

Aug. 17, 1937.

C. SCHAUM

2,090,460

CENTRIFUGAL EXTRACTOR

Filed Oct. 9, 1934

3 Sheets-Sheet 1

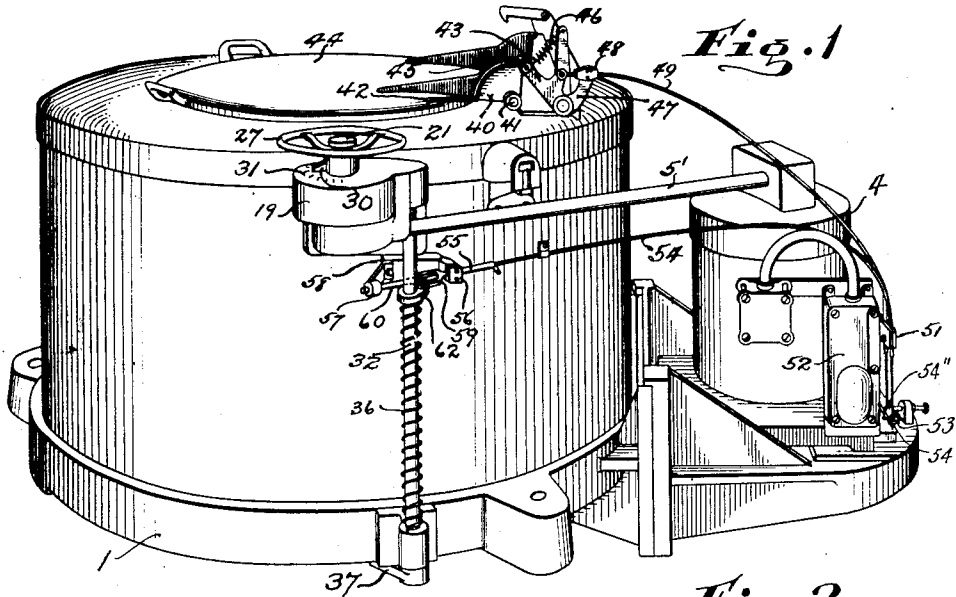


Fig. 1

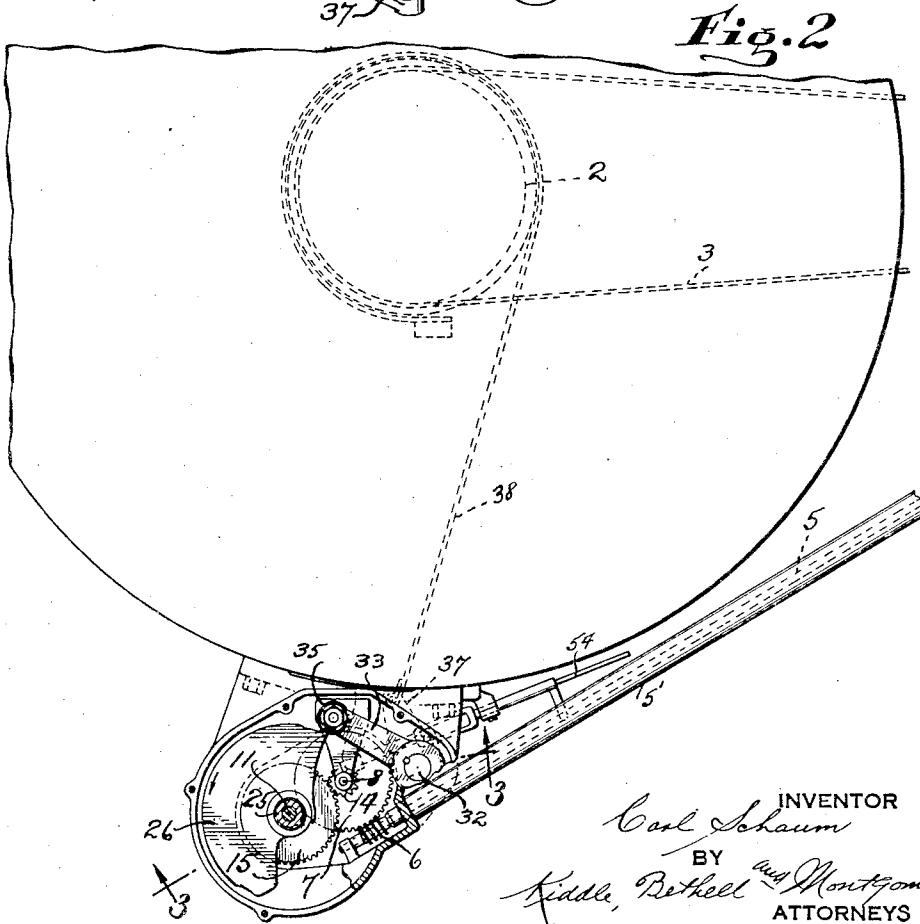


Fig. 2

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3 Sheets-Sheet 2

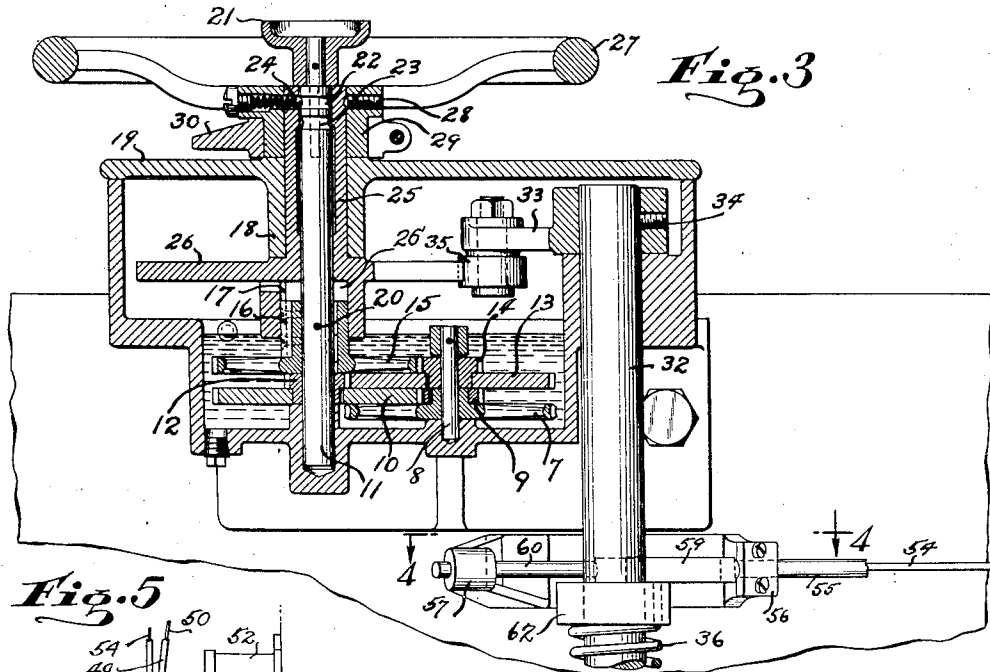


Fig. 3

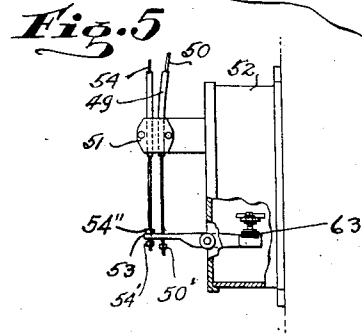


Fig. 5

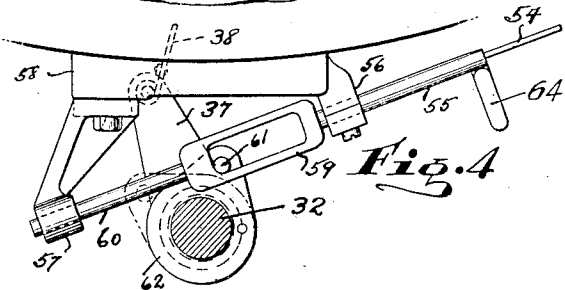


Fig. 4

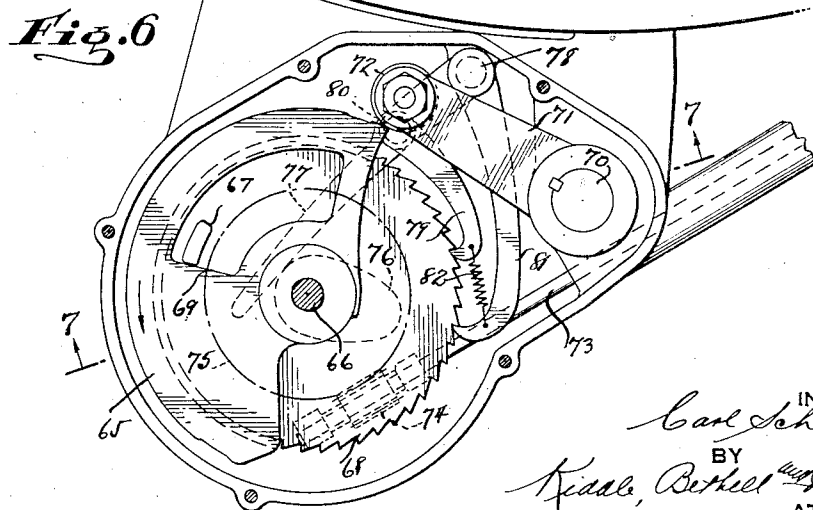


Fig. 6

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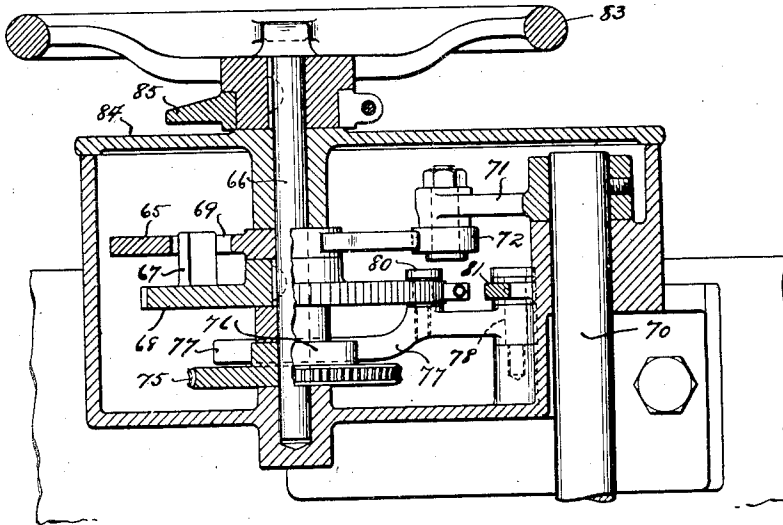
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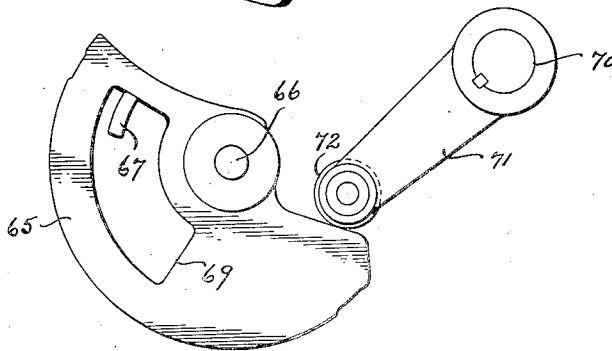
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*Fig. 7*



*Fig. 8*



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## UNITED STATES PATENT OFFICE

2,090,460

## CENTRIFUGAL EXTRACTOR

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Application October 9, 1934, Serial No. 747,565

7 Claims. (Cl. 210—72)

This invention relates to improvements in centrifugal extractors and is particularly directed to extractors wherein timers are employed.

One of the objects of the invention is the provision of a device of the character indicated wherein the manual operations required to run the machine are centralized and simplified.

Another object of the invention is the provision of means for applying the brake gradually instead of suddenly as is the case with such machines at the present time.

A still further object of the invention resides in the provision of a timer that will completely control a mechanical brake, the setting of this timer causing the retraction of the brake when starting the machine, the timer also controlling the gradual application of the brake when the run is over.

A further object of the invention resides in the elimination of the usual brake handle or pedal.

Further objects of this invention will be manifest from the following description and the accompanying drawings in which drawings:

Fig. 1 is a perspective view of a centrifugal extractor embodying my invention;

Fig. 2 is a fragmentary plan view showing the timing mechanism in some detail;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a view taken on line 4—4 of Fig. 3;

Fig. 5 is a view of the motor switch mechanism;

Fig. 6 is a plan view of a modified form of timer;

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6; and

Fig. 8 is an enlarged plan view of the cam and cam follower to the timer mechanism of Figs. 6 and 7.

Referring to the drawings in detail, 1 designates a centrifugal extractor housing which encloses the usual basket supported for rotation on a spindle, the lower portion of the spindle being provided with a brake drum or pulley 2 which is driven by belt 3, for example, from an electric motor enclosed in a housing 4. This motor also drives the timer mechanism of Fig. 3, for example, through rod 5 which is enclosed in a tube 5', one end of this rod being operatively connected to the motor shaft for rotation. The other end of the rod 5 is provided with a worm 6 meshing with a gear 7 mounted for rotation on shaft 8. The hub of the gear 7 carries a pinion 9 in mesh with a gear 10 freely mounted

on a vertically extending handwheel shaft 11. The hub of the gear 10 is provided with a pinion 12 in mesh with a gear 13 on the shaft 8 and the hub of this gear 13 is provided with a pinion 14 in mesh with a gear 15 on the shaft 11 above mentioned.

The shaft or rod 11 is fastened to the gear 15 by means of the stud 20. This shaft 11 is provided at its upper end with a knob 21 whereby the shaft may be moved vertically. The shaft adjacent its upper end is provided with annular grooves 22 and 23 adapted to receive a spring pressed ball 24 whereby the shaft may be held in raised or lowered position.

It will be noted that when the shaft 11 is raised so that the ball 24 engages the groove 23, the gear 15, by reason of the fact that it is keyed to this shaft will be raised also so as to be disengaged from the pinion 14. Carried in a sleeve 18 is a rotatable bushing 25 integral with cam 26 which is provided at its lower end with a bore 26' having a keyway 17 for receiving a key 16 carried by the gear 15, the upper end of this bushing carrying a handwheel 27 secured thereto by a set screw 28. The hub 29 of this handwheel carries a pointer 30. The top or cover of the housing 19 is provided with a calibrated dial 31 cooperating with the pointer 30.

The timer mechanism as will be seen from Fig. 1, for example, is mounted on the side of the housing of the centrifugal.

Extending vertically along the outside of the housing 1 of the machine is a brake rod or shaft 32, the upper end of this rod extending into the timer housing 19 where it is provided with cam follower arm 33 secured thereto by means of set screw 34. This arm carries cam follower 35 adapted to engage the cam 26.

It will be obvious that the speed of rotation of the cam 26 will be much slower than the speed of rotation of the basket of the centrifugal because of the reduction gearing of the timer mechanism.

The brake rod 32 is provided with a torsion spring 36 by which the brake is applied as will be brought out hereinafter. The lower end of the brake rod is provided with an arm 37 attached to the brake band 38 in the usual manner.

From the mechanism thus far described it will be obvious that the cam 26 which is normally driven from the driving motor of the machine through the gear train above described can be rotated manually for adjustment and setting by raising the knob 21 thereby raising the gear 15

to disconnect the same from the pinion 14, whereupon the cam 26 and the pointer 30 can be freely rotated to bring the pointer adjacent the desired marking on the dial 31. When the pointer has been set as desired, the knob is depressed thereby reengaging the gear 15 with the pinion 14. In this way the time or length of "run" can be varied as desired.

It is to be understood that the timer which is driven from the extractor motor, through the gear reduction above described, may be driven in any other suitable manner or the gear train may be varied at will. It will also be understood that different speeds of the driving motor or the basket can be taken care of by changing the dial calibrations.

The switch operating mechanism comprises a cam 40 mounted on a pintle 41 of the hinge of the cover 44 of the machine, this cam being provided with a lever 42 overlying the cover 44 when the latter is in closed position.

On top of the housing 1 adjacent the cam 40 is a pivoted lever 43, carrying a cam follower 45 adapted to follow the under face of the cam 40. The lever 43 is provided with a spring 46 to hold the roller or cam follower 45 in engagement with the cam 40.

A rigidly mounted bracket 47, also mounted on the top of the housing 1, carries a clamp 48 for tubing 49 within which is pull wire 50, one end of which is attached to the lever 43. A clamp or bracket 51 is mounted on the switch housing 52 for receiving the other end of the tubing 49 through which the pull wire 50 extends. This wire passes through and is secured to a motor switch lever 53 shown in Fig. 5. The wire has slight movement relatively to the lever. A collar 50' is secured to the end of the wire 50 below the lever so that when the wire is pulled the collar will engage the lever and move the same about its pivot to open the circuit to the driving motor for the machine as will be explained presently.

The motor switch is also controlled by wire 54 operatively connected to the brake rod 32, one end of this wire passing through switch lever 53 and being free to move therein. A collar 54' is secured to the end of the wire below the lever 53 so that when the wire is pulled the lever will be rocked to open the motor switch. Another collar 54'' is secured to the wire above the switch lever so that when the wire is pushed the lever will be rocked to close the motor switch.

The other end of the wire 54 is connected to a rod 55 adapted to be moved longitudinally in a bearing 56 in the bracket 58 secured to the side of the housing 1 of the machine. To the rod 55 is secured a slotted member 59, to which is also secured a rod 60 slidable in bearing 57 of the bracket 58. Cooperating with the slot in the member 59 is a pin 61 carried by a cam 62 keyed to the brake rod 32. The rod 55 has an integral handle 64 for manual operation of motor switch 63.

In operation, assuming that the machine is running, roller 35 on the cam follower arm 33 inside the timer housing is on the dwell of the slowly rotating cam 26 and is therefore held stationary. When the run is finished, the dwell of the cam 26 has been rotated sufficiently to permit the cam follower 35 to move toward the center of the cam 26 under the urge of the brake spring 36, thereby slowly rotating the brake rod 32 to apply the brake. The shape of the cam and its speed of rotation determine the speed of application of the brake as will be apparent. On the initial movement of the brake rod 32, the cam 62

carrying the pin 61 will be rotated anti-clockwise as viewed in Fig. 4 and through the medium of the pin 61 and the slot in the member 59 will pull the wire 54 to the left to rock the lever 53 and open the switch 63.

When the machine has come to rest, the cover may be opened, the opening of the cover operating the lever 43 and associated parts pulling the pull wire 50 to the left as viewed in Fig. 1, whereupon the collar 50' will engage the lever to prevent the switch 63 closing again until the cover is closed. The machine may now be unloaded and loaded with safety, the motor circuit being held open by reason of the fact that the cover of the machine is still open.

It will be seen therefore, that in the assumed operation just described, the switch 63 was opened by the wire 54 due to application of the brake, and that by opening the cover of the machine, the switch 63 is held against closing again until the cover of the machine is again closed. I wish to point out further, however, that in addition to this safety feature, opening of the cover without first applying the brake will also open the switch 63 and hence the circuit of the driving motor. In short the machine cannot be driven while the cover is open.

The closing of the cover of the machine after the latter is loaded will push the wire 50 so as to release the lever from engagement with the collar 50', leaving the lever free to be operated by the wire to close the switch 63.

The timer mechanism may now be restored to its original setting for the next run by simply lifting the knob 21 to disengage the gears 15 and 14, rotating the handwheel 27 until the pointer is at the desired time setting for the next run, and the cam 26 and cam follower are in correct relation to each other, the rotation of the cam 26 in the setting of the timer mechanism positively releasing the brake. The knob 21 is then depressed again to mesh the gears 15 and 14. In releasing the brake the pin 61 is moved away from the end of the slot in the member 59 so that the latter is now free to be moved. The operator will then move the handle 64 of the rod 55 to the right as viewed in Fig. 4 to push the wire 54 in the same direction, causing the collar 54'' to engage the lever 53 to rock the same in a direction to close the motor switch 63.

In the modified form of timer mechanism disclosed in Figs. 6, 7 and 8, I employ ratchets and pawls instead of gears to obtain the desired speed reduction and to further simplify the operation. In this modified form a cam 65 is loosely mounted on a handwheel shaft 66. This cam is driven by a lug 67 carried by a ratchet 68 keyed to the handwheel shaft 66. The lug 67 extends through a slot 69 in the cam 65. This modified structure is provided with a brake rod 70 corresponding to the brake rod 32 of Fig. 3 and carries an arm 71 which in turn carries a cam follower or roller 72 engaging the face of the cam 65.

The modified form of timer mechanism is driven from the motor through shaft 73, worm 74 and worm wheel 75. The worm wheel 75 is provided with an integral cam 76 adapted to engage and operate a wiper arm 77 which is pivoted at 78. The wiper arm 77 has a pull pawl 79 pivotally secured thereto to 80, and a holding pawl 81 which is mounted on the wiper arm pivot 78. These pawls are connected to each other by means of a spring 82 and cooperate with the ratchet 68. Upon each revolution of the work

wheel 75 and cam 76, the ratchet 68 will be advanced one or more teeth by the pull pawl 79 as the wiper arm oscillates back and forth.

As will be seen from the drawings, there is considerable lost motion between the lug 67 and the slot 69 in the cam 65.

In operation, assuming the parts to be in the position shown in Fig. 8, so far as cam follower 72, cam 65 and lug 67 are concerned. The handwheel 83 is rotated in a direction to move the lug 67 to the other end of the slot 69. Continued rotation of the handwheel will rotate the cam 65 until the roller 72 rides on the dwell of the cam. This releases the brake. As soon as the cover of the machine is closed, the motor circuit is closed and the machine will run until the cam 65 reaches the position shown in Fig. 6, whereupon the roller 72 will ride into the drop of the cam under the action of the brake spring, kicking the cam forward until the position of the slot in the cam relatively to the lug 67 is as shown in Fig. 8. The brake is now applied and the motor circuit opened.

This modified form of timer mechanism has some advantages over the first form described in that setting is accomplished more readily and quick stopping can be had. To set the modified timer, the handwheel is merely moved in a forward direction to the desired time setting indicated on the dial 84 under the pointer 85. It will be obvious that the ratchet 68 will permit motion in this direction without the necessity of lifting knobs or meshing gears. Furthermore in the modified form the handwheel can be moved forward very quickly for emergency stopping.

It will be understood that I do not wish to be limited to the precise structures herein illustrated and described as obviously various changes and modifications may be made therein without departing from the spirit and scope of my invention.

What I claim is:

1. In combination a rotatable brake drum, a brake therefor, brake applying means, a timer comprising a cam rotating simultaneously with said brake drum, a cam follower for said cam for controlling the application of said brake to said drum, a manually operable selector member for varying the position of said cam with respect to said cam follower, a portion of said cam having a uniform follower path of such shape that whenever the follower is against this portion the brake is in retracted position, another portion of said cam having a variable follower path of such shape that the movements of application and retraction of the brake are gradual.

2. In combination a rotatable brake drum, a brake therefor, means for applying said brake, a pointer and a dial movable relatively to each other, a manually operable setting member for effecting relative movement between said pointer and dial, a brake retracting cam secured to said

setting member, said cam having a dwell portion maintaining said brake in retracted position, and power means for rotating the cam into brake-applied position at the end of the period for which the said setting member has been set.

3. In combination a brake, a brake shaft, a spring carried by said shaft, a timer, a timer operated cam, a cam follower carried by said shaft and cooperating with said cam to hold the brake out of braking position against the action of said spring and to permit the spring gradually to apply the brake when the cam follower leaves the dwell of the cam, manually operable means secured to said cam for restoring said cam follower to the dwell of the cam and to rotate said shaft to withdraw the brake to tension said spring.

4. In combination a rotatable brake drum, a brake therefor, means for applying the brake, a pointer and a dial, a manually operable setting member for effecting relative movement between said pointer and dial, a brake retracting cam secured to said setting member, a follower for said cam, said cam having a dwell portion for maintaining the brake in retracted position, and driven means for positively rotating the cam into brake-applied position at the end of the period for which the said setting member has been set, the cam retarding the movement of the follower to effect gradual movement of the brake from each position to the other.

5. In combination a brake, brake applying means, a motor driven timer for controlling the brake applying means to effect application of said brake in accordance with the setting of said timer and manually operable means carried by the timer for rotating the same to effect positive release of the brake.

6. In combination a centrifugal machine, a driving motor therefor, a mechanical brake for the machine, a brake rod, a spring carried by said rod for applying the brake, a timer driven by said motor comprising reduction gearing and a cam, a cam follower carried by the brake rod and cooperating with said cam initially to hold the brake out of braking position with said spring under tension, movement of said timer under the action of said motor shifting the cam thereby to effect gradual application of the brake by said spring.

7. In combination a centrifugal machine, a driving motor therefor, a motor switch, a mechanical brake for the machine, a spring for applying the brake, a brake rod, a timer driven from said motor and comprising reduction gearing and a cam, a cam follower on said brake rod, switch controlling means carried by said brake rod, the rotation of said cam permitting said brake rod to rotate under the action of said spring gradually to apply the brake and open the motor switch.

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