

March 24, 1931.

T. A. BRYSON

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SAFETY GUARD FOR CENTRIFUGAL EXTRACTORS

Filed Oct. 3, 1925

4 Sheets-Sheet 1

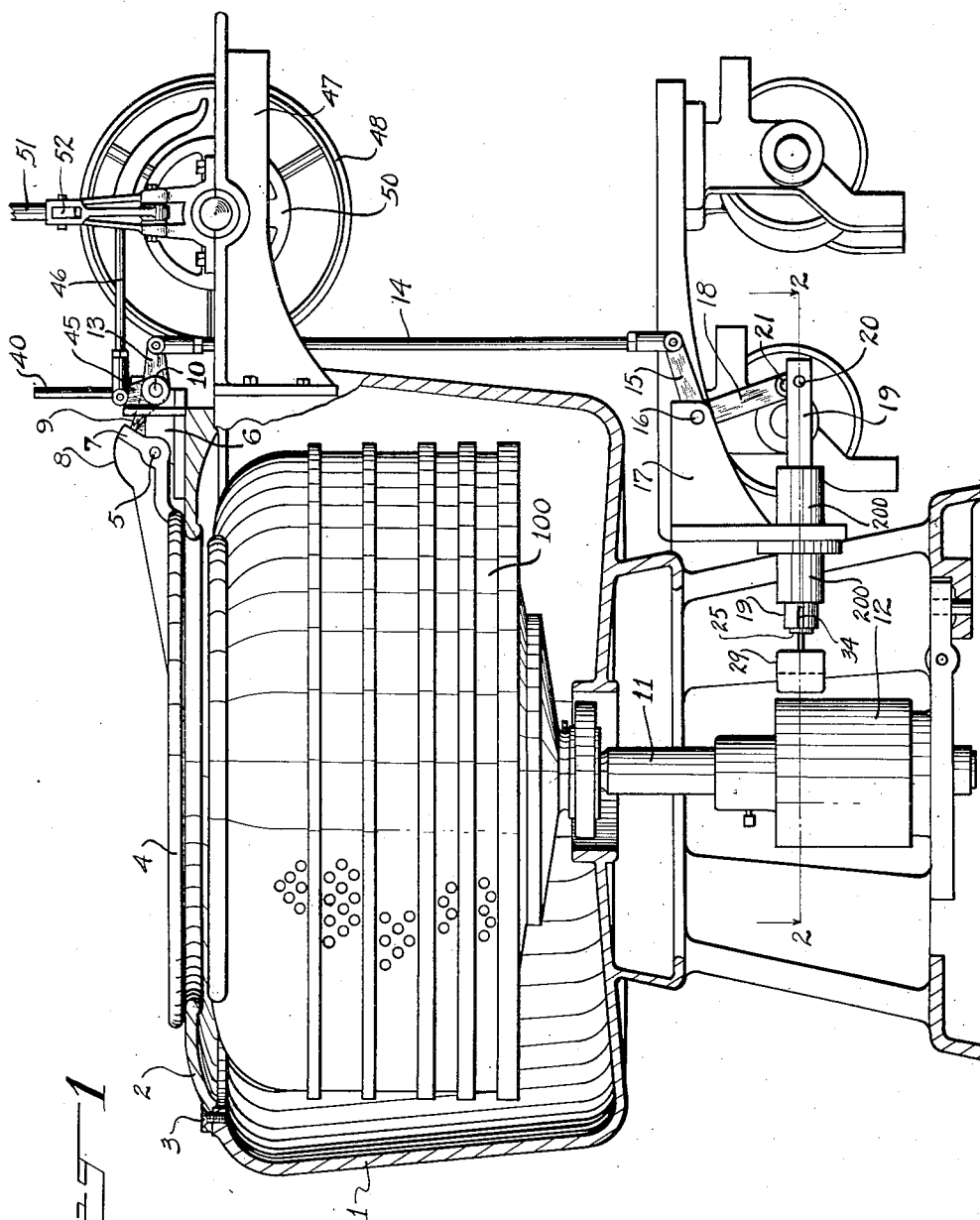


Fig. 1

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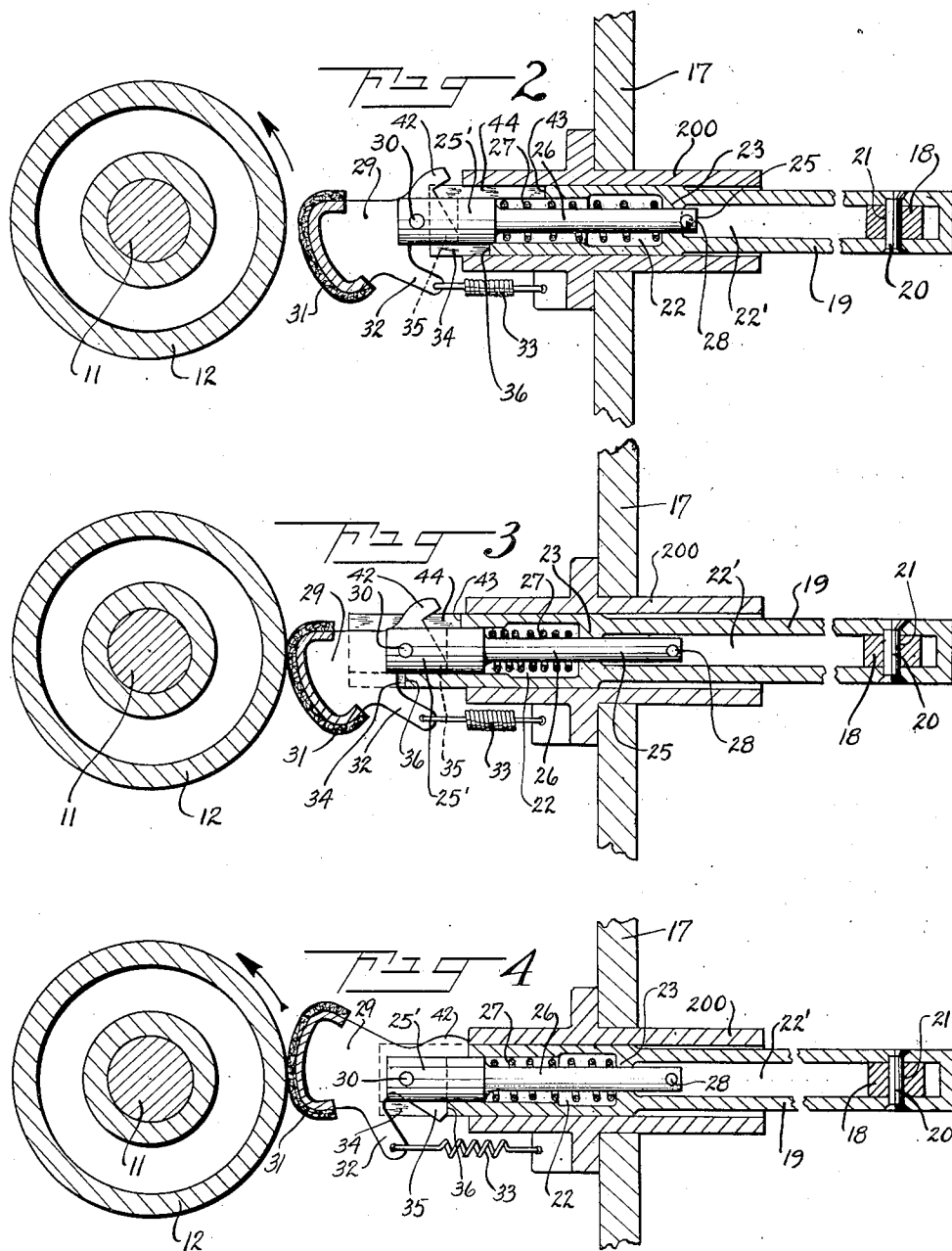
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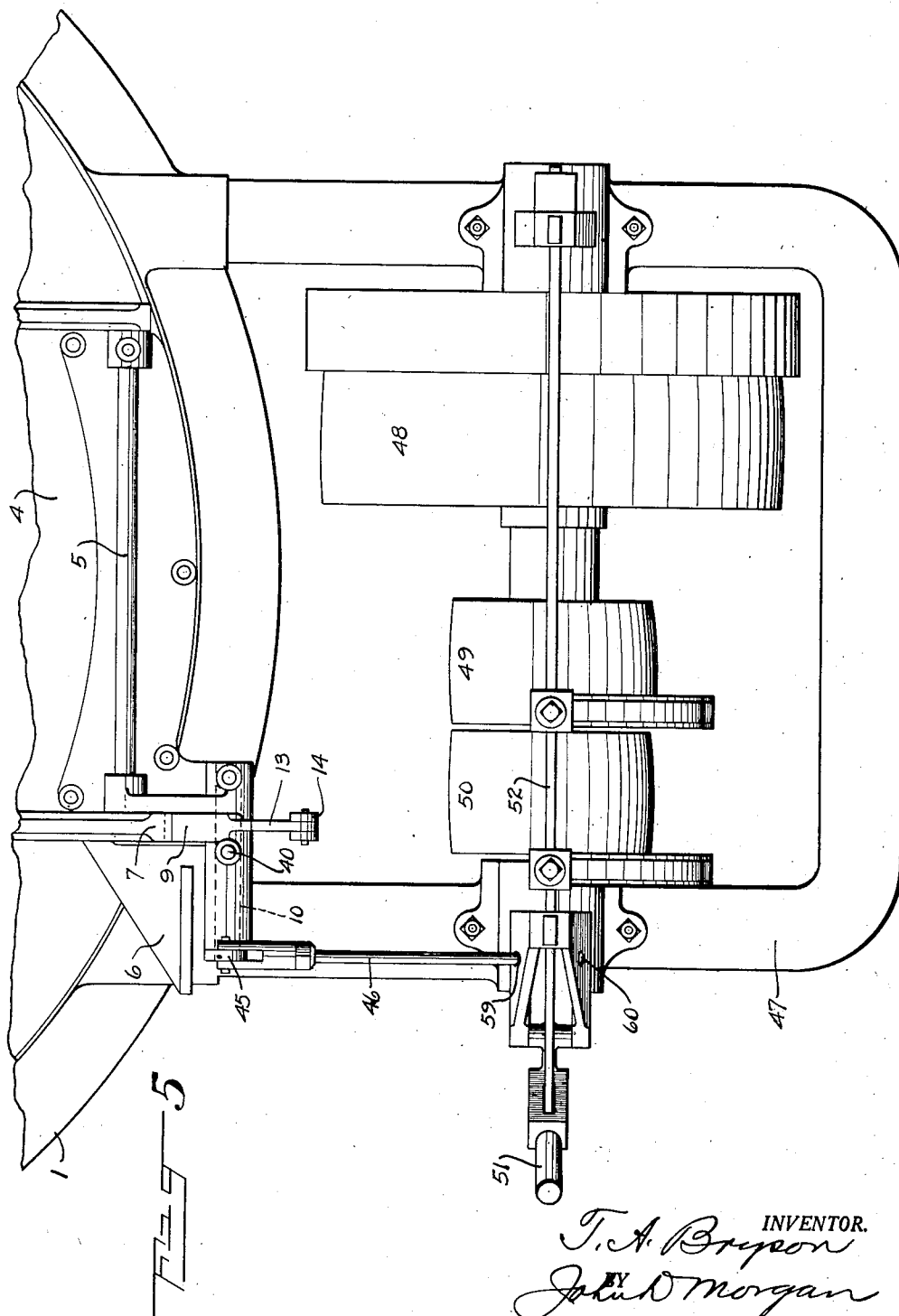
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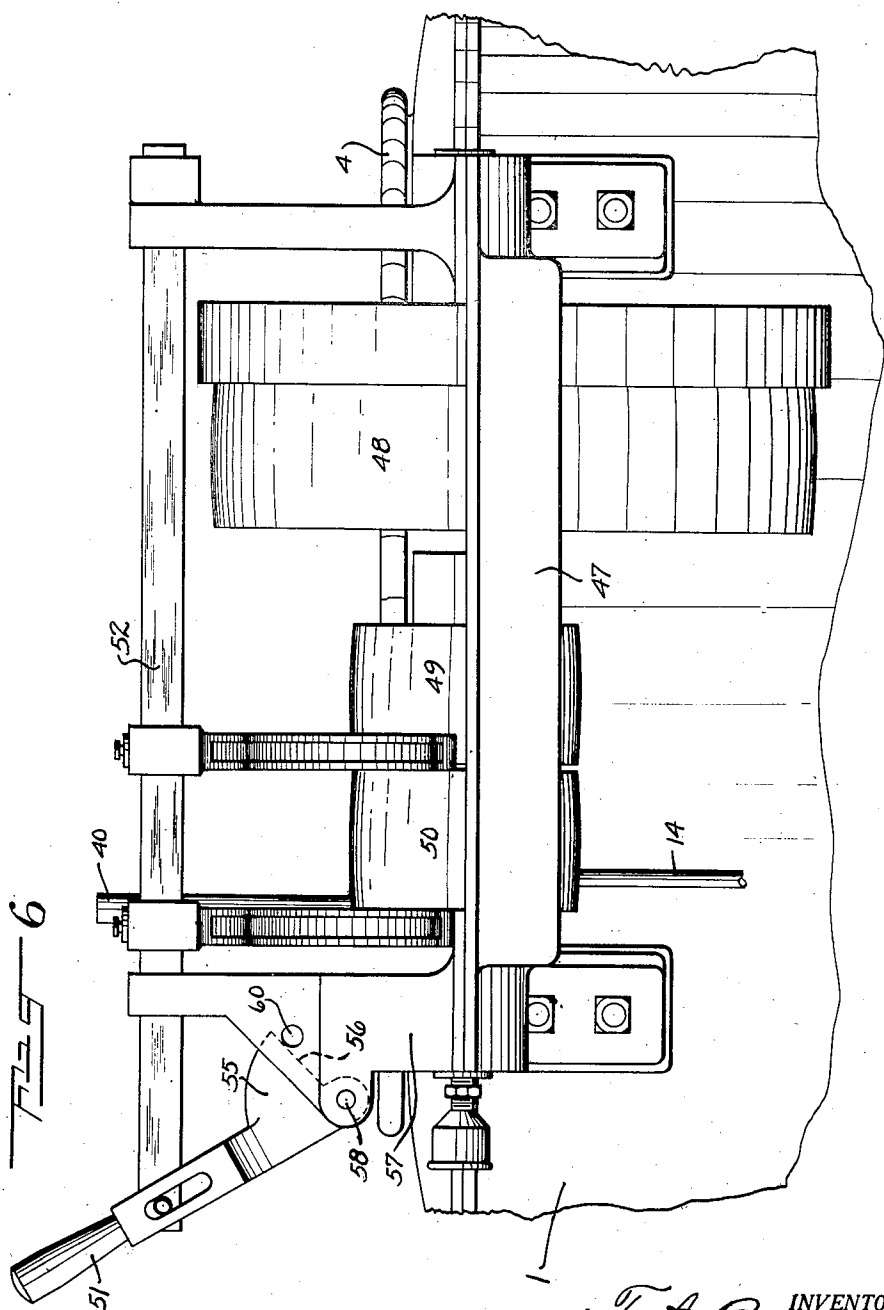
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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SAFETY GUARD FOR CENTRIFUGAL EXTRACTORS

Application filed October 3, 1925. Serial No. 60,180.

My invention relates to centrifugal extractors, and more particularly to a safety guard to prevent the cover of the extractor being opened while the basket is being rotated.

My invention further relates to an extractor provided with such a guard, usually in the form of a cover, and, in addition thereto, means to prevent the extractor being started while the guard or cover is open.

10 My invention further relates to underdriven centrifugal extractors equipped with such a safety guard and, preferably, with means to prevent the underdriven extractor being started while the guard or cover is
15 open.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the
20 same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations
25 and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and
30 together with the description, serve to explain the principles of the invention.

Of the drawings:—

35 Fig. 1 is a side elevation of an underdriven centrifugal extractor equipped with my invention, certain parts being broken away and shown in vertical section for the purpose of clearer illustration;

40 Fig. 2 is a detail horizontal section, on an enlarged scale, substantially on the line 2—2 of Fig. 1, looking in the direction of the arrows, showing the parts in their running position;

45 Fig. 3 is a horizontal section, on the same line 2—2 of Fig. 2, showing the position of the parts when the basket is stationary and the cover open;

50 Fig. 4 is a horizontal section, on the same line 2—2 of Fig. 1, showing the position of the parts when it is attempted to open the

cover or guard when the basket is being rotated;

Fig. 5 is a plan view of the back of the centrifugal separator, showing more particularly the manner of controlling the shift
55 handle by the position of the guard or cover of the centrifugal separator;

Fig. 6 is a side elevation of the pulley mechanism, and illustrating the cooperation of the shift handle and the shift control rod.
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For purposes of illustration, I have shown my invention applied to an underdriven centrifugal extractor, though of course it is understood that it may be applied to an extractor driven in any other suitable manner.
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In the embodiment of my invention, shown in the drawings, 1 is the case of the centrifugal extractor provided with the usual ring 2 secured to it by any suitable means such as by screws 3, 3, only one being shown in Fig. 1.
70 This case is provided with a guard or cover 4 pivoted at 5 to a bracket 6. This guard or cover is provided with a shoulder 7 and with a curved surface 8 upon which rides a locking dog 9, fast on a shaft 10. In my invention, this locking dog 9 and shoulder 7 are cooperating locking members which, when in engagement, prevent the guard or cover being opened so that the workmen cannot be injured by thoughtlessly, or prematurely, opening the guard or cover. My invention broadly consists in having these cooperating locking members 7 and 9 in engagement at all times while the basket 10, vertical spindle 11, and driven pulley 12, are rotating, even slowly. It is, therefore, impossible for the operator to open the guard or cover until the basket 10 has absolutely stopped its rotation.
85 In addition thereto I provide a further safety mechanism, which will be more fully hereinafter described, which will prevent power being applied to the basket, or to the driven pulley 12, as long as the cover or guard 4 is open, thereby preventing the starting of the machine.
90

In the particular embodiment shown, I mount on the shaft 10 a horizontal lever 13, which is pivoted to the rod 14, which in turn is pivoted to the bell crank lever 15, pivoted at 16, on the bracket 17. The other arm 18
100

of the bell crank lever 15 is pivoted to the sleeve 19 by the pin 20 cooperating with the slot 21 in the bell crank lever.

5 This sleeve 19 (Figs. 2, 3 and 4) slides within the guide 200 secured to the bracket 17 which is immovable. The sleeve is provided with two chambers 22, 22', leaving an annular shoulder 23 between the chambers. Within the sleeve 19 is mounted a plunger 25, hav-
10 ing a reduced portion 26' around which is mounted a coil spring 27, for a purpose to be more fully hereinafter described. The reduced end 26 of the plunger which extends into the chamber 22' is provided with a pin 28
15 which limits the movement of the plunger in one direction.

The head 25 of the plunger is slotted. Within this slot is mounted a rocking friction shoe 29, pivoted on the pivot 30. This pivoted shoe is provided with a friction surface 31 to contact with the periphery of the driven pulley 12. The rocking shoe 29 is also provided with an arm 32 to which is connected a holding spring 33, the other end of the holding spring being connected to the fixed guide 200. The end of the sleeve 19 is also provided with slots 34, 44 registering with the slot in the plunger 25 to permit the free rocking of the rocking shoe 29. The spring 33 normally holds the rocking shoe in its retracted or inoperative position as shown in Figs. 2 and 3, wherein the locking member or shoulder 35 of the shoe is held up and away from the cooperating locking surface 36 upon the sleeve 19, as shown for example in Figs. 2 and 3. It will be noted from Fig. 2 that the length of the slot 34 in the sleeve 19 is such that considerable movement of the sleeve 19 to the left is permitted before it would be possible to bring the cooperating locking surfaces 36 on the sleeve 19 into contact with the locking surface 35 on the shoe 29. This is to insure compression of the spring 27, and that there will be sufficient pressure of the shoe 29 against the driven pulley 12 before the parts are called upon to lock themselves. Were it not for the length of the slot 34 which allows the compression of the spring 27, it might be possible to accidentally move the sleeve 19 to the left of Figs. 2, 3 and 4 with such speed that the locking surface 36 would get under the locking surface 35 on the rocking shoe 29, before the rotation of the pulley 12 would cause the shoe to rock on its pivot 30 and bring its cooperating locking surface 35 into the path of the locking surface 36 on the sleeve 19.

From the position of the parts so far described, and with more particular reference to Figs. 1 and 2 which show the parts in the running position, the hinge cover or guard 4 is locked, and the basket 10 and the driven pulley 12 are freely rotating. In this running position, the control mechanism, including the pivoted shoe 29, would be out of

engagement with the pulley 12 and the parts would be in the position shown in Fig. 2.

After the material in the basket 100 has been treated and it is desired to remove it, the operating handle 40, fast upon the shaft 10, is swung to the right from the position shown in Fig. 1, which will cause the locking dog 9 to move up the shoulder 7 and at the same time will cause the rod 14 to actuate the bell crank lever 15 and move the sleeve 19 to the left and into the position shown in Fig. 3. In this position the driven pulley 12 is stationary. The sleeve 19 moving to the left, carries with it the plunger 25 and spring 27 until the rocking shoe 29 contacts with the stationary pulley 12. The pulley 12 not rotating acts simply as a stop preventing further movement of the pivoted shoe 29 and plunger 25 to the left. This will permit the sleeve 19 to be moved freely over the plunger 25, for the locking surface 35 has not been swung down into the path of the locking surface 36 on the sleeve 19. This permits complete or free movement of the operating handle 40, which can then move in its full arc to the right of the position in Fig. 1, to release the locking dog 9 from the shoulder 7 on the guard or cover 4. When the locking dog is free from the shoulder 7 the cover or guard 4 can be lifted, the dog then riding upon the curved surface 8 of the cover or guard 4. When the cover or guard 4 is closed the stress in the springs 27 and 33 will cause the dog 9 to snap into locking engagement with the shoulder 7.

If, instead of waiting until the basket 100 and the driven pulley 12 are brought to rest, it is attempted to lift the guard or cover 4, the parts would assume the position shown in Fig. 4. In this position it is impossible to swing the operating handle 40 far enough to release the dog 9 from the shoulder 7 on the cover or guard, thereby positively preventing the opening of the cover or guard 4 until such time as the basket and the pulley 12 have come to rest.

In this Figure 4 it is assumed that a careless or inattentive operator has, before the basket has come to rest, attempted to swing the operating handle 40 to the right of Fig. 1, far enough to release the dog 9 from the shoulder 7. The moment that the operator attempted to do this, when the basket 10 and the driven pulley 12 were still rotating, and the pivoted rocking shoe 29 came in contact with the periphery of the rotating pulley 12, the pulley would instantly cause the shoe 29 to rock on the pivot 30, against the action of the holding spring 33, and instantly cause the locking surface 35, carried by the pivoted shoe, to swing down into the path of the locking surface 36 on the sleeve 19, which surface is the end of the slot 34. The result would be that these two locking surfaces 35 and 36

would be brought into engagement and prevent further relative movement between the sleeve 19 and plunger 25. The moment these locking surfaces are brought together it will be impossible to complete the full swing of the operating handle 40 to permit the locking dog 9 to escape from the locking shoulder 7, on the guard or cover 4. It is, therefore, clear that it would be impossible to open the cover or guard 4, until such time as the basket and the pulley 12 are brought to rest, when the parts can be brought into the position, shown in Fig. 3. I also preferably provide the shoe 29 with a heel 42 to engage with the surface of 25' in order to limit the swing of shoe 29 to that necessary for positive locking.

From the mechanism so far described, it is impossible to open the guard or cover 4 as long as the basket 10, vertical spindle 11 and pulley 12 are rotating. It is further clear that the slightest rotation will cause the shoe 29 to rock and lock the parts, which renders the control mechanism very sensitive.

In addition to the mechanism just described I also preferably, though not necessarily, provide means to prevent the machine being started while the guard or cover 4 is open. This may be done in various ways. In the embodiment of my invention shown by way of illustration, I mount on the shaft 10 a vertical lever 45 and connect it to the shift control rod 46 (Figs. 1 and 5). At the rear of the machine is mounted a pulley bracket 47 in which is mounted in the usual manner the driving pulley 48, and on a counter shaft a tight pulley 49 and a loose pulley 50. The shift handle 51 controls the belt shifter 52 which moves the belt (not shown) from the loose pulley 50 to the tight pulley 49, or the reverse, as the case may be.

The shift handle 51 (Fig. 6) is provided with a semi-circular stop-plate 55 and a shoulder 56. Within the bracket 47 to which the shift handle 51 is pivoted at 58, I form two holes 59 and 60 (Fig. 5) to cooperate with the shift control rod 46. The end of this rod always rests in hole 59 which acts as a bearing for it.

When the operating handle 40 is thrown over to the right in Fig. 1 to its full movement so as to permit the locking dog 9 to escape from the locking shoulder 7, the shift control rod 46 will be at the same time forced to the right of the position shown in Figs. 1 and 5, and into the position shown in Fig. 6, where it will be seen that any attempt to actuate the centrifugal extractor while the cover 4 is open will be prevented, for the reason that the shift control rod 46 will be in the path of the semi-circular stop-plate 55 on the shift handle 51, and this will prevent the shift handle 51 operating the belt shifter 52 to move the belt (not shown) from the loose pulley 50 to the tight pulley 49. It is,

therefore, clear that not only is it impossible to open the guard or cover 4 while the machine is operating, but that it is impossible to start the machine while the guard or cover 4 is open.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. In centrifugal extractors, the combination of a case, a cover or guard, a basket, a rotatable member adapted to rotate with the basket, a pivoted friction member adapted to contact with the rotatable member, a plunger on which the pivoted member is mounted, a sleeve in which the plunger is mounted, means to lock the sleeve and plunger together when the friction member rocks on its pivot, means to actuate the sleeve, and locking means on the cover or guard preventing the cover or guard being opened when the pivoted friction member on the plunger is rocked from its normal position.

2. In centrifugal extractors, the combination of a case, a cover or guard, a basket, a rotatable member adapted to rotate with the basket, a pivoted friction member adapted to contact with the rotatable member, two telescoping members adapted to slide on each other and in one of which the pivoted friction member is mounted, an operating handle and connections from said handle to one of the two telescoping members, locking means actuated by the cover and operating handle, said locking means remaining in engagement as long as the telescoping members have only a limited movement on each other, but being disengaged when the two telescoping members slide freely on each other thereby permitting the cover or guard to be opened.

3. In centrifugal extractors, the combination of a case, a cover or guard, a basket, a rotatable member adapted to rotate with the basket, a pivoted friction member adapted to contact with the rotatable member, two telescoping members adapted to slide on each other and in one of which the pivoted friction member is mounted, an operating handle and connections from said handle to one of the two telescoping members, locking means actuated by the cover and operating handle, said locking means remaining in engagement as long as the telescoping members have only a limited movement on each other, but being disengaged when the two telescoping members slide freely on each other thereby permitting the cover or guard to be opened, a power shift handle, and means to prevent the movement of said handle to start the extractor, when the cover or guard is open.

4. In underdriven extractors the combina-

tion of a case, a cover or guard for the case provided with locking means to cooperate with locking means operated by a shift handle, a basket mounted on a vertical drive spindle, a vertical drive spindle, a drive pulley mounted on the drive spindle, a pivoted friction member adapted to contact with the drive pulley, two telescoping members adapted to slide on each other and on one of which the pivoted member is mounted, a shift handle provided with locking means to cooperate with those carried by the cover, said locking means remaining in engagement as long as the telescoping members have only a limited movement on each other, but being disengaged when the two telescoping members have free movement thereby permitting the cover or guard to be opened.

5. In underdriven extractors the combination of a case, a cover or guard for the case provided with a shoulder, a shaft provided with a dog to engage with the shoulder on the cover, an operating handle mounted on the shaft, a basket, a vertical spindle to rotate the basket, a driven pulley on the spindle, a guide fast to the frame of the extractor, a sliding slotted sleeve mounted in the guide, a plunger mounted in the sleeve, connections from the actuating handle shaft to the slidable sleeve, a pivoted shoe mounted on the plunger, a spring to hold the pivoted shoe in its normal position, said pivoted shoe being adapted to be moved into contact with the driven pulley on the vertical spindle and be rocked if the pulley and spindle are rotating thereby preventing the free sliding movement of the sleeve with relation to the plunger, and preventing the opening of the cover or guard.

6. In underdriven extractors the combination of a case, a cover or guard for the case provided with a shoulder, a shaft provided with a dog to engage with the shoulder on the cover, an operating handle mounted on the shaft, a basket, a vertical spindle to rotate the basket, a driven pulley on the spindle, a guide fast to the frame of the extractor, a sliding slotted sleeve mounted in the guide, a plunger mounted in the sleeve, connections from the actuating handle shaft to the slidable sleeve, a pivoted shoe mounted on the plunger, cooperating locking members on the sleeve and on the pivoted shoe, a spring to hold the pivoted shoe in its normal position in which said locking members are in their inoperative position, said pivoted shoe being adapted to be moved into contact with the driven pulley on the vertical spindle and be rocked if the pulley and spindle are rotating thereby bringing the locking members on the sleeve and pivoted shoe into engagement and preventing the free sliding movement of the sleeve with relation to the plunger, and preventing the opening of the cover or guard.

7. In a centrifugal extractor, the combina-

tion of a case, a cover, a rotatable basket provided with a driving spindle, starting means for setting said spindle in motion, and a rocking member having a cover locking arm and having means actuated by rotation of said driving spindle for preventing unlocking of said cover while said spindle is rotating, said rocking member having another arm associated with said starting means for preventing starting of said spindle while said cover is open.

8. In a centrifugal extractor, the combination of a case, a cover, a rotatable basket, a locking member associated with said cover, a driving pulley having a cylindrical surface rotating on its own axis, a pivoted friction member associated with said locking member and adapted to contact with said cylindrical surface and preventing cover unlocking movement of said locking member when said pulley is rotating.

9. In a centrifugal extractor, the combination of a case, a cover, a rotatable basket, a locking member associated with said cover, a member rotatable with said basket, and a pivoted friction shoe associated with said locking member and adapted to contact with said rotatable member and prevent cover unlocking movement of said locking member when said basket is rotating.

10. In a centrifugal extractor, the combination of a case, a cover, a rotatable basket, a member rotatable with said basket, a locking member associated with said cover, and a pivoted friction shoe having reciprocating movement controlled by said locking member, and adapted to contact with said rotatable member and, by movement about its pivot, preventing cover unlocking movement of said locking member while said basket is rotating.

11. In a centrifugal extractor, the combination of a case, a cover, a basket, a member rotatable with said basket, cover locking means for holding the cover in closed position, mechanism controlling said cover locking means including a pivoted friction shoe adapted to contact with said rotatable member and having a projection movable to prevent cover unlocking movement of said cover locking means while said basket is rotating.

12. In a centrifugal extractor, the combination of a case, a cover, a rotatable basket, a member rotatable with said basket, a locking member for said cover, a pivoted friction shoe having reciprocating movement controlled by said locking member and adapted to contact with said rotatable member, and, by movement about its pivot, preventing cover unlocking movement of said cover locking member while said rotatable member is rotating, driving mechanism for said extractor, starting means therefor, and means associated with said starting means and with said cover locking member, operable by cover unlocking movement thereof to prevent said

starting means from setting said driving mechanism in motion.

adapted for movement by rolling engagement with said element, and connection from said means to the guard adapted to prevent release of the guard while said element is in motion.

In testimony whereof, I have signed my name to this specification.

TANDY A. BRYSON.

13. In a centrifugal extractor, the combination of a case, a cover, a rotatable basket, a member rotatable with said basket, cover locking means for holding said cover in closed position, a friction member movable into engagement with said rotatable member, and stop means carried by said friction member preventing cover unlocking movement of said cover locking means while said rotatable member is in motion.

14. In a centrifugal extractor, the combination of a case, a cover, a rotatable basket, a member rotatable with said basket, cover locking means for holding said cover in closed position, a friction member movable into engagement with said rotatable member, and stop means brought into position by said friction member preventing cover unlocking movement of said cover locking means while said rotatable member is in motion.

15. In a centrifugal extractor, the combination of a case, a cover, a basket, a rotatable member adapted to rotate with the basket, a friction member adapted to engage with the rotatable member, means between the friction member and the cover controlled by said friction member preventing the opening of the cover while the basket and rotatable member are rotating and permitting opening of the cover when said rotatable member comes to rest in any position.

16. In a centrifugal extractor, the combination of a case, a cover, a basket, a rotatable member adapted to rotate with the basket, a friction member adapted to engage with the rotatable member, cover locking means for holding the cover in closed position, means between the friction member and cover locking means controlled by said friction member preventing unlocking of the cover while the basket and rotatable member are rotating, and means maintaining said cover locking means in unlocked position while said cover is open.

17. In a centrifugal extractor, the combination of a case, a cover, a basket, a rotatable member adapted to rotate with the basket, a friction member adapted to engage with the rotatable member, cover locking means for holding the cover in closed position, means between the friction member and cover locking means controlled by said friction member preventing unlocking of the cover while the basket and rotatable member are rotating and permitting opening of the cover when said rotatable member comes to rest in any position, and means maintaining said cover locking means in unlocked position while said cover is open.

18. In a machine of the character described having a rotatable element provided with a driven member and a guard for said element, a safety device, comprising, means

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