C. B. McDONALD & J. E. McCULLOUGH.

CAN TESTING MACHINE.

APPLICATION FILED DEC. 28, 1909.

1,013,796.

Patented Jan. 2, 1912.

2 SHEETS—SHEET 1.

Fig. 2

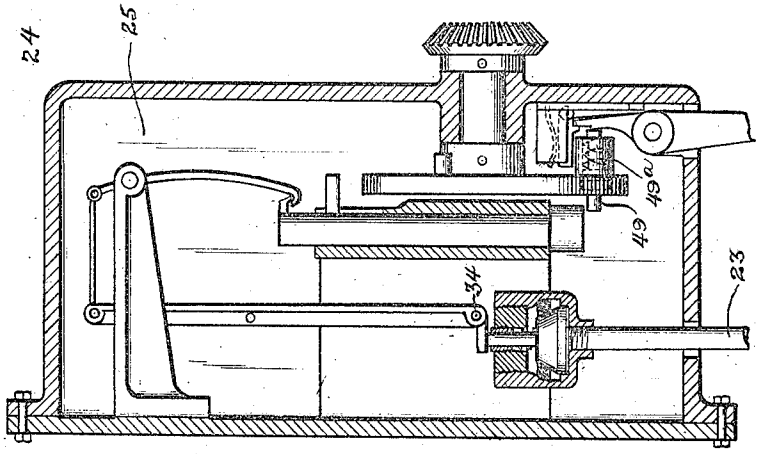

Fig. 1

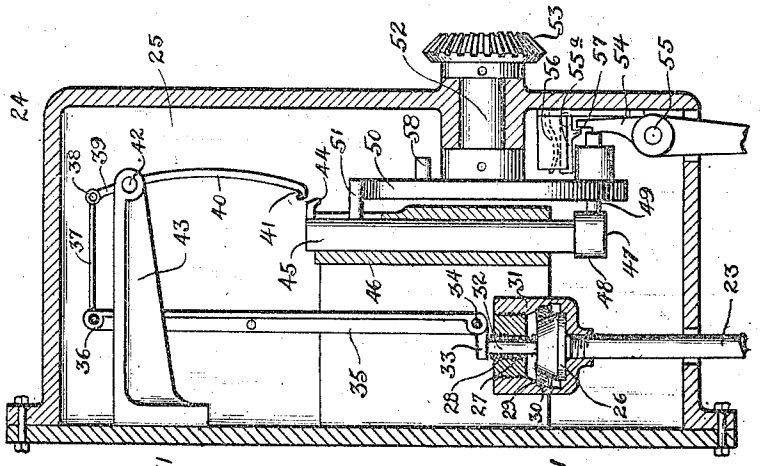

Fig. 6

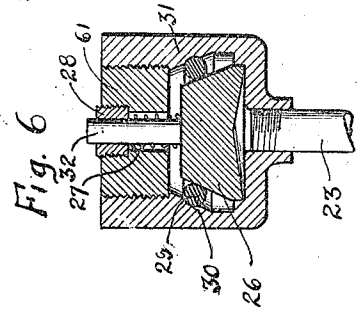

Fig. 7

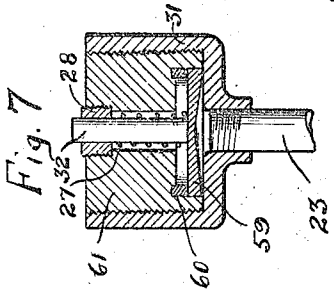

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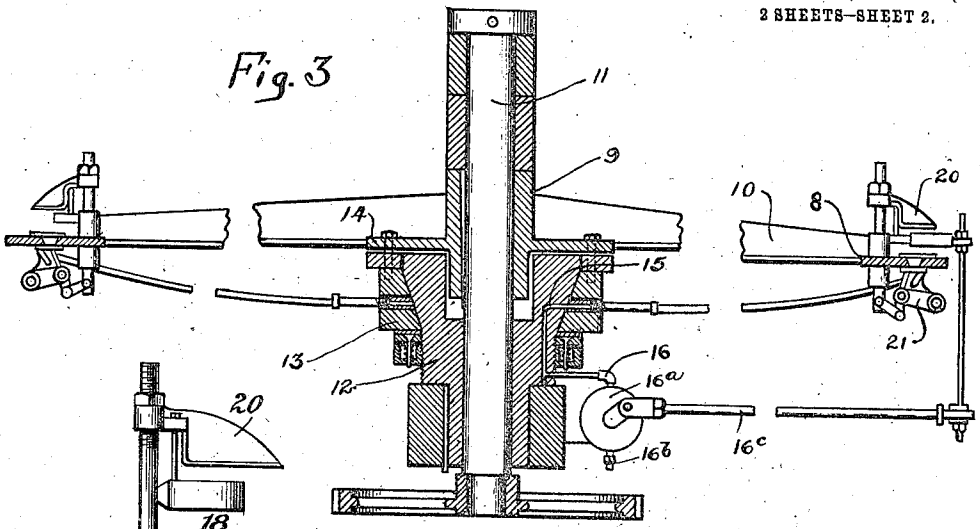
Fig. 3



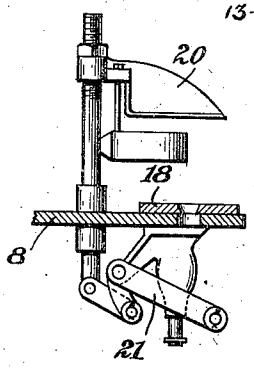
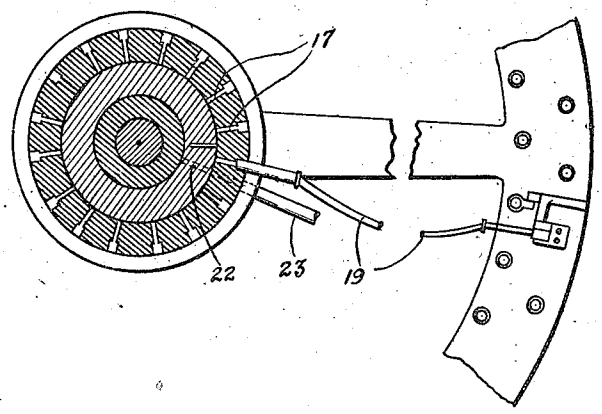


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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CAN-TESTING MACHINE.

1,013,796. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed December 28, 1909. Serial No. 535,252.

To all whom it may concern:

Be it known that we, CHARLES B. McDONALD and JOHN E. McCULLOUGH, both citizens of the United States, and both residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Can-Testing Machines, of which the following is a specification.

This invention relates to can testers of the general style shown and described in applications Serial No. 436,009, filed June 1, 1908, and No. 459,679, filed October 27, 1908.

The object of the present invention is to effect an improvement in the form of pressure-actuated mechanism of the type shown and described in said application S. N. 459,679 (issued as Patent No. 945,573 of date, January 4, 1910) which pressure actuated mechanism automatically operates to reject the defective cans from the testing machine, the improvement consisting in the use of a new form of pressure-actuated piston for operating the catch hook of said pressure-actuated mechanism.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a sectional elevation of the pressure-actuated mechanism in released position; Fig. 2, a similar view of the same, showing the parts in engaged position; Fig. 3, a sectional elevation of the cone-bearing for the testing wheel, together with portions of the wheel; Fig. 4, a cross sectional view of the same; Fig. 5, an enlarged detail of one of the sealing heads; Fig. 6, an enlarged detail, showing in section the preferred form of piston for use in the pressure-actuated mechanism; and Fig. 7, an enlarged detail of a modified form of the piston.

In describing the features of the present invention, it is not deemed necessary to enter into a full description of the construction and arrangement of the testing wheel, the sealing heads, and the can discharge chute, since these features are fully described in the applications previously referred to and particularly in said application S. N. 459,679 (issued as Patent No. 945,573).

As shown in Fig. 3, the testing wheel of the machine comprises a rim 8, which is connected with a hub 9 by means of spokes 10. The hub is keyed to a shaft 11 which is journaled within a fixedly mounted cone 12, which cone is surrounded by a ring 13 beveled on its inner face to fit the cone, and which is secured to a flange 14 on the hub by means of bolts or in any other suitable manner. These features are fully described in the above mentioned applications and further description is deemed unnecessary.

The cone has formed therein an air supply passage 15 which receives air under pressure from a pipe 16, and the air supply passage is adapted to register with any one of a plurality of passages 17, which communicate with a series of sealing heads 18 by means of sections of rubber hose 19. A valve mechanism 16^a controls the admission of air from a main supply pipe 16^b to the pipe 16, and this valve mechanism 16^a is controlled by means of a rod 16^c and connections actuated by the clamping head. However, further discussion of this mechanism is deemed unnecessary, in view of the previously referred to application. It will be understood that each of the sealing heads is thus provided with a pipe, which is adapted to receive air under pressure from the main supply pipe at a suitable point in the revolution of the wheel. Each of the sealing heads coöperates with a clamping head 20 adapted to be actuated by means of suitable links, and levers 21 actuated by cams or other suitable mechanism. The method of actuating these clamping heads is fully explained in the applications above referred to.

In addition to the pressure supply passage the cone is provided with an outlet passage 22, which communicates with a tester pipe 23 leading to the pressure-actuated mechanism 24, which pressure actuated mechanism more especially forms the subject matter of the present invention. The supply passage is so located as to fill each of the cans with air under pressure immediately after its engagement with the clamping head, which pressure thus supplied will be retained within the can, if the latter be perfect, until the passage 17 has almost completed its circle of travel and is brought into register with the outlet passage 22 which communicates with the pressure actu-

ated testing device. If during the course of its travel the can has allowed a reduction of pressure due to leakage, this fact will be ascertained by the pressure actuated testing device, and suitable mechanism set in motion whereby such defective can will be thrown out at a suitable discharge point.

The testing mechanism or device of the present invention is inclosed within a box 25, and its form is as follows: The pipe 23 communicates with a piston 26 of any suitable design, so that air pressure from the pipe 23, acting on the piston 26, will tend to raise the piston. A spring 27 is adapted to oppose the upward motion of the piston, and the amount of compression can be suitably regulated by means of an adjustable nut 28, or in any other suitable manner. The piston 26, in its preferred form, has its upper edge beveled, so that it takes the form of a truncated cone. A gasket or washer 29 contacts the upper beveled surface of the piston and fits into a grooved recess 30 in the inner wall of the piston chamber 31. It will be seen that an upward movement of the piston, due to increase of air pressure beneath it, will increase the sealing tendency of the gasket or washer, by reason of the increased pressure which it exerts upon the piston and piston chamber, and that this increased sealing tendency is exerted just at the time when it is most needed,—that is, when the air pressure has been increased; and also that the greater the air pressure and consequent movement of the piston the greater will be the sealing tendency.

The piston 26 is adapted to operate through the medium of the piston rod 32 on the short arm 33 of a bell crank pivoted at 34 to the frame of the pressure-actuated mechanism. The long arm 35 of the bell crank is connected by a pin 36 to a link 37, which link is connected by a pin 38 to the short arm 39 of a hook lever, the long arm 40 of which carries, at its lower end, a hook 41. The hook lever is pivoted at 42 to a bracket 43 firmly attached to the frame of the pressure-actuated mechanism. It is evident that a very slight movement of the piston will cause a considerable movement of the hook, by reason of the connection of the long arm of the bell crank with the short arm of the hook lever.

The hook 41 is adapted to engage a lug 44 attached to an actuating rod 45 which is slidably mounted within a sleeve or guideway 46, and is provided, on its lower end, with a cam head 47, the side face 48 of which is flattened, and is adapted, when the pin is dropped, to engage a spring-supported pin 49 outwardly projecting from the face of a cam wheel 50. A spring 49ª tends to constantly maintain said pin in projected position. The cam wheel is of such shape that a pin 51, riding on its edge and attached to the actuating rod 45, will be carried up and down with the rotation of the cam wheel when the lug 44 is not in engagement with the hook 41. The cam wheel is mounted on a shaft 52 driven by means of a bevel pinion 53, or in any suitable manner, so that the cam wheel will make one complete revolution for the movement of each can on the rim 8 past a given point. The spring-supported pin 49 is adapted to engage the upper end of a lever 54, which is pivoted at 55 and is adapted to actuate a discharging runway for discharging the cans from the machine, which runway is of the general character of that shown and described in said application S. N. 436,009 (issued as Patent No. 938,165). The upper end of the lever 54 normally underlies a pivoted catch finger 55ª, which is held in engagement with the lever by means of a spring 56. The catch finger is provided with a depending tooth 57 which, when the lever 54 is thrust back, as shown in Fig. 1, will hold the lever against a return movement until the revolution of the cam wheel has brought a stop pin 58 under the end of the catch finger 55ª, thereby raising it and allowing the lever 54 to resume its normal position.

In use, the cans are fed in succession to the tester wheel in any suitable manner, and are successively clamped in position against the sealing heads, each can in turn receiving its charge of air under pressure and is carried around to practically a complete revolution until it is brought into communication with the tester. If the pressure within the can is reduced by leakage, the pressure actuated mechanism will operate in the manner described in the above mentioned application, Serial No. 459,679.

It is not intended to limit our invention to the use of a piston of the type shown in Figs. 1 and 2 and in detail in Fig. 6, but it is contemplated to use any suitable form of piston; such, for example, as shown in Fig. 7, in which figure the piston 59 contacts on its upper face against a gasket 60, of rubber or other suitable material, in such a way as to increase the pressure between the parts when the increased air pressure from the pipe 23 forces the piston upward.

In practice we prefer to form the piston box in the manner shown in Figs. 6 and 7, wherein we provide a removable cap 61 threaded into the body of the box 31, so that, by unscrewing the parts, the piston, gasket, spring, etc., may be removed for adjustment, replacement, or cleaning.

In this application where we use the word piston, we do not limit ourselves necessarily to the use of a piston of the design shown,

but wish to include also pistons of the ordinary style acting in properly arranged piston chambers.

We claim:

1. In a testing device of the class described, the combination of an actuating pin, a finger on the same, a hook lever suitably pivoted to a stationary portion of the tester, a bell crank lever suitably pivoted to a stationary portion of the tester, a link connecting one arm of the bell crank with one arm of the hook lever, an air chamber and a pneumatic piston therefor in engagement with the other arm of the bell crank, the air chamber being in communication with a device under test, substantially as described.

2. In a testing device of the class described, the combination of an actuating pin, a finger on the same, a hook lever suitably pivoted to a stationary portion of the tester, a bell crank lever suitably pivoted to a stationary portion of the tester, a link connecting one arm of the bell crank with one arm of the hook lever, a pneumatic chamber having its walls inwardly and upwardly beveled in communication with a device under test, a piston within the chamber, and having its side wall inwardly and upwardly beveled, a compression sealing ring interposed between the side wall of the piston and the side wall of the chamber, and a piston rod on the piston in engagement with the free arm of the bell crank, substantially as described.

3. In a testing device of the class described, the combination of an actuating pin, a finger on the same, a hook lever suitably pivoted to a stationary portion of the tester, a bell crank lever suitably pivoted to a stationary portion of the tester, a link connecting one arm of the bell crank with one arm of the hook lever, a pneumatic chamber having its walls inwardly and upwardly beveled in communication with a device under test, a piston within the chamber, and having its side wall inwardly and upwardly beveled, a compression sealing ring interposed between the side wall of the piston and the side wall of the chamber, means tending to restore the piston into lowered position against fluid pressure within the chamber, and a piston rod on the piston in engagement with the free arm of the bell crank, substantially as described.

4. In a testing device of the class described, the combination of an actuating pin, a finger on the same, a hook lever suitably pivoted to a stationary portion of the tester, a bell crank lever suitably pivoted to a stationary portion of the tester, a link connecting one arm of the bell crank with one arm of the hook lever, a pneumatic chamber having its walls inwardly and upwardly beveled in communication with a device under test, a piston within the chamber, and having its side wall inwardly and upwardly beveled, a compression sealing ring interposed between the side wall of the piston and the side wall of the chamber, a spring normally tending to restore the piston into initial position against fluid pressure within the chamber, means for adjusting the tension on said spring, and a piston rod on the piston in engagement with the free arm of the bell crank, substantially as described.

5. In a can testing machine, the combination of a pressure chamber in communication with a device under test, a piston in said pressure chamber, an actuating member, a series of pivoted levers operatively connected at one end to the piston and at the opposite end to the actuating members, said levers amplifying the movements of the piston to effect an operation of the actuating member thereby, substantially as described.

6. In a can testing machine, the combination of a pressure chamber in communication with a device under test, a piston in said pressure chamber, an actuating member, levers extending between the piston and actuating member for communicating movement from the piston to the actuating member, a hook connection between the actuating member and the lever movement of the piston being amplified by said levers, substantially as described.

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