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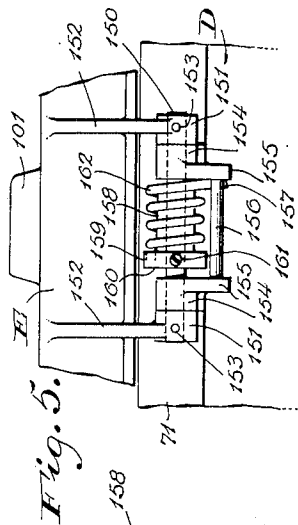
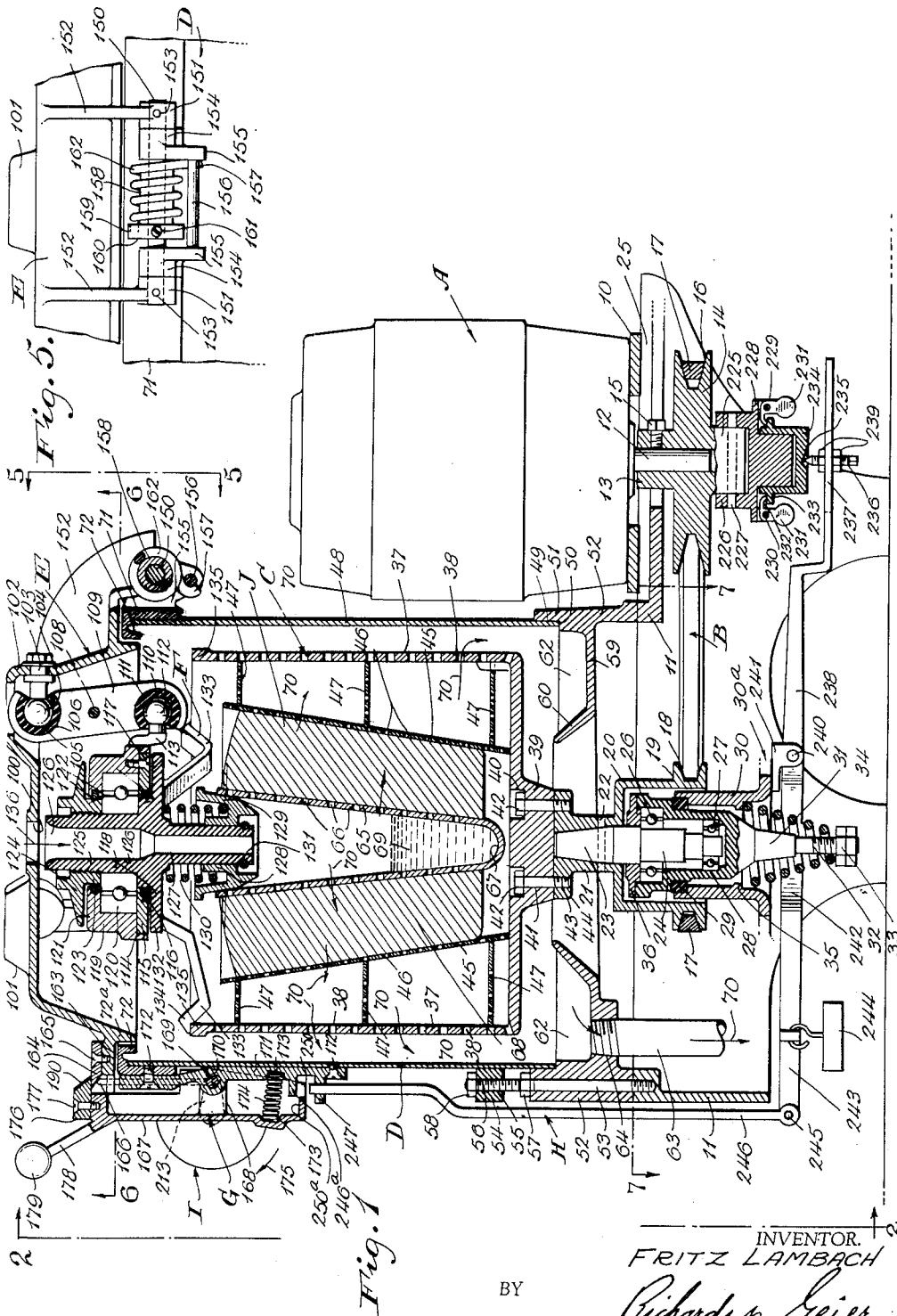
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2,169,260

SAFETY DEVICE

Filed April 20, 1936

3 Sheets-Sheet 1



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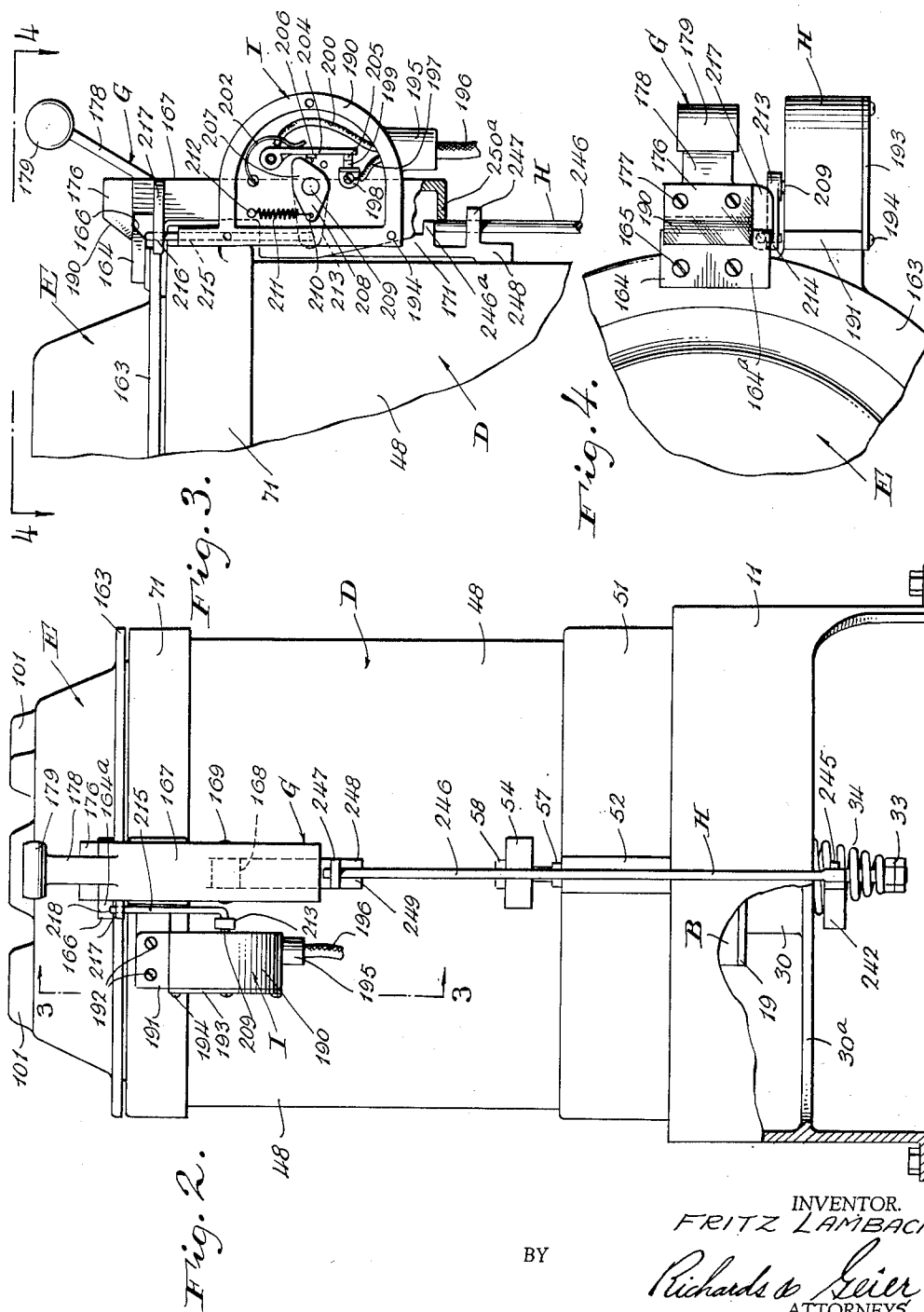
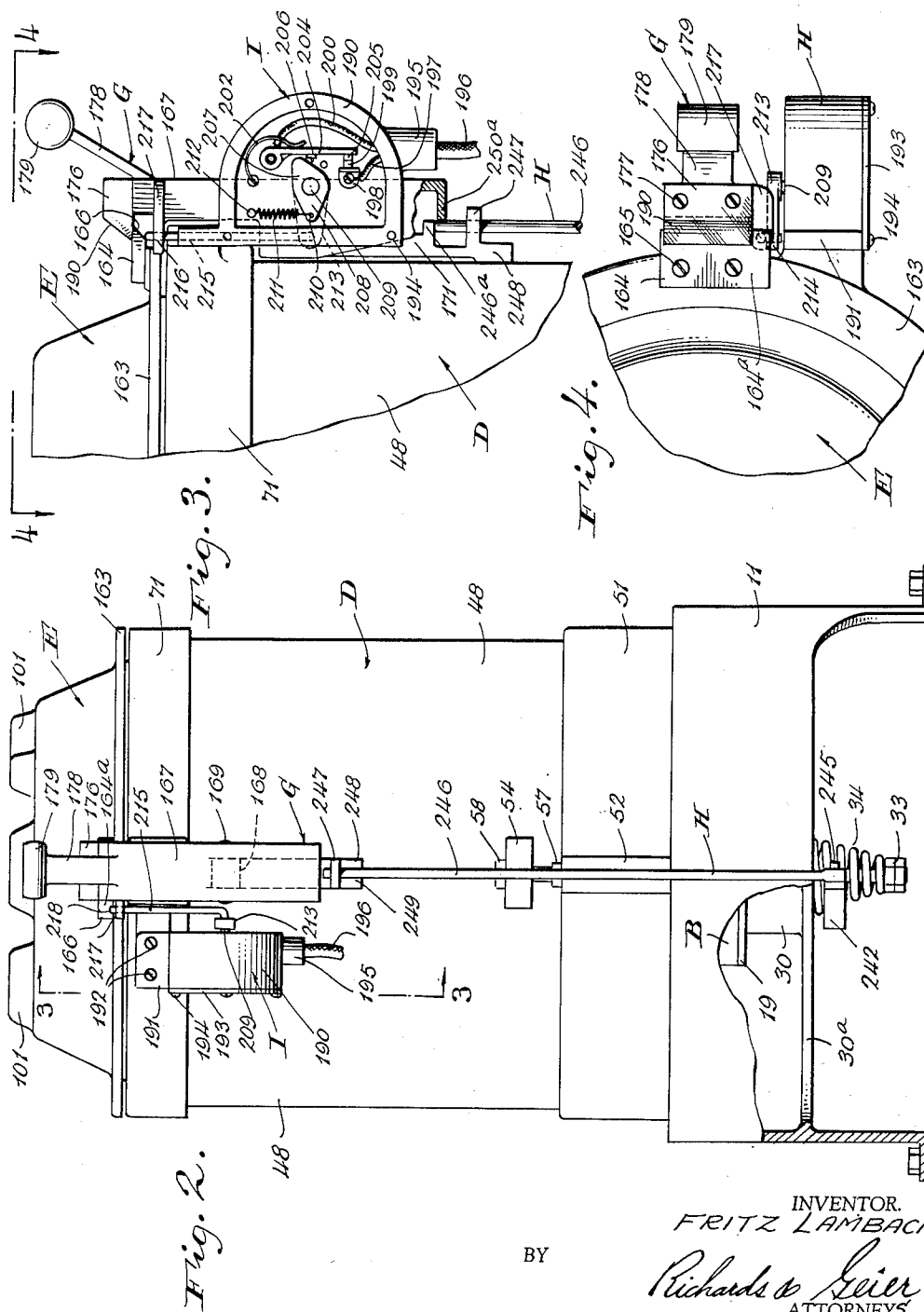
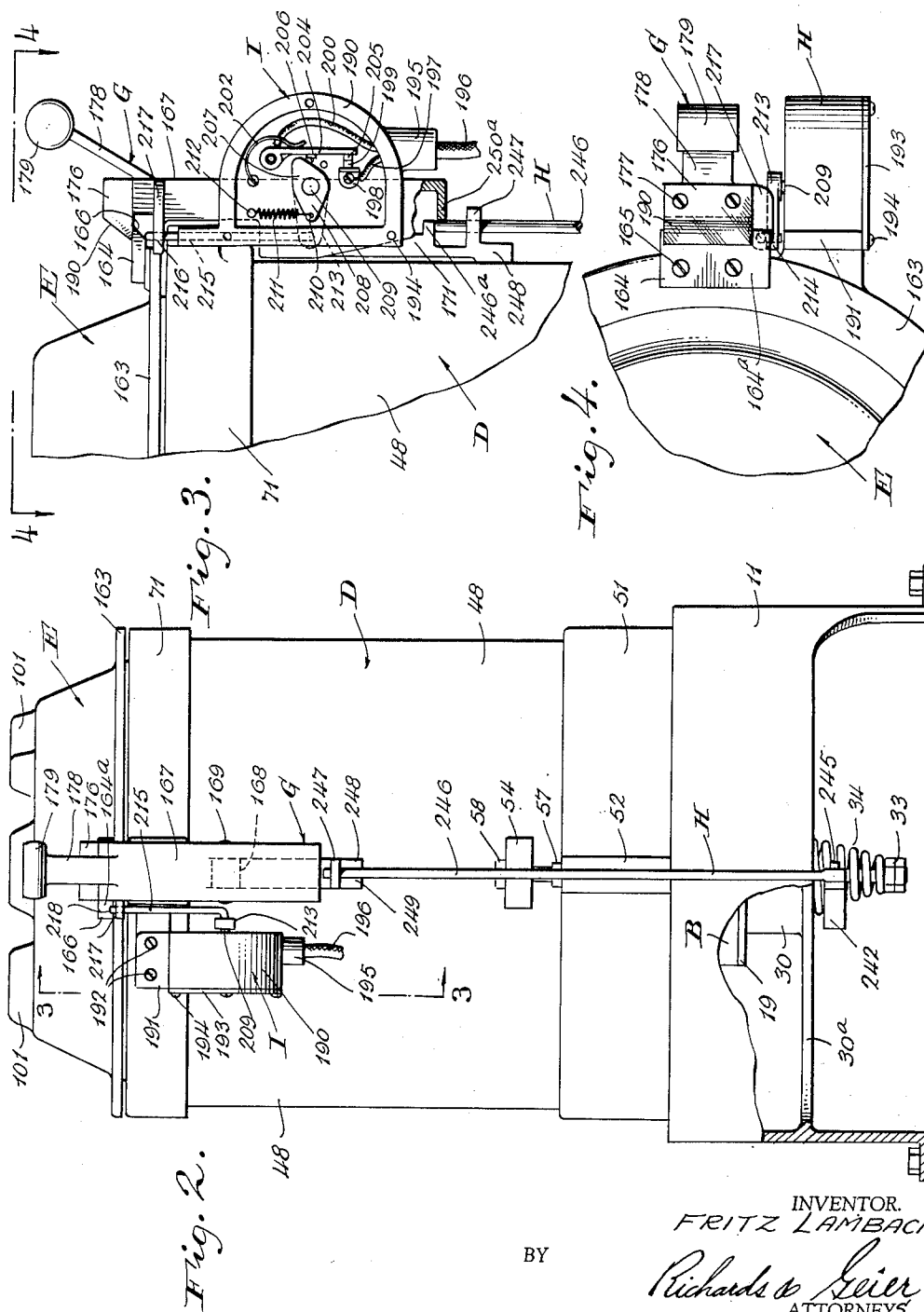
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3 Sheets-Sheet 2



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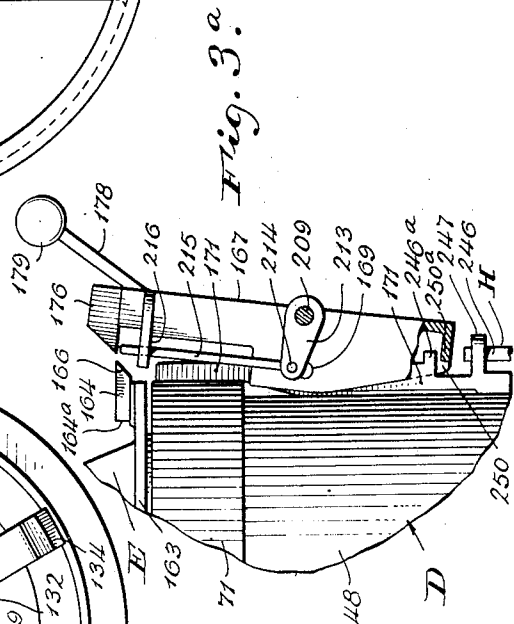
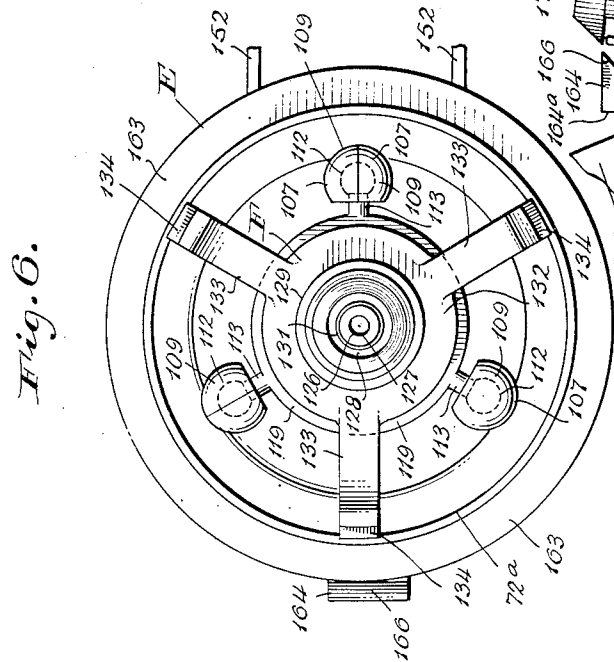
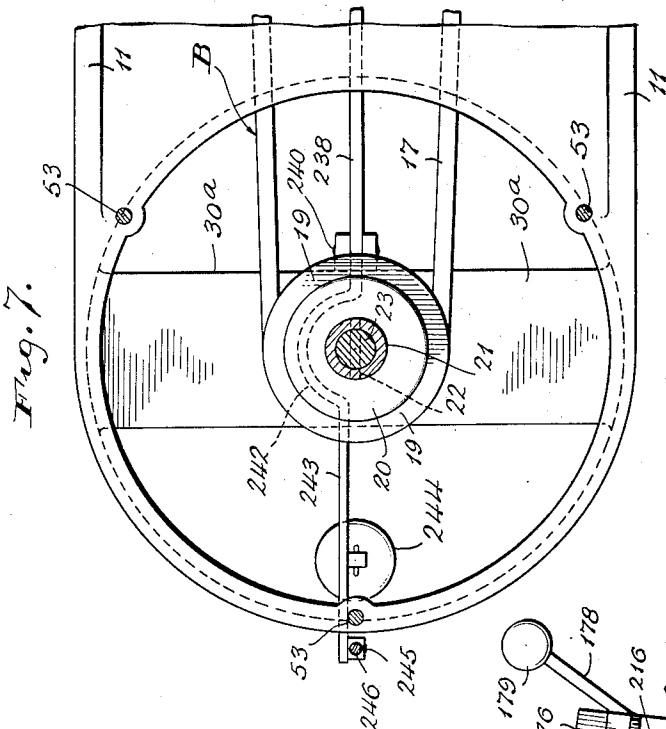
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F. LAMBACH
SAFETY DEVICE

2,169,260

Filed April 20, 1936

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,169,260

SAFETY DEVICE

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Application April 20, 1936, Serial No. 75,344

9 Claims. (Cl. 210—71)

The present invention relates to safety controls and other improvements in centrifugal machines.

Although not restricted thereto, the present invention will be particularly described in connection with its application to a centrifugal extractor, for conditioning yarns, of the type shown in the copending application of Charles F. Dulken, Serial No. 700,214, filed November 29, 1933.

In this application, there is disclosed a centrifugal extractor for treating cones or tubes of yarns, the treating liquid being fed into the interior of the cone or tube and being forced by centrifugal energy through the annular body of yarn and extracted therefrom, while rotating the yarn holder at a relatively high speed.

In the structure shown in said copending application, the yarn cone or cylinder is locked in the rotating basket by a suitable latch.

A separate cover is put over the opening in the said casing. During operation, the operator may readily remove said separate cover; or she may fail to apply it upon initiation of operation. In either case, the rapidly rotating devices would be exposed, with the resultant possibility, that injury might be caused to the hands of the operator, if accidentally they should be inserted within the interior of the casing.

In addition, since it is necessary not only to latch the yarn cone or cylinder in the rotating basket, but also to cover the main casing, there is considerable handling and delay occasioned in setting up the machine for the centrifugal extraction operation and in subsequently dismantling the machine to enable the treated cone or cylinder of yarn to be removed and a new one to be inserted, with decrease in efficiency.

It is among the objects of the present invention to provide an improved extractor construction of the character above described in which assurance will be had that the operator will be protected and guarded from injury by the rotating element during operation of the machine, without the need of providing complicated safety mechanisms and without the necessity of relying upon manual intervention to operate such safety mechanisms.

Another object is to provide an improved mechanism of the character above described in which it will be possible to remove and apply the outer cover to the casing and a latch to the interiorly revolving structure by a single operation, thus materially decreasing the amount of time required for removing a cone or cylinder of yarn after treatment and for replacing a new cone or

cylinder of yarn therein for the next treatment.

Other objects will be apparent or will appear during the course of the specification.

In accomplishing the above objects according to one embodiment of the invention, it has been found most satisfactory to provide a combined basket latch and cover arrangement, the basket latch to hold the rotating basket and yarn package and the cover to close the opening in the casing, whereby the operator by closing the cover may also latch the yarn package in position in the basket.

Preferably, the latch or holder construction for the yarn package and which serves to hold the cylinder or cone of yarn in position is provided with a bearing connection so as to permit the latch or holder carried by the cover to rotate in respect to the cover construction.

In one preferred form this is accomplished by a series of links which suspend the outer bearing element or the fixed bearing element.

To accomplish other objects of the present invention, the driving motor is preferably interconnected with the cover arrangement so that until the cover is closed, the motor may not be operated and, moreover, so that the cover may not be opened until the motor has stopped.

Although this may be accomplished by a variety of manners and by one or more switch constructions controlled by closure of the cover, it has been found satisfactory in one embodiment to place a switch in the motor circuit which will be open until the cover is closed to prevent the motor from being started until the cover has been applied.

The motor may also be connected through a centrifugal device and a lever arrangement with an interlocking means actuated to lock the cover upon the casing as long as the motor is rotating.

A manual switch, which forms no part of the present invention may also be provided to start and stop the motor or, as is usually more preferable from a viewpoint of commercial practice, the motor may be set automatically to "stop" after a predetermined period of operation.

The above and other objects will appear more clearly from the following detailed description which when taken in connection with the accompanying drawings, will illustrate the preferred embodiments of the inventive idea.

Referring to the drawings:

Figure 1 is a side sectional view of the assembly showing the motor, the casing, the rotatable basket, the holder for holding the cone or cylinder

der and the cover with the centrifugal latching arrangement.

Figure 2 is a side view in partial section upon the line 2—2 of Figure 1 showing the cover latch and automatic motor switch in front elevation.

Figure 3 is a fragmentary side view in partial section upon the line 3—3 of Figure 2 upon a slightly enlarged scale with the cover of the switch arrangement removed and with the cover latch closed.

Figure 3a is a fragmentary side view similar to Figure 3, showing the cover latch opened, and only the connecting rod of the automatic motor switch.

Figure 4 is a top view upon the line 4—4 of Figure 3 showing the cover latch and automatic motor switch in top elevation.

Figure 5 is a fragmentary side view upon the line 5—5 of Figure 1 showing the balanced spring cover hinge construction.

Figures 6 and 7 are respectively transverse sectional views upon the lines 6—6 and 7—7 of Figure 1, Figure 6 showing the cover construction and Figure 7 showing the drive construction.

Referring to Figure 1, the motor A is provided with a drive B to the basket C inside the casing D, which basket C receives the cone of yarn J.

The treating and extractor device D is provided with a cover E carrying the rotatable latch or construction F. The cover E is held down upon the casing D by the casing latch G.

The casing latch G cooperates with the centrifugal locking arrangement H to lock the latch G in closed position when the motor A has been started and is driving the basket C.

The switch I, also shown in Figures 2 and 3, opens the motor circuit when the cover is open.

Referring to Figure 1, the motor A may be preferably supported on the cross bars 10 which are in turn supported on the ribs 25 of the machine frame 11.

The shaft 12 of the motor projects downwardly and receives the sleeve 13 and is held in position by the set screw 15.

The pulley 14 forming part of the drive B is slotted at 16 and receives the belt 17, which at its other end fits into the groove 18 of the pulley 19 formed on the lower part of the rotatable cup 20.

The rotatable cup 20 is provided with a reduced portion 21 which is pinned at 22 to the conical end 23 of the bearing stud 24. The bearing stud 24 is provided with the ball bearings 26, 27, which are enclosed in the cup 28, said cup being supported by the rubber gasket 29 upon the sleeve 30 which is connected to the base frame 11 by suitable ribs or arms 30a (see Figure 7).

The cup 28 is provided with an extension 31 which receives a threaded end member 32 and the double lock nut 33, said nuts serving as a reaction member for the coil spring 34 which at its other end reacts against the shoulder 35 on the interior of the supporting sleeve 30.

The ball bearings 26 and 27 are enclosed by the cover plate 36.

The exterior cylinder 37 of the basket C is perforated at 38 and has a downwardly extending boss 39. The boss 39 is provided with the recess 40 and bores 41 to receive the bolts 42, which screw into the tapped openings 43 in the flange 44 at the upper end of the sleeve 21.

The basket C also encloses the central conical holder 45 perforated at 46 which holder is centrally positioned in respect to the cylindrical enclosure 36 by the perforated annular plates 47.

The cylindrical casing 48 of the device D, at its lower end 49 closely fits on to the shoulder 50 inside of the flanges 51 of the upper frame member 52 which is connected to the lower frame structure 11 by the bolts 53.

The cylinder 48 is provided with outstanding ears or bosses 54 which are tapped at 55 to receive the upper threaded ends 56 of the bolts 53, the nuts 57 and 58 respectively locking the upper frame 52 to the lower frame 11 and the casing 48 to the upper frame 52.

The lower frame 52 has inwardly extending continuous annular flange 59 which at its inner end is upturned, as indicated at 60, which flange forms a trough 62 to receive the liquid discharged from the basket C. The trough 62 in turn discharges said liquid through the pipe 63 connected to the said flange 59 at 64.

The yarn package or cone J, which also may take the form of a cylinder has a central conical form 65 perforated at 66 and usually composed of paper. The lower end is closed at 67 and all of the perforations 66 are covered by the mass of yarn 68.

The construction so far described is substantially disclosed in said copending application of Charles F. Dulken, Serial No. 700,214, and forms no part of the present invention, but has been described in this application in order to make clear one specific application of the present invention, to which the present invention is by no means restricted.

In operation the yarn cone J is placed in position as shown in Figure 1, and then latched in position. The latch is shown in said Dulken application as pivotally connected to the perforated cylinder C.

The cover is then closed and through an opening in said cover the treating liquid is poured into the cone 65 to form a pool 69 (see Figure 1). Then the operator switches on the motor A, which rapidly rotates the basket C and the cone J through the pulleys 14 and 19 and the belt 17. The liquid passes through the perforations 66, through the body of yarn 68, through the perforations 46 in the outer conical holder 45 and 38 in the cylinder 37, as indicated by the arrows 70, whereupon the treating liquid flows into the trough 62 and out through the pipe 63.

Not only will the liquid 69 be thoroughly distributed through the yarn body 68, but in addition any excess thereof will be thoroughly extracted. The operation may be continued until the operator turns off the switch or the motor may automatically be stopped after a predetermined time interval.

The cover and latch may then be removed, the treated yarn body lifted out of position and a new yarn body inserted.

The present application is particularly directed to the interconnection between the outer cover E and the interior basket latch or holder F, so as to enable both to be closed and opened by one movement or operation; to the switch I which opens the circuit of the motor A, unless the cover E is closed; and to the centrifugal control H which prevents the cover being opened while the motor is running.

The switch I and the centrifugal control H are primarily for the purpose of making certain that the operator cannot lift the cover while the motor A is rotating the basket C and also to prevent the operator from turning on the motor A until the cover is closed.

Referring specifically to the cover E, the cover

is provided with a central opening 100 and with the elevations 101, each of which has the flat 102 receiving the bolt 103. The end of the bolt 103 carries the ball member 104.

5 The ball member 104 fits into the rubber cap or recess 105 which is received in the hollow 106 formed by the two link sections 107 which are connected together at 108 to form the combined link elements 109, three being utilized (see also Figure 6).

10 The lower portion of the link 109 is also provided with a similar socket 110 receiving the rubber liner 111 into which is fitted the ball 112. The ball 112 is held at the end of the arm 113 which arm is connected to the cup structure 119.

15 In the recess 114 at the bottom of the cup structure 119 is fitted the plate 115, which plate is screwed to the cup 119 by the screws 117.

The inner end of the plate is provided with a groove 116 receiving a washer which presses against the shoulder on the rotating member 118.

20 The cup structure 119 encloses the ball bearing 120 and the inverted base 121 of the cup is provided with a washer 122 fitting against the sleeve 123 of the member 124 which is threaded at 125 onto the rotating element 118. The member 124 clamps the inner element of the ball bearing 120 to move with the rotatable element 118.

30 The ball bearing 120 may be packed with grease or lubricant and is effectively sealed by the washers 116 and 122 against escape of grease or ingress of treating fluid.

The rotatable element 118 is provided with a central bore 126 which continues into the nipple 127, said nipple fitting into the central sleeve 128 of the conical nipple element 129, which conical element 129 is inserted into the open end of the paper cone 65.

40 The sleeve 128 may slide upon the nipple 127 and is normally pressed by the spring 130 so that it will be stopped against the stop ring 131. When inserted into a paper cone, as indicated at 65, it will be moved away from the stop ring 131.

45 The rotating element 118 is also provided with a plate 132 from which extend downwardly the centering fingers 133 each of which is provided with the recess 134 to fit over the inner edge of the cylinder 37, as indicated at 135 (see Figure 1).

50 It is thus apparent that the cover E, by means of the ball and socket connections 104, 105 and 111, 112, and the links 109 may carry the outer bearing element or cup 119, within which the sleeve element 118 rotates, said sleeve element also being bored to permit introduction of the treating fluid into the cone 65, as indicated by the arrow 136 in Figure 1.

60 The arms 133, being rigid with the sleeve 118, will center the bearing in respect to the cylinder 37, while the conical insert 129 will do the same for the paper cone 65.

65 The links 109 permit sufficient movement between the cover E and the rotatable latch or holder arrangement F to accurately center the conical insert 129 and the arms 133 in respect to the cone 65 and the basket C.

70 It is thus apparent that the rotatable holder F may be raised or lowered with the cover and that such holder will automatically adjust itself to center the upper bearing carried by the cover E to the basket C and the yarn package J, which in turn are centered on the lower bearing element 24.

75 The cover E is hinged on the pivot rod 150

which extends through the sleeves 151 (see particularly Figure 5), said sleeves being on the ends of the fins 152 and forming an integral part of the cover construction E.

8 The pivot rod 150 is fixed by the pins 153 to said sleeves 151 and between said sleeves 151 it receives the sleeves 154 having the outstanding flanges 155 and carrying the rod 156. The rod 156 acts as a stop for one end 157 of the spring 162. The spring 162 is coiled around the sleeve 158 and its other end is inserted at 159 into the collar 160 on the end of said sleeve 158. The collar 160 is fixed at 161 to the rod 150.

10 The spring 162 tends to open the cover and in so doing balances the cover so as to relieve the operator of the total weight of the cover in opening and closing the same.

15 In Figure 1, is shown in section, the cover latch construction, which is shown in front elevation in Figure 2 and in side elevation in Figures 2 and 3a.

20 As shown in Figures 1 and 3, the periphery of the cover E away from the hinge 150 is provided with the horizontal flange 163 to which is attached the plate 164 by the screw 165, said plate 164 having a bevelled forward edge 166.

25 The cover E is also provided with a peripheral down flange 72a, fitting inside of the splash deflector element 72 on the inside of the casing rim member 71.

30 The latch G is provided with a box like structure 167 which has the inwardly extending element 168 pivotally mounted at 169 on the sleeve 170 on the bracket 171 screwed at 172 to the casing 48 and its rim member 71.

35 The bracket 171 and the box 167 are provided with the recesses 173 between which the spring 174 reacts. The spring 174 normally tends to bias the box in the direction indicated by the arrow 175 on Figure 1, so as to force the latch plate 176 bolted at 177 to the top of the box 167 over the plate 164 attached to the top of the cover 163.

40 The handle 178 with the hand piece 179 enables the latch plate 176 to be withdrawn from the top of the plate 164 against the spring 174, whereby the cover E may be unlatched and lifted from the top of the cylinder 48 together with the rotatable basket latch structure F.

45 Figure 1 shows the cover down with the cover latch G in position and the switch I is so coordinated with the latch G, that until the latch G is closed, the motor circuit is open and the motor may not be started.

50 The switch I is best shown in Figures 2 to 4 and is provided with a semi-cylindrical casing 190 bolted by the flange 191 and the bolts 192 to the casing 48.

55 The side of the casing 190 is provided with a cover 193 which is bolted in position by the screws 194.

60 The lower portion of the casing is provided with a centrally bored boss 195 which receives the cable 196, which cable has the connection 197 leading to the element 198 carrying the contact 199. The other wire 200 leads to the lever 204 carrying the contact 205. The spring element 202 tends to press the contacts 199 and 205 together to close the motor circuit when the cover E is closed.

70 The lever 204 is moved outwardly by the spring 202 so that the circuit will be broken between the contacts 199 and 205, with the result that the motor may not be started, this being best shown in Figure 3a.

When the cover E is opened, the insulating piece 206 is contacted by the lobe 207 of the cam 208, which is rotatable on the pivot 209 so as to separate the contacts 199 and 205 and open the motor circuit preventing the starting of the motor.

The cam 208 is provided with an ear 210 to which is attached the coil spring 211, the other end of the coil spring 211 being attached at 212 to the casing 190, the coil spring normally biasing the lobe 207 toward the contact piece 206.

The shaft 209 extends through the side of casing 190 and at its outer end carries the link 213 to the end 214 of which is pivotally attached the upwardly extending rod 215. The rod 215 passes through a bore 216 in the flange 217. The upper end of the rod 215, when the cover is opened will be pressed upwardly by the spring 211 to the position shown in Figure 3a, but when the cover is closed, the rod will be pressed against the cam or bevel surface 166 of the plate 164, resulting in the contacts 205 and 199 being pressed together as shown in Figure 3.

It is thus apparent that the motor may be started only when the latch G is holding the cover down, as shown in Figure 1, in which position the rod 215 will be pressed down by contact with the cam surface 166 on the plate 164 attached to the front end of the cover E.

However, it is possible that the operator may lift the cover E during operation of the motor A and although this will cut off power to the motor, the basket C will still be twirling at a relatively high speed and may well cause injury.

To prevent this eventuality, the centrifugal latch H is provided to lock the latch G in position until the motor has substantially stopped.

Referring to Figure 1, the pulley 14 is provided with a downwardly extending boss 225 which is received in the cup 226 to which it is pinned at 227.

The cup is provided with the peripheral flange 228 having the downwardly extending ears 229 on which the weights 231 are pivotally mounted at 230. Moving with the weights 231 are the intumed fingers 232 which bear upon the flange 233 around the periphery of the cup 234.

The bottom of the cup 234 has a recess 235 which receives the screw stud 236, said stud 236 passing through and being held in position on the left end 237 of the lever 238 by the lock nuts 239.

The lever 238 is pivotally mounted at 240 on the bracket member 241 attached to the cross member 30a of the frame 11 and it is provided with the curved portion 242 to circle around the pivot element 24, as best shown in Figure 7.

The left arm 243 of the lever 238 carries the weight 244 to counterbalance the weight of the cup 234 and it is pivotally connected at 245 to the upwardly extending rod 246 which rod at its upper end passes through an opening in the shelf 247 integral with the bracket 171 and attached to the side of the casing 48 by the flange 248 and the screw 249.

When the motor A is rotated at its normal speed, the weights 241 will be thrown outwardly pressing the cup 234 and the right end of the lever 237 downwardly and lifting the left end of the lever 243 and the rod 246 so that its upper end will move within the recess 250 and be stopped by the shelf 246a. This will prevent the lower end 250a of the box 167 from being moved inwardly to unlatch the plate members 176 and 164.

The locking effect of the control H will continue until the speed of the motor has substantially decreased to an extent that it is safe to raise the cover E.

In operation, the cone of yarn J is inserted within the perforated conical cylinder 45 and then the cover E together with the holder F for the basket is locked into position.

The arms 133 by means of the shoulders 134 will adjust themselves to the upper inside edges of the perforated cylinder 37 and the conical insert 129 will adjust itself to fit within the perforated cone 65.

This automatic adjustment will be possible because of the relative movement permitted between the cover E and the basket latch F by means of the ball and socket joints 104—105 and 111—112 and the links 109.

In closing the cover E, the beveled edge 166 will press down upon the beveled edge 190, until the edge of the plate 164 slides under the edge of the plate 176, which plate 176 will be biased toward the position shown in Figure 1 by the spring 174.

When this occurs, the rod 215 will be depressed under the extension 164a of the plate 164 causing the cam 207 of Figure 3 to move away from the lever 204 and permit closure of the contacts 199 and 205, completing the motor circuit.

Before the motor A is started, the desired amount of treating liquid is poured through the opening 100 into the lower part of the cone 65.

The motor A is then started by a suitable switch (not shown), which will result in the liquid 69 being forced outwardly through yarn 69 through the openings 46 and 37, as indicated by the arrows 70 into the trough 62 from whence the used liquid will descend through the pipe 63.

During this rotation, the centrifugal device 231 through the lever 238 will elevate the rod 246 until its upper end enters the recess 250 and contacts the plate 246a. This will prevent the latch G being opened until the motor has slowed sufficiently to make it no longer dangerous to open the cover E.

When the motor has been turned off automatically or manually after a predetermined treatment and has substantially stopped, the cover may be opened by unlatching it through the device G and lifted by the operator, which will be made relatively easy by the balancing spring 162. This will cause the arms 133 and the cone 129 to be lifted out of engagement with the basket C and the yarn package J.

The treated yarn may then be removed and a new yarn package placed in position.

It is to be understood, however, that all these variations and alterations as well as any other changes or modifications within the scope of the invention are all to be included herein and the invention is not to be limited to the specific embodiment above illustratively set forth.

What is claimed is:

1. A centrifugal apparatus having a casing, a rotatable member therein, a motor to rotate said rotatable member at a high speed, a circuit provided with a switch to control starting and stopping of said motor, said rotatable member being provided with a carrier for material to be processed and said casing being provided with an opening to enable access to said material, and insertion and removal thereof, a cover for said opening, a holder for holding said material in said carrier having a linked connection to said cover permitting rotation between the holder and the

cover, a cover latch for holding said cover on said casing, and another switch on said circuit opening said circuit unless said cover is closed.

2. A centrifugal apparatus having a casing, a rotatable member therein, a motor to rotate said rotatable member at a high speed, a circuit provided with a switch to control starting and stopping of said motor, said rotatable member being provided with a carrier for material to be processed and said casing being provided with an opening to enable access to said material, and insertion and removal thereof, a cover for said opening, a holder for holding said material in said carrier, a cover latch for holding said cover on said casing, and rotatable bearing supports for said rotatable member respectively connected to said casing and said cover, said rotatable bearing supports connected to said cover being suspended from said cover by spaced links to permit relative movement between said last mentioned supports and said cover.

3. A centrifugal apparatus having a casing, a rotatable member therein, a motor to rotate said rotatable member at a high speed, a circuit provided with a switch to control starting and stopping of said motor, said rotatable member being provided with a carrier for material to be processed and said casing being provided with an opening to enable access to said material, and insertion and removal thereof, a cover for said opening, a holder for holding said material in said carrier, a cover latch for holding said cover on said casing, and rotatable flexible bearing supports for the upper and lower ends of said rotatable member.

4. A centrifugal apparatus having a casing, a rotatable member therein, a motor to rotate said rotatable member at a high speed, a circuit provided with a switch to control starting and stopping of said motor, said rotatable member being provided with a carrier for material to be processed and said casing being provided with an opening to enable access to said material, and insertion and removal thereof, a cover for said opening, a holder for holding said material in said carrier, a cover latch for holding said cover on said casing, said cover being provided with a plurality of depending flexible links and with an outer bearing element carried by said links, said holder being provided with an interior bearing element carried by said outer element and with a plurality of radial arms to contact the rotatable member and with a central element to contact the material.

5. A centrifugal yarn cone extractor comprising an open top cylindrical casing, a basket provided with a central conical holder for receiving the cone, a motor, a driving connection between the motor and the basket, a holder for said cone to hold said cone down and center it in the basket, a cover for said casing, a latch to hold said cover down carried by the casing, and link means to rotatably suspend said holder from said cover to permit relative lateral movement between the holder and the cover.

6. A centrifugal yarn cone extractor comprising an open top cylindrical casing, a basket provided with a central conical holder for receiving the cone, a motor, a driving connection between the motor and the basket, a holder for said cone to hold said cone down and center it in the basket, a cover for said casing, a latch to hold said cover down carried by the casing, and bearing means for the basket located at the top and bottom of the basket and respectively carried by the cover and the casing, said top bearing means being provided with a connection to said cover permitting relative lateral movement between said cover and said bearing means.

7. The extractor of claim 6, said bearings consisting of ball bearings and being rubber mounted.

8. A centrifugal yarn cone extractor comprising an open top cylindrical casing, a basket provided with a central conical holder for receiving the cone, a motor, a driving connection between the motor and the basket, a holder for said cone to hold said cone down and center it in the basket, a cover for said casing, a latch to hold said cover down carried by the casing, said cover being provided with a plurality of depending flexible links and with an outer bearing element carried by said links, said holder being provided with an interior bearing element carried by said outer element and with a plurality of radial arms to contact the rotatable member and with a central element to contact the material.

9. A centrifugal apparatus having a casing, a rotatable member therein, said rotatable member being provided with a carrier for material to be processed and said casing being provided with an opening to enable access to said material, and insertion and removal thereof, a cover for said opening, a holder for holding said material in said carrier, said cover being provided with a plurality of depending flexible links and with an outer bearing element carried by said links, said holder being provided with an interior bearing element carried by said outer element and with a plurality of radial arms to contact the rotatable member and with a central element to contact the material.

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