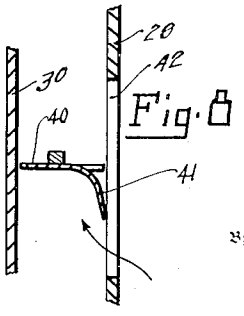


Fig. 8

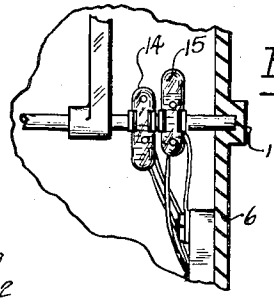


Fig. 5

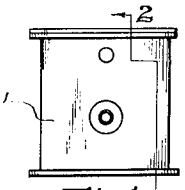


Fig. 12

Inventor
John E. Kilkenny
By
Attorney

Jan. 1, 1935. J. E. KILKENNY 1,985,930

AUTOMATIC STOPPING DEVICE

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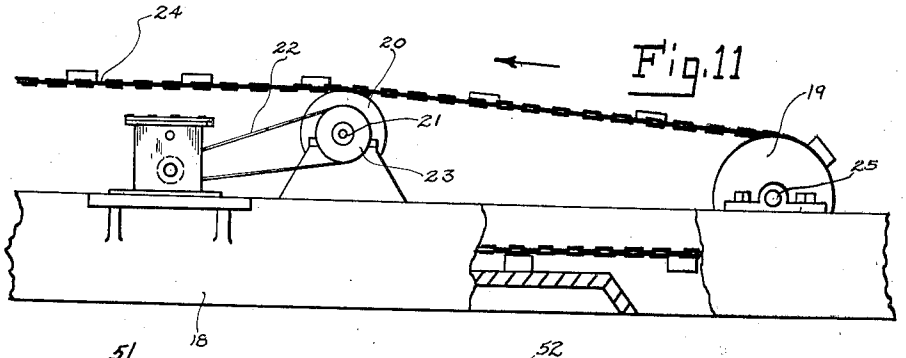


Fig. 11

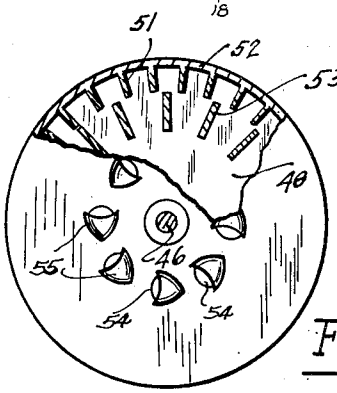


Fig. 9

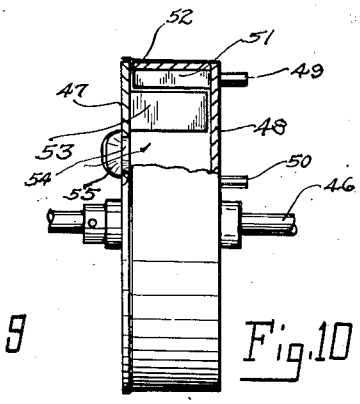


Fig. 10

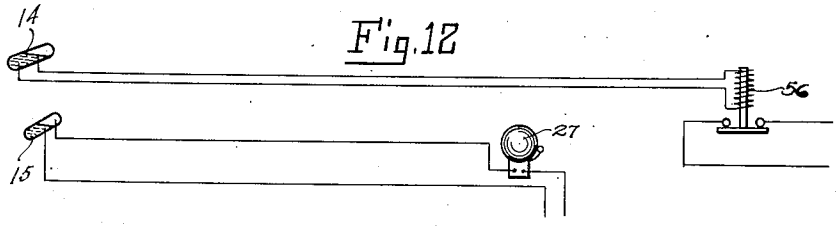


Fig. 12

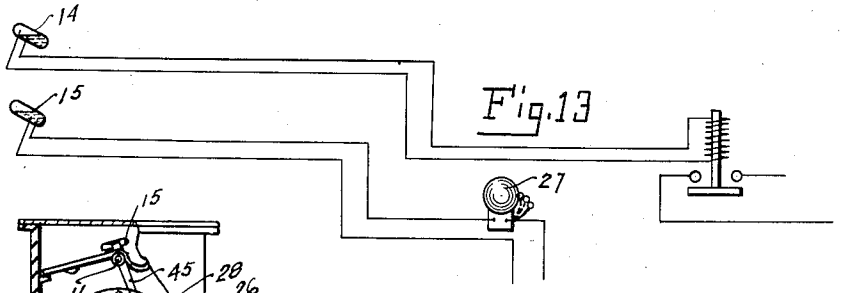


Fig. 13

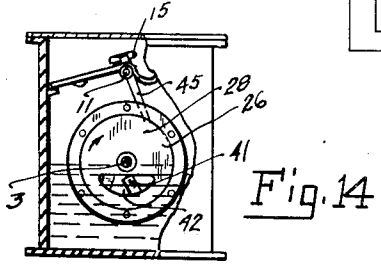


Fig. 14

Inventor
John E. Kilkenny
By Thomas Kilgore
Attorney

Patented Jan. 1, 1935 1,985,930

UNITED STATES PATENT OFFICE

1,985,930

AUTOMATIC STOPPING DEVICE

John E. Kilkenny, Portland, Oreg.

Application January 19, 1932, Serial No. 587,569

2 Claims. (Cl. 192—140)

My invention is primarily adapted for use in conjunction with heavy drives as used in mills of various types.

The device is primarily adapted for use in conjunction with conveyor chains, belt drives and in any and all places where it is desirable to instantly stop the drive, when a break occurs within the conveyor chain, or upon the belt, chain, or other drive.

The device is particularly adapted for use upon heavy drives where an idler sprocket, or pulley is being used in conjunction with the drive for maintaining the same in a taut and in a suitable driving condition. Much lost time is experienced in various manufacturing plants due to shutdowns that are made necessary, because of drive troubles and particularly upon conveyor drives as now in general use in practically all wood working plants.

Heretofore breaker parts have been used in many machines that are adapted for being shocked, or greatly over-loaded during the normal operation of the machine.

My device is particularly adapted for being substituted and for being used directly in conjunction with the drive and for stopping the prime mover when such over-loading occurs upon the drive.

My device is particularly well adapted for being used with heavy drives as conveyors and for stopping the prime mover when an abnormal overload is encountered. The device requires no resetting and operates in a bath of oil and is adapted for being used at relatively slow speeds and may be used under practically all operating conditions and in practically all locations.

I provide a pair of mercury switches that are entirely enclosed within the housing of my device, each of which has an independent electric circuit leading thereto and therefrom, one being utilized for the stopping of the driving motor and the other having an electric signaling device associated therewith to indicate automatically by an electric gong that the device has functioned and that a break in the drive has occurred.

A further object of my device consists in so constructing the same that it may be used in the open where it is exposed to the weather, or be used in any and all places where it is subjected to dust and dirt without in any way interfering with the operating efficiency of the device.

A still further object of my invention consists in so constructing the same that it may be operated at relatively low speeds, or at a relatively large variation in speed without in any way affecting the automatic operating efficiency of the device.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts, the essential elements of which are set forth in the appended claims, and a preferred form of embodiment of which is hereinafter shown with reference to the drawings which accompany and form a part of this specification.

In the drawings:

Fig. 1 is a front view of the assembled device.

Fig. 2 is a sectional, side view of the assembled device. The same being taken on line 2—2 of Fig. 1, looking in the direction indicated.

Fig. 3 is a sectional view, of the mechanism illustrated in Fig. 2. The same being taken on line 3—3 of Fig. 2, looking in the direction indicated.

Fig. 4 is a sectional view, of the mechanism illustrated in Fig. 2. The same being taken on line 4—4 of Fig. 2, looking in the direction indicated.

Fig. 5 is a fragmentary, top plan view, of the mercury switches, and of the supporting assembly. The same being taken on line 5—5 of Fig. 4, looking in the direction indicated.

Fig. 6 is a sectional, side view, of the control pump mechanism. The same being taken on line 6—6 of Fig. 3, looking in the direction indicated.

Fig. 7 is a sectional, plan view, of the mechanism illustrated in Fig. 6. The same being taken on line 7—7 of Fig. 6, looking in the direction indicated.

Fig. 8 is a fragmentary, sectional, plan view, of the mechanism illustrated in Fig. 6. The same being taken on line 8—8 of Fig. 6, looking in the direction indicated.

Fig. 9 is a plan view, partially in section, of a modified form of assembly illustrating the casing partially broken away to show the internal construction of the same.

Fig. 10 is a side view, of the casing housing, partially in section, made to illustrate the internal relationship of the respective blades disposed and secured to the side housing and the peripheral housing member.

Fig. 11 illustrates one of my new and improved controlling devices disposed upon the driving end of a conveyor chain and illustrating the same as being indirectly actuated from the idler shaft of the conveyor chain assembly.

Fig. 12 is a diagrammatical layout of the switches and the control motor and the electric gong and the circuits disposed therebetween and illustrating the same as in driving position.

Fig. 13 is a diagrammatical layout of the circuits leading to the control motor and to the electric gong. These circuits illustrate the mercury switches as being actuated into the opposite direction to that shown in Fig. 12 to close the circuits and to actuate the electric gong and close the motor.

Fig. 14 is a fragmentary, front view of the control unit illustrating the mercury switches associated therewith as being in position for maintaining the electric motor circuit closed and the gong circuit open.

Like reference characters refer to like parts throughout the several views.

I preferably form my device of a liquid proof housing 1. I place a removable lid, or closure 2 upon the housing. A shaft 3 is disposed horizontally within the housing and is journaled upon its oppositely disposed ends in the side walls 5 and 6 of the housing by suitable hubs, or journal bearings 7 and 8. Set collars 9 are disposed upon the shaft and are secured thereto by a fastening bolt 10 to adapt the shaft to precise positioning within the housing.

A second shaft 11 is rockably disposed within the housing. The ends of the same being journaled within suitable hub bearings 12 and 13 that are formed integral with the side walls 5 and 6 of the housing. Suitable mercury switches, here shown as two in number at 14 and 15 are fixedly positioned upon the shaft 11. A governor housing 16 is mounted upon the shaft 3 and a shrouded pulley 17 is mounted upon the outer end of the shaft 3.

Much time is lost, especially around wood working plants and other mill structures due to conveyor chains, hog fuel chains, saw mill refuse chains and other conveyor chains breaking especially at remote locations within the mill.

I have here shown my device in Fig. 11 as being mounted upon the side frame 18 of a conveyor assembly. The driving sprocket 19 of the conveyor is mounted upon the side wall housing, and the same passes over an idler sprocket 20 and as a chain passes thereover it drives the spocket and also the shaft 21 to which the sprocket 20 is secured. A drive element 22 is trained about the respective pulleys 17 and 23 and so long as the conveyor chain 24 is being manipulated by the drive shaft 25 and the associated sprocket 19, the idler shaft 21 will be driven and the governor shaft 3 of my control will also be driven.

The mercury switches 14 and 15 mounted upon shaft 11 have circuits leading thereto and therefrom that connect with a control governor 26 and an electric gong 27 and the mercury switches are adapted for making and breaking the electric circuits that lead to the control governor 26 and the electric gong 27. The control governor 26 is comprised of a floating split governor housing that is comprised of a side wall 28 having a hub 29 to mount the same upon the governor shaft 3 and a side wall 30 having a hub 31 to adapt the same to the governor shaft 3 and a peripheral band 32 that separates the respective split housings and secures the split housing together. Stop pins 33 and 34 outwardly extend from the side wall of one side of the housing members and the housing floats upon the axle, or governor shaft 3 within a limited range of movement, depending on the spaced relationship of the stop pins 33 and 34, and a stop arm 35 that is disposed in registry alignment with the respective stop pins and is secured to the inner wall of the case by any suitable fastening means as through the use of a set screw 36. The housings 28 and 30 are counter-balanced by a counterweight 37 and the counterweight is so positioned upon the casing, or housing that it will have the greatest advantage to return the assembly to normal position by gravity, as illustrated at Fig. 4, if for any reason the governor shaft 3 should fail to rotate, or should the rate of rotation of the governor shaft 3, drop below the critical range for which the same is set.

I partially fill the housing 1 with an operating fluid, as an oil, that does not solidify excepting at extremely low temperatures and fill the same up to the governor shaft 3 so that the governor control housing will dip thereinto upon its lower side. Governing spider arms 38 are fixedly mounted upon the governor shaft 3 through the hub 39 and the blades 40 are mounted upon the spider arms 38. A part of each of the blades has a grooved segment 41, and the operating fluid is permitted to enter into the governor housing through suitable openings 42 disposed through the side wall of the governor housing. The rotation of the spider within the housing and within the operating fluid disposed therein sets up a certain frictional resistance between the spider and the inner walls of the governor housing. A plurality of spaced ribs 43 inwardly extend from the band 32 of the split housing and the outer ends 44 of the blades are made to work in a close working relationship with the ribs, the housing and the ends of the blade to further increase the frictional driving relationship between the spider and the housing. This rotates the housing until the stop pin 34 engages the arm 35 in which position the same will remain, and the mercury switches will be so positioned that electric current will flow through the control motor switch and not the electric gong 27.

In the event that the rate of rotation of the governor shaft 3 should fall below the critical speed, or in the event for any reason the governor shaft 3 should not be driven as by the break of the conveyor chain 24, the frictional drive relationship between the spiders and the housing will cease and the housing will be turned by the counterweight 37 so that the stop pin 34 will be made to engage the mercury switch arm 45 at which time the shaft 11 will be rocked to which the arm 45 is secured and the mercury switches will tilt sufficiently to open the electric current through control relay 56 to thereby stop the prime mover that drives the driving shaft of the conveyor 24 and closes the gong circuit.

In Figs. 9 and 10 I have shown a modified form of my device. In this form a governor shaft 46 is disposed transversely of the housing 1. The governor is comprised of casing members 47 and 48, the member 47 is fixedly secured to the governor shaft 46, and the casing 48 is floating and is free to rotate about the governor shaft 46. Stop pins 49 and 50 outwardly extend from the side wall housing member 48. A plurality of spaced ribs 51 are disposed about the inner peripheral surface of the band 52 that is formed integral with the housing 48 and spaced blades inwardly extend from the side wall of the housing, or casing member 47.

A plurality of spaced openings 54 extend through the side wall of the casing 47.

Cup-shaped ears 55 are disposed about the openings and as the casing is power rotated, the same are adapted for maintaining the operating fluid within the casing. The friction created by the operating fluid within the casing member 48,

the same being counterweighted as heretofore described to maintain the same in normal inoperative operating position. Mercury switches are disposed within the casing as heretofore described.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein shown and described, as it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow.

What I claim is:

1. In a device of the class described, in combination with a driven shaft, the combination of a liquid holding housing, a removable lid for said housing, a power driven governor shaft disposed transversely of the housing and journaled relative thereto, means for driving said shaft relative to the driven shaft, a mercury supporting switch shaft rockably disposed within the housing and superposed the power driven shaft, a control governor mounted upon the governor shaft, said control governor being formed of split housing members, rotatably mounted on the shaft and counterweighted to return the same to a normal position of repose, a spider disposed within the governor housing and fixed relative to the governor shaft, an opening disposed through the side wall of the governor housing to permit the operating fluid to flow thereinto, blades and fins disposed upon the spiders, said blades and fins adapted to rotate in close relationship with the interior of the governor housing, spaced ribs disposed upon the inner peripheral surface of the governor housing, spaced stop pins outwardly extending from the side walls of the housing, and an arm disposed in registry with the stop pins adapted to tilt the shaft upon which the mercury switches are mounted when the stop pins contact the arm.

2. In a device of the class described, the combination of a liquid holding housing, a power driven shaft disposed horizontally within the housing and journaled relative thereto, a second shaft spaced apart from the power driven shaft and rockably disposed relative to the housing, a downwardly extending arm secured to the second shaft upon which mercury switches may be mounted, a governor housing rotatably mounted on the power driven shaft, a governor secured to the shaft and disposed within the governor housing, means associated with the governor and the governor housing to cause the governor to rotate the governor housing by frictional engagement with a fluid disposed within the respective housings, and means associated with the floating housing to rock the said downwardly extending arm when the governor housing is rotated.

JOHN E. KILKENNY.