J. CLAYTON.

OPENING DEVICE FOR SPINNING BOXES.

APPLICATION FILED APR. 8, 1918.

1,373,169.

Patented Mar. 29, 1921.

2 SHEETS—SHEET 1.

Fig. 3.

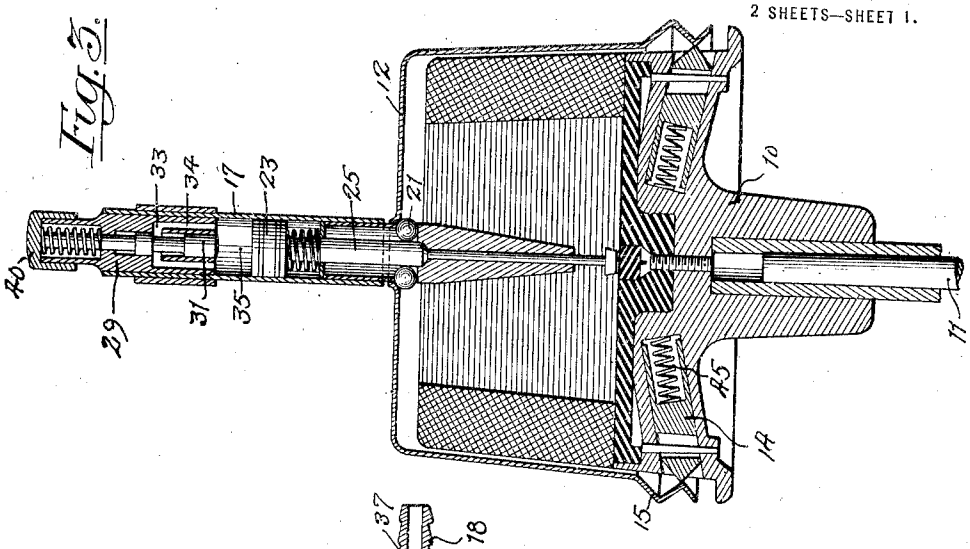


Fig. 1.

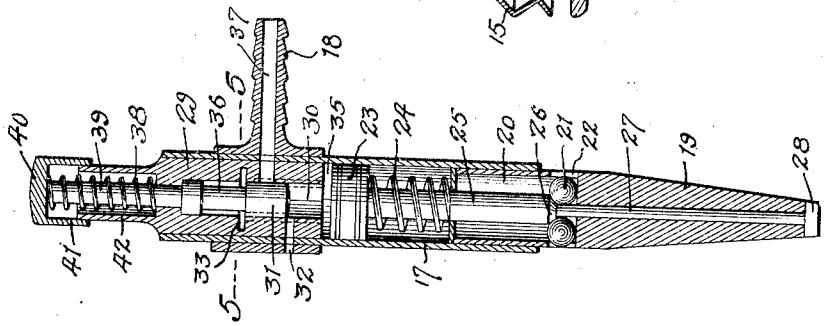
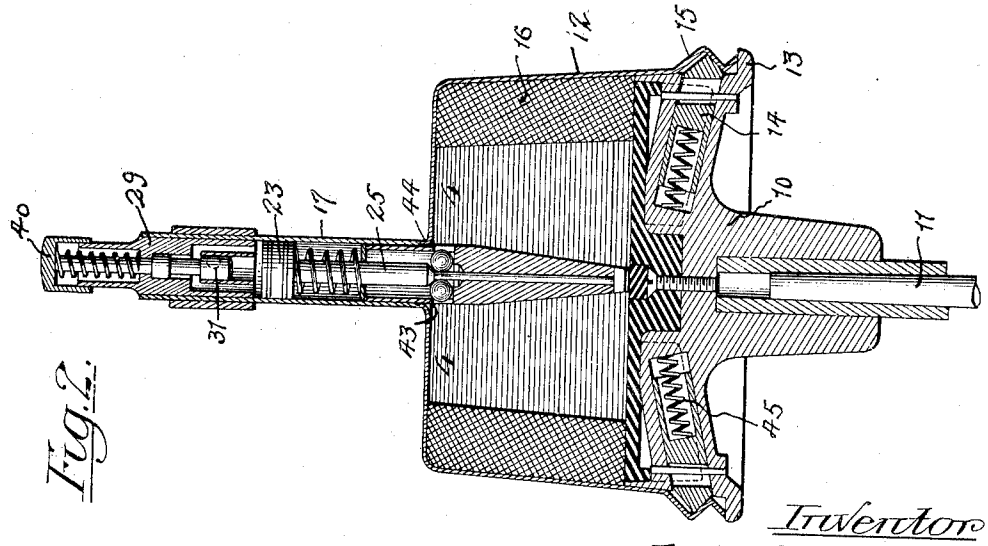


Fig. 2.



Inventor

JAMES CLAYTON

by his Attorneys

Watson and Watson

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2 SHEETS—SHEET 2.

Fig. 4.

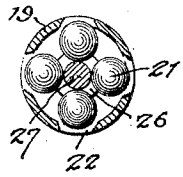


Fig. 7.

Fig. 5.

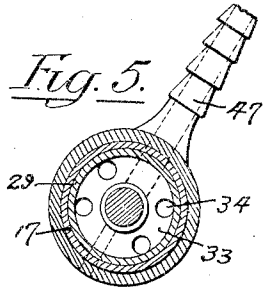


Fig. 6.

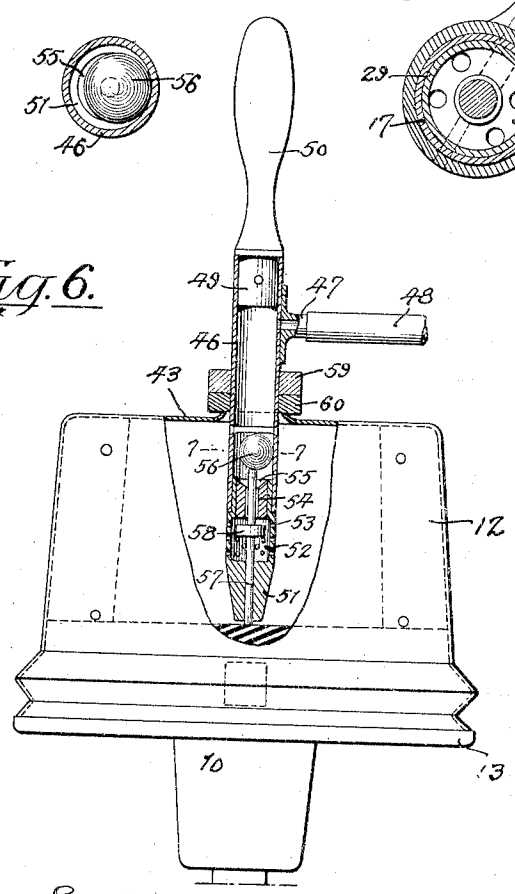
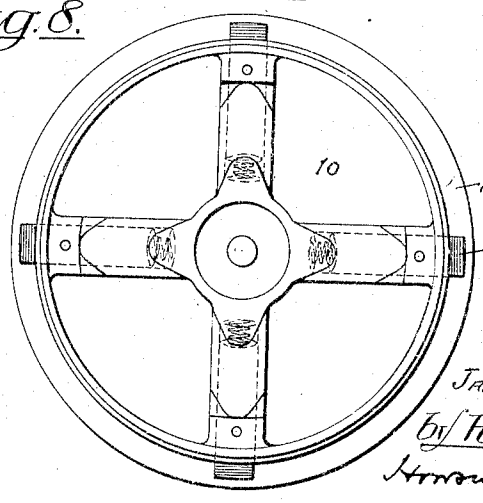


Fig. 8.



Inventor:
JAMES CLAYTON
by his Attorneys,
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UNITED STATES PATENT OFFICE.

JAMES CLAYTON, OF COVENTRY, ENGLAND, ASSIGNOR TO COURTAULDS, LTD., OF LONDON, ENGLAND.

OPENING DEVICE FOR SPINNING-BOXES.

1,373,169. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed April 8, 1918. Serial No. 227,349.

To all whom it may concern:

Be it known that I, JAMES CLAYTON, a subject of the King of Great Britain, residing at 12 Middleborough road, Coventry, England, have invented certain new and useful Improvements in Opening devices for Spinning-Boxes, of which the following is a specification.

The present invention relates to a device for opening spinning boxes and particularly to a device designed to coöperate with a spinning box having a separable cover of the general type shown in my application of even date herewith, the object of my invention being to provide a pneumatically operated device for freeing the cover from the base of the box.

In the accompanying drawings,

Figure 1 is a vertical section through an opening device in which my invention is embodied in one form;

Fig. 2 is a vertical section at right angles to Fig. 1, drawn to a smaller scale and shown in connection with a spinning box of the type above mentioned;

Fig. 3 is a similar view showing the cover of the box lifted;

Figs. 4 and 5 are respectively cross sections on the lines 4—4. Fig. 2, and 5—5, Fig. 1;

Fig. 6 is a vertical section through a modified form of opening device shown in operative relation to a spinning box;

Fig. 7 is a transverse section on the line 7—7, Fig. 6;

Fig. 8 is a plan of the box base with the cover removed, showing the holding pins.

Without going into detail in regard to its construction, the spinning box here shown is of the general type described in my application of even date herewith. It suffices for the purpose of the present invention to point out that it comprises a base 10 fixed on the spinning spindle 11 and a coöperating cover 12 of inverted basket shape, resting upon the flange 13 in the base and held in position by the pins 14, which engage the annulus 15 formed in the box wall. When the fiber cake 16 has been completed and is to be removed from the box, some means must be provided for lifting the cover 12 from the base, and my present invention relates to a suitable device for this purpose.

In the form shown in Figs. 1 to 5 inclusive, this device comprises a piston cylinder 17 carrying an inlet nipple 18, to which a supply pipe (not shown) for compressed air may be attached. The lower end of the cylinder carries a post 19 having in its upper end a chamber 20 for the group of balls 21. The wall of this chamber is apertured at 22 to permit the balls to project partially therethrough, but preventing their complete escape. Within the cylinder 17 works a piston 23 pressed upward by the coil spring 24 which is confined between the top of the post 19 and the piston head. The stem 25 of the piston passes downward through the chamber 20 and merges by a conical section 26 adjacent the balls 21, into a stem 27 of reduced diameter, which in turn passes downward through the post 19 and terminates in the foot piece 28. The latter forms a stop limiting the upward movement of the piston under the influence of its spring 24.

The upper portion of the cylinder 17 is closed by a plug 29 having a central distributing chamber 30, in which works the plunger valve 31. An exhaust passage 32 opens to the lower portion of the distributing chamber, while a recess 33 extends from the chamber 30 to the top of the inlet passages 34 (Fig. 5) bored through the plug and communicating with the piston chamber 35. The piston 31 has a reduced area 36 adapted to establish communication between the bore 37 of the nozzle 18 and the inlet recess 33, but is normally maintained in such position that the bore 37 of the inlet nozzle is closed and the exhaust port 32 is open. This position is assured by the coil spring 38 which surrounds the stem 39 of the piston and is confined under pressure between the top of the plug 29 and the cap 40. A flange 41 on the cap sleeves over the neck 42 on the upper end of the plug and completely houses in the spring 38.

The operation of the device is readily understood by reference to Figs. 2 and 3. When the cover 12 of the box is to be removed, the post 19 of the opening device is

inserted through the hole 43 in the top of the box cover (through which the spinning funnel enters) and is shoved down until the lower end of the cylinder rests upon the flange 44 surrounding the opening 43. The length of the post 19 is so predetermined that in this position of the device, the foot 28 at the lower end of the stem 27 is slightly above the base 10 of the box. If the operator now depresses the cap 40, the valve 31 is moved downward, closing the exhaust port 32 and establishing communication between the bore 37 of the inlet nozzle and the passages 34 which admit air under pressure to the head of the piston. As the piston moves down under pressure, the conical section 26 of its stem 25 bears against the balls 21 and thrusts the same laterally outward through the apertures 22 in the wall of the chamber 20, so that they project sufficiently beyond the post to engage the top of the box lid 12, as shown in Fig. 3. As the piston moves farther downward, the foot piece 28 is halted by coming to rest on the base of the box, and the pressure now exerted by the piston serves to lift the cover 12 by reason of the engagement of the balls 21 therewith. The pressure exerted need not be very great to overcome the resistance of the springs 45 which thrust the pins 14 outward into engagement with the annulus 15. As soon as the cover is thus freed, the operator releases the cap 40, and the valve 31 rises to its normal position under the influence of its spring 38, again opening the exhaust port 32 and permitting the air to escape from the piston chamber 35. The piston rises under the action of its spring 24 and again brings its conical section 26 above the balls 21, so that as the opening device is lifted from the cover, the balls are returned to their normal position within the chamber 20 by their engagement with the flange 44 of the cover. The opening device may now be withdrawn and the cover readily lifted by hand from the box. The fiber cake 16 ordinarily remains at rest upon the bottom of the box, but should it tend to adhere to the cover, the operator may lightly tap the latter to bring about this result. The slightly conical contour of the cover facilitates the separation of the cake from the cover in the manner described.

In the modification shown in Figs. 6, 7 and 8, I have shown an operating device in which the cover is lifted directly by the compressed air. In this construction the device comprises a cylinder 46 having as before a nipple 47, to which a flexible pipe 48 is attached for leading air under pressure to the cylinder. The latter is closed at its upper end by a plug 49 having a handle 50 by which the device may be manipulated. At the lower end of the cylinder 46 is a post 51 chambered at 52 and provided at this point with piercings 53 to permit the escape of air to the interior of the box. A bushing 54, fitted in the upper end of the plug 51, has its upper surface concaved, as at 55, to form a seat for the ball valve 56 which normally rests in this seat. Passing axially through the plug is a stem 57 provided within the chamber 52 with a retaining washer 58 of such thickness as to allow considerable longitudinal play of the pin 57 in the post. Upon the cylinder I secure in any suitable way a metal ring 59 faced on its lower side with a packing 60 of rubber or the like, adapted to bear against and seal the opening 43 in the top of the cover when the opening device is applied thereto.

The operation of this modified arrangement is readily understood from Fig. 6. When the cover is to be lifted, the operator, grasping the handle 50, inserts the post 51 through the opening 43 in the cover. As the post approaches the bottom of the box, the pin 57 engages the latter and is lifted, thus raising the ball 56 from its seat 55 and admitting air through the bushing to the chamber 52, from which it escapes to the interior of the box through the ports 53. Inasmuch as the packing 60 now rests against the flange 44 surrounding the opening 43, the box is closed against the escape of air, and as the air pressure increases in the box, the cover is lifted, carrying with it the cylinder 46. As soon as the cover is freed, the operator lifts the post from the cover, thus permitting the stem 57 to drop back to its normal position, and the ball 56 comes to rest upon its valve seat 55 and prevents loss of air.

Various other modifications will readily occur to those skilled in the art which do not depart from what I claim as my invention.

I claim:—

1. A tool for opening spinning boxes of the type described, comprising a casing element adapted to be inserted through the spinning tube aperture in the box cover, a shoulder adapted to bear upon the box cover surrounding said aperture, and pneumatic means operating within the box to lift the cover from the box base.

2. A tool for opening spinning boxes of the type described, comprising a casing element adapted to be inserted in the spinning tube aperture in the box cover, a member adapted to bear against the box base during the opening operation, and associated pneumatic means for lifting the cover from said base.

3. A tool for lifting the cover of spinning boxes of the type described, comprising a tool element adapted to be inserted through the spinning aperture in the box cover, a member adapted to bear upon the exterior of

the cover surrounding said aperture, and pneumatic means operating within the box to lift the latter from its base.

4. A device for opening spinning boxes of the type described comprising a casing, a thrust member carried thereby and adapted to enter the chamber of the box through the spinning tube aperture in the cover thereof, and bear against the base of the box, together with means underlying the cover in the inserted position of said thrust means and laterally extruded by said thrust means on the application of pressure to the latter.

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

JAMES CLAYTON.