No. 609,232. Patented Aug. 16, 1898.

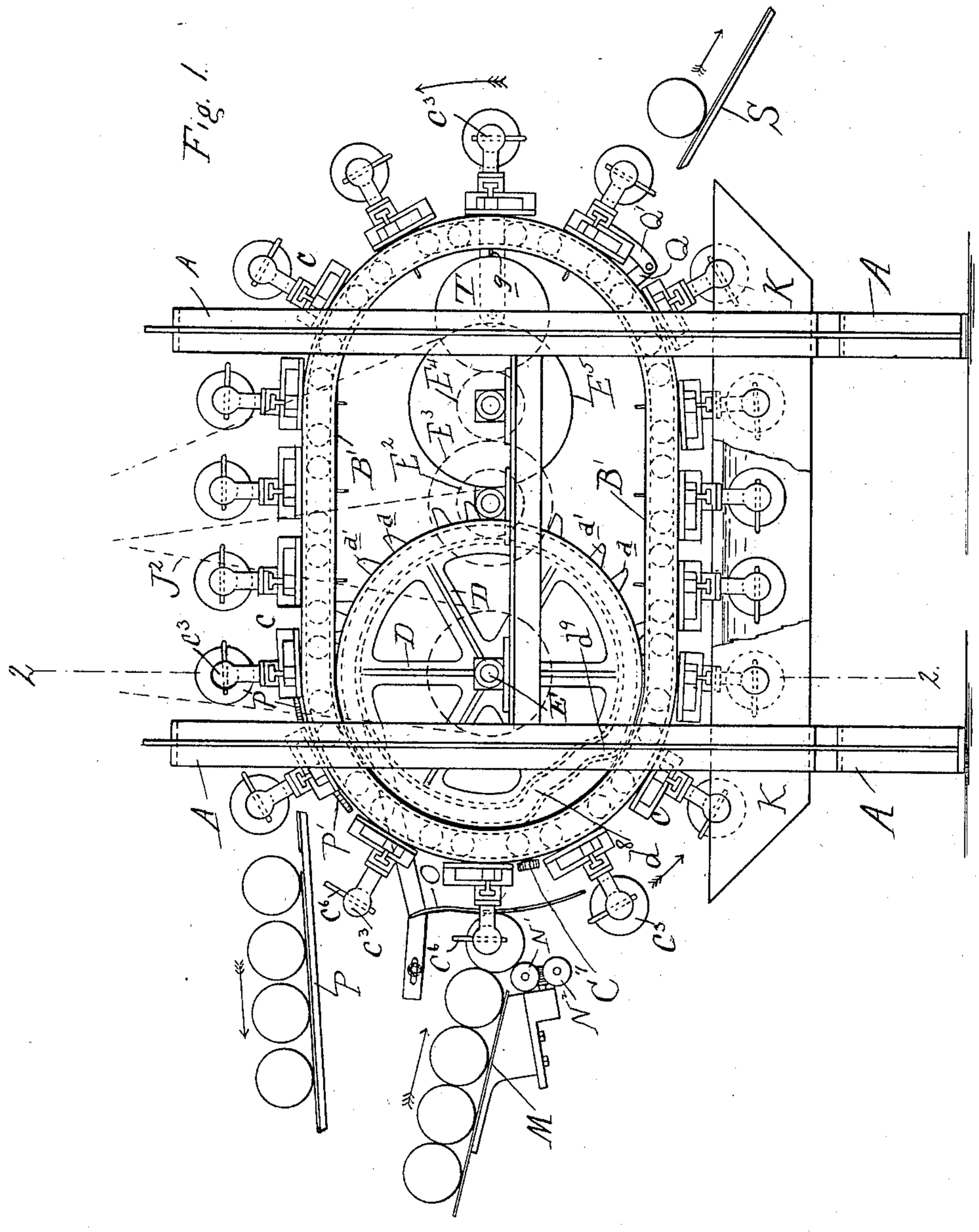
E. P. HOLDEN & J. L. BOARD.

CAN TESTING MACHINE.

(Application filed June 15, 1894.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 5 Sheets—Sheet 2.

Fig. 2

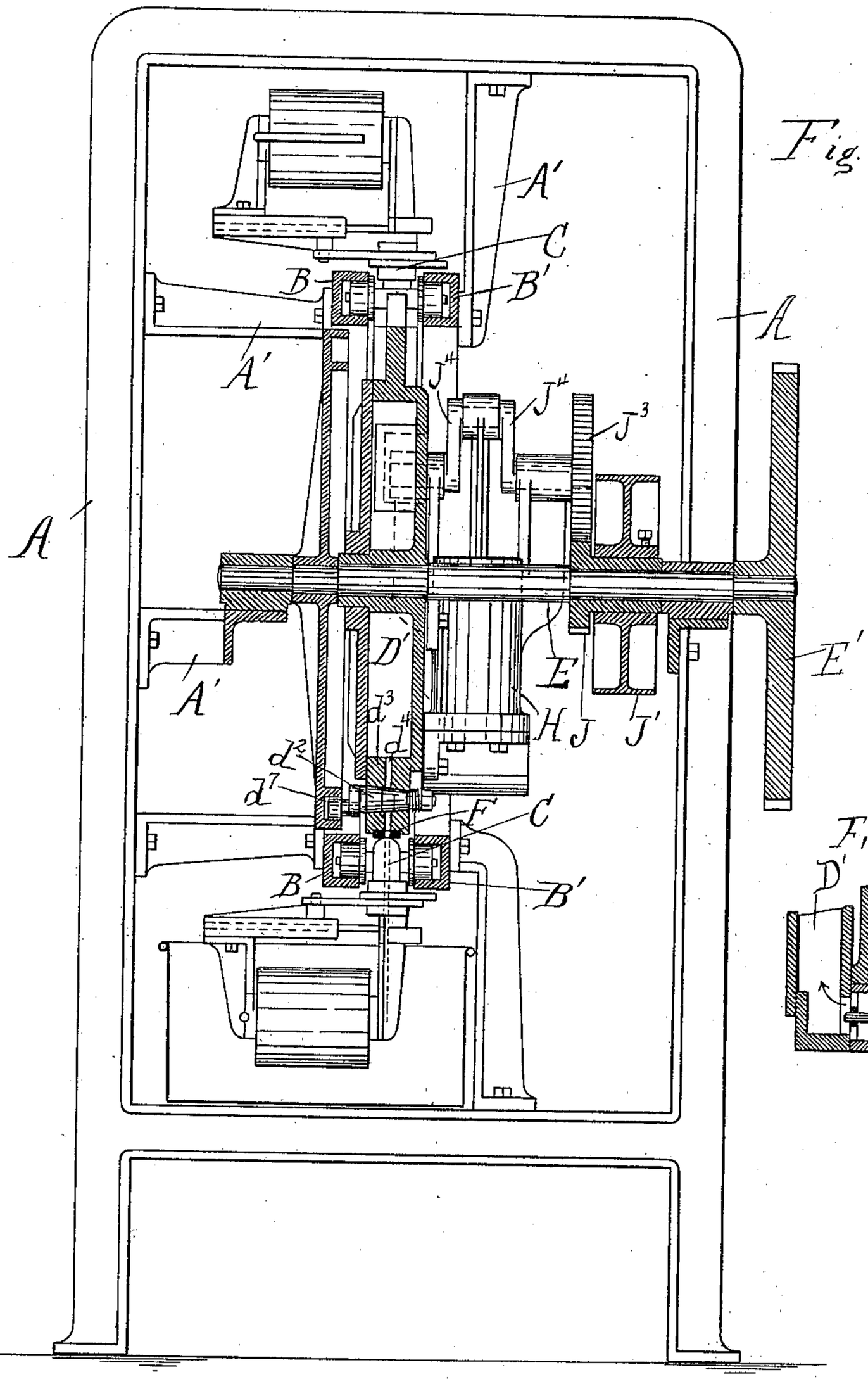
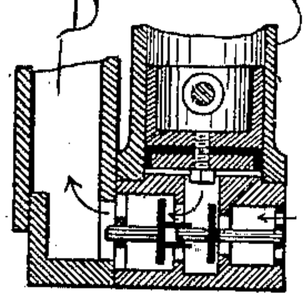


Fig. 19.



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(No Model.) 5 Sheets—Sheet 3.

Fig. 3.

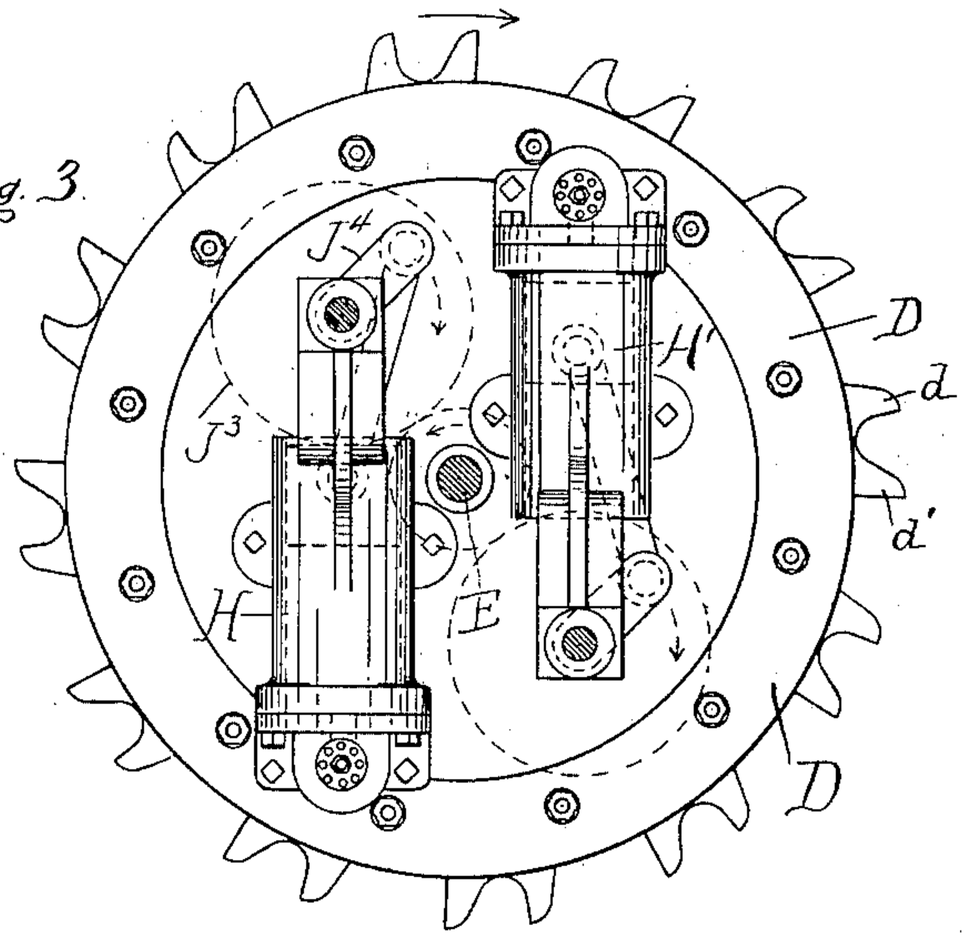


Fig 4.

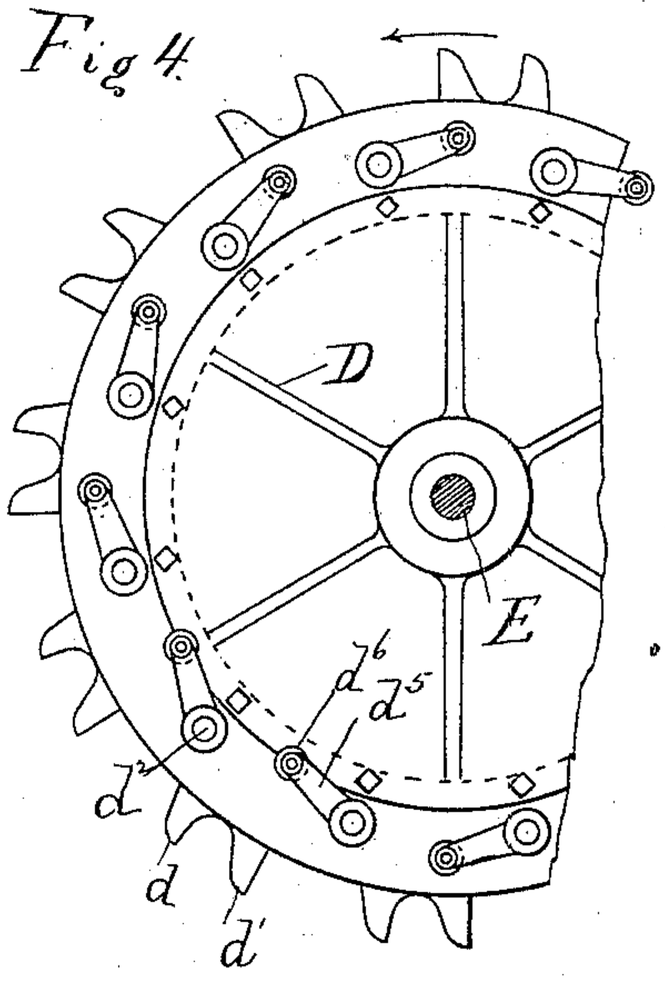


Fig 5.

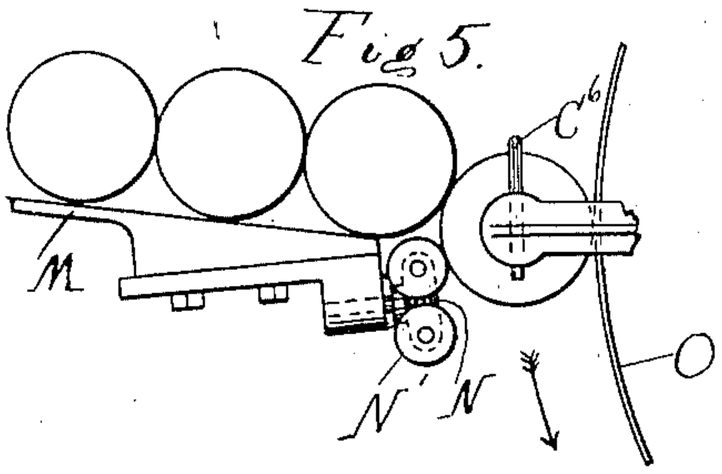


Fig 6.

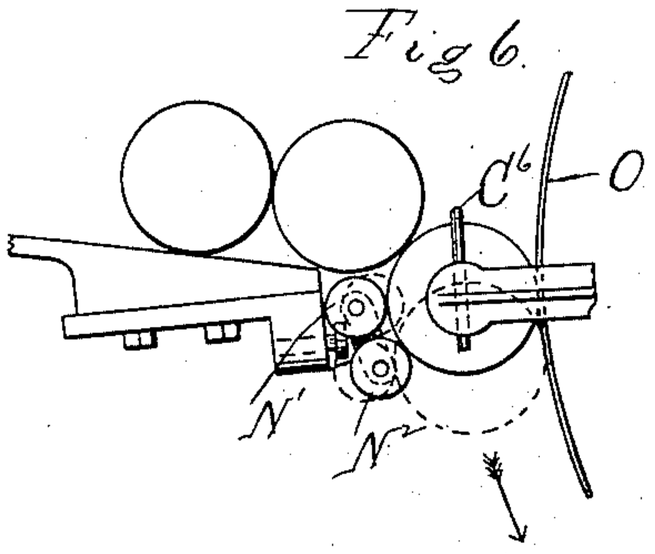


Fig 7.

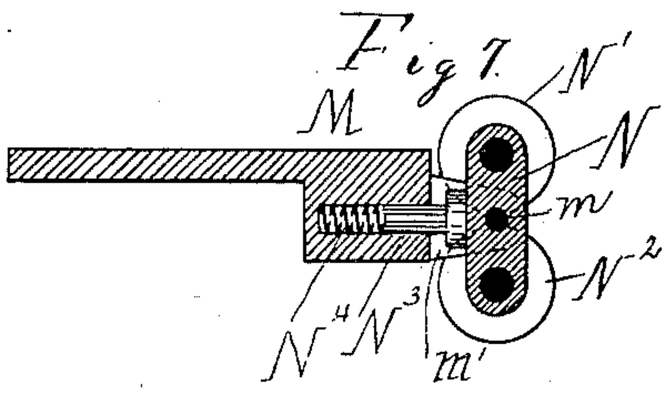
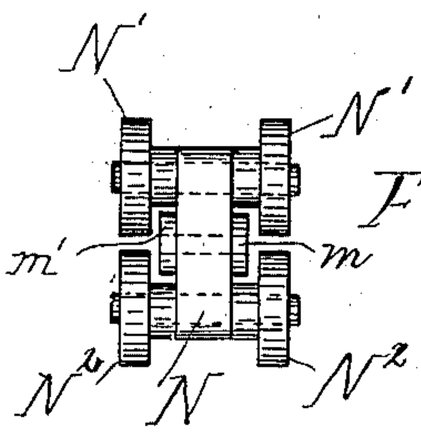


Fig 8.



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(No Model.) 5 Sheets—Sheet 4.

Fig 9.

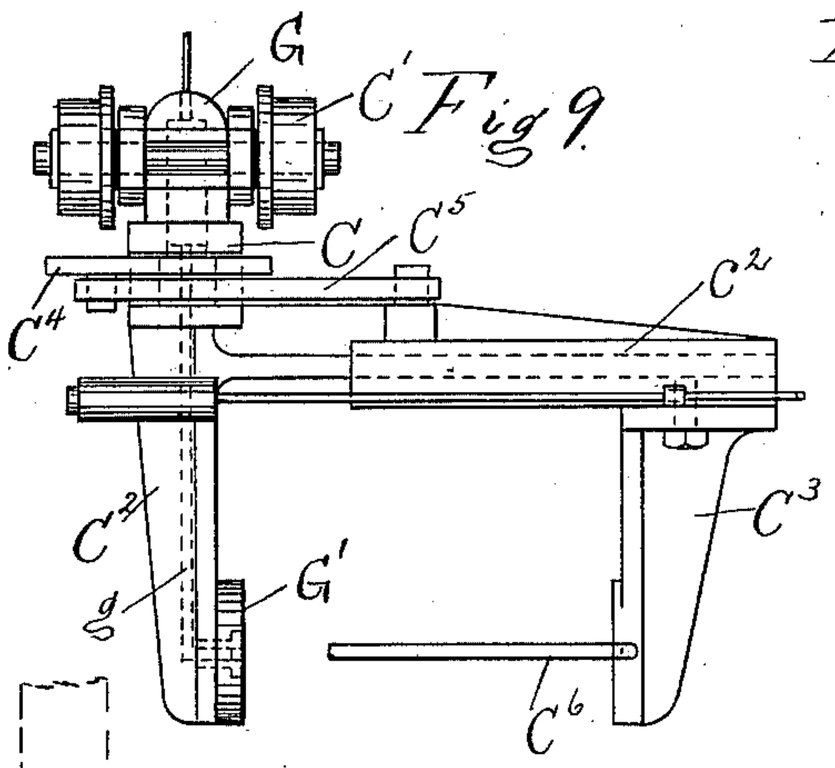


Fig 10.

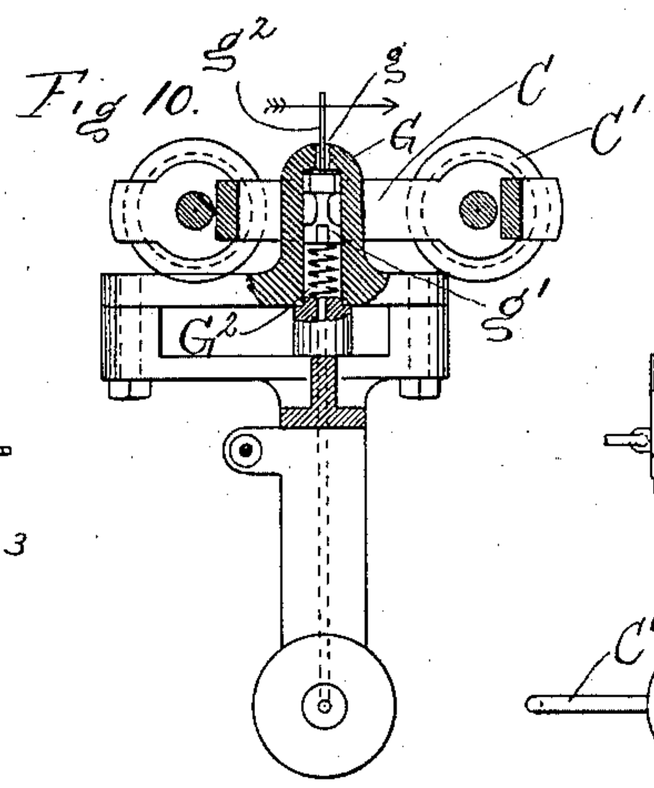
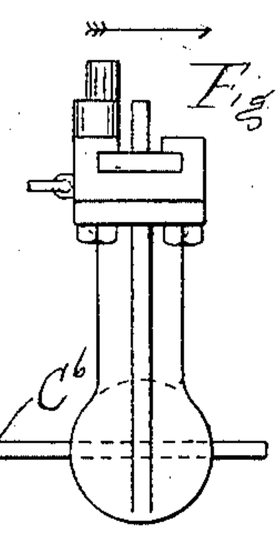


Fig 11.



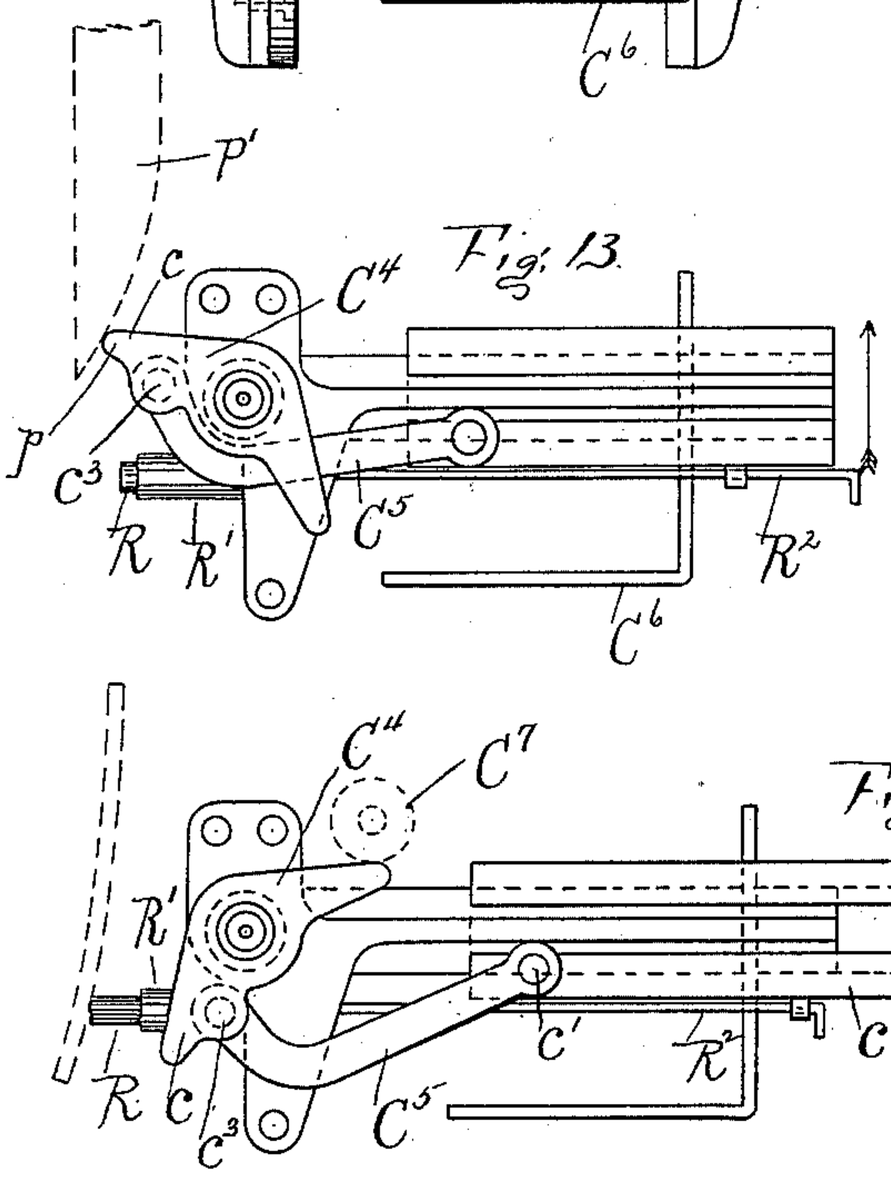


Fig. 13.

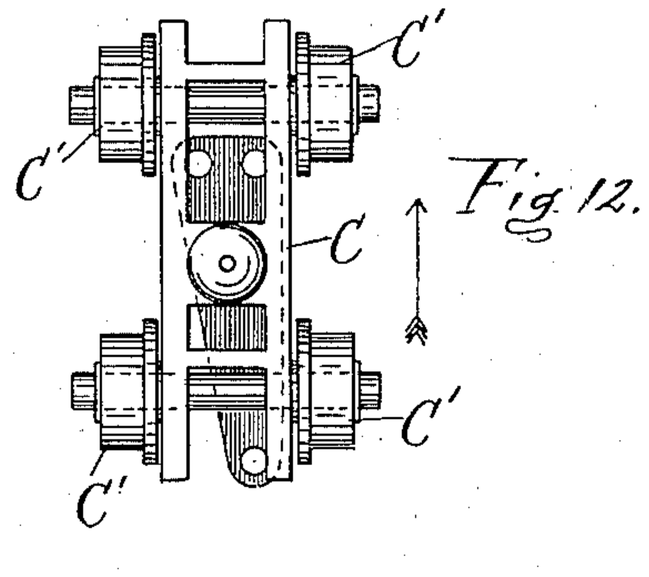


Fig. 12.

Fig. 14.

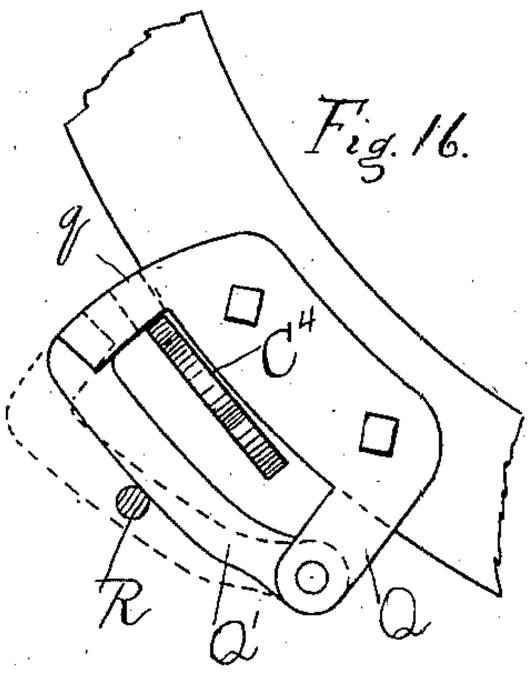


Fig. 16.

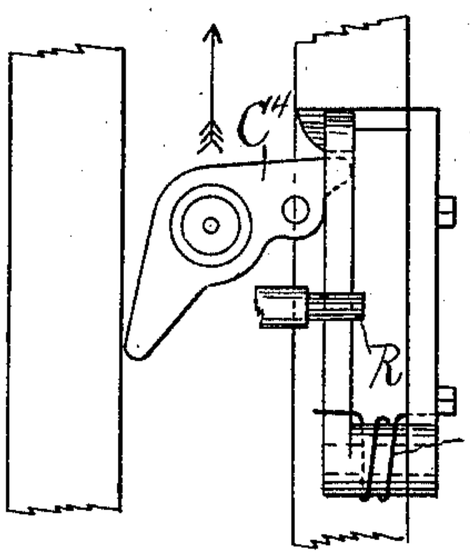


Fig. 15

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CAN TESTING MACHINE.

(Application filed June 15, 1894.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 18.

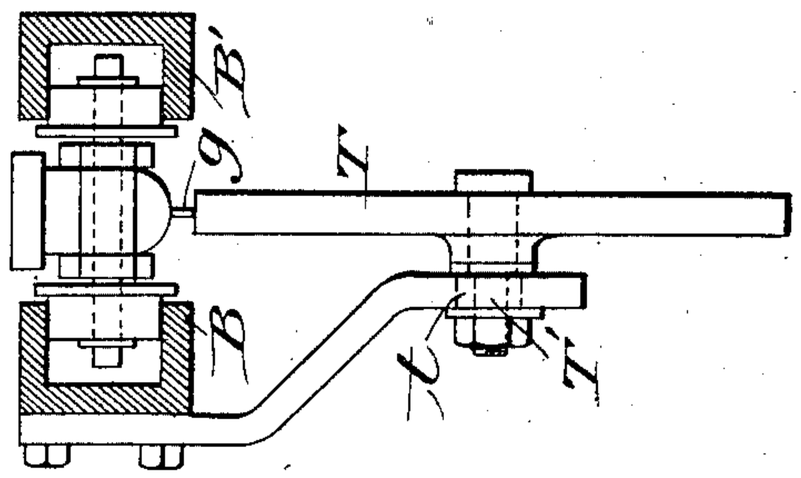
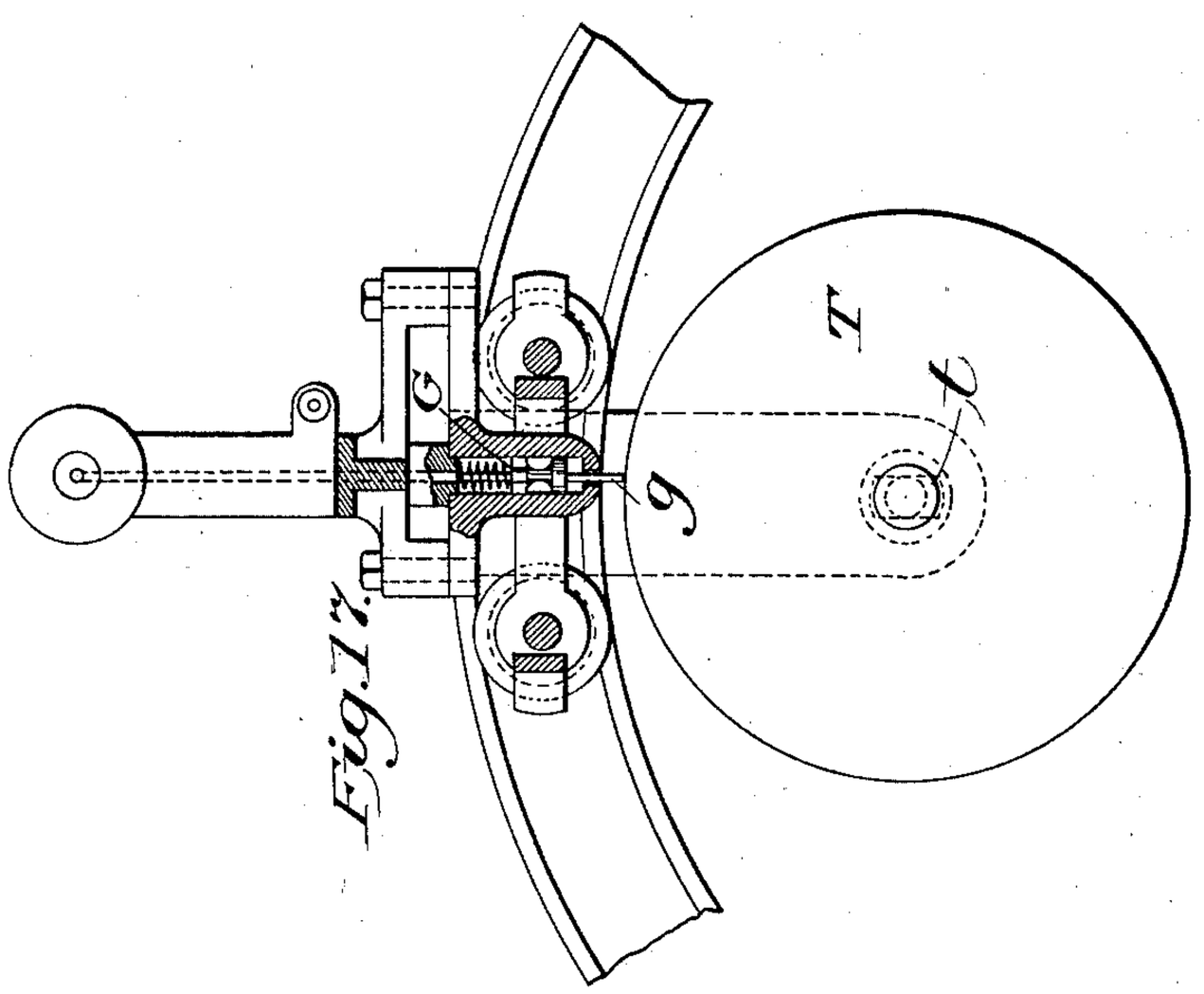


Fig. 17.



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UNITED STATES PATENT OFFICE.

EDWARD P. HOLDEN AND JAMES L. BOARD, OF CHICAGO, ILLINOIS.

CAN-TESTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 609,232, dated August 16, 1898.

Application filed June 15, 1894. Serial No. 514,663. (No model.)

To all whom it may concern:

Be it known that we, EDWARD P. HOLDEN and JAMES L. BOARD, citizens of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Can-Testing Machines; and we declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has for its object the production of a can-testing machine of that class in which air is used to test the perfectness of the can.

The invention is more particularly applicable to that class of mechanism in which the cans are first filled with compressed air and while so filled submerged in a bath of water or other liquid, the escape of air from the can causing bubbles to rise through the water and thus showing that the can is defective.

The invention consists in a combination of devices and appliances hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a vertical section on the line 2 2 of Fig. 1. Figs. 3 and 4 are views of the sprocket-wheel. Figs. 5 and 6 are details showing the manner of delivering the cans to the carriages. Figs. 7 and 8 are details of the mechanism at the end of the chute. Fig. 9 is an end elevation of one of carriages. Fig. 10 is a side elevation of the same. Fig. 11 is a view of the opposite side. Fig. 12 is a view of the under side of the carrier. Figs. 13, 14, 15, and 16 are details of the switch mechanism. Figs. 17 and 18 show the mechanism for relieving the pressure on the cans at the desired time. Fig. 19 is a sectional view showing the communication between the pump and chamber.

In carrying out the invention A, Fig. 2, represents a suitable framework for supporting the operative mechanism. This framework is at suitable points provided with arms A′ for directly supporting the operative parts. Supported by the arms A′ are two channel-irons B B′, facing each other and forming an endless track or way in which the carriages C travel. The carriages C (shown in Figs. 9, 10, 11, and 12) are made up of a suitable framework C, having four wheels C′. The frame C carries also a stationary upright C^2 and a movable upright C^3. Pivoted to the upright C^2 is a lever C^4, and pivoted to one arm *c* of this lever is a rod C^5, the other end being pivoted at *c′* to the horizontal portion c^2 of the upright C^3. (See Figs. 13 and 14.) Now when the lever is thrown to the position shown in Fig. 14 by switch mechanism hereinafter described the can may be inserted between the uprights C^2 C^3, Fig. 9, and then when the lever C^4 is thrown to the position shown in Fig. 13 by suitable cam mechanism the can is clamped between the two uprights. On the way B B′ are a series of these carriages C, there being enough to substantially fill the way, so that the end of one frame C will abut the frame of the next adjacent carriage. Thus if one carriage is pushed the entire line is moved.

D is a suitable sprocket-wheel (see Figs. 3 and 4) having a series of projections or sprockets *d d′*, there being one set of these for each carriage. When the sprocket-wheel is revolved by means of the shaft E, these sprockets engage the carriages and cause them to move around the endless track. On this sprocket-wheel (see Fig. 4) is a series of valves d^2. (See also Fig. 2.) The valve consists of a block d^2, extending through a portion d^3 of the sprocket-wheel, which is provided with an orifice or bore d^4. The block is also transversely bored, so that when set in one position it will form a portion of the orifice d^4 and when turned to another position will cut off the orifice d^4. This block is provided with an arm d^5, Fig. 4, having on its end a roller d^6. This roller travels in a channel d^7. (See Fig. 2.) This channel conforms substantially to the sprocket-wheel D except at one point, where it forms a cam-surface d^8. (See Fig. 1.) The roller d^6, traveling in this channel, throws the arm when it reaches the point d^8 to such a position that the block d^2 opens the orifice d^4. At the end of the orifice d^4 is a suitable gasket F.

By reference to Figs. 9 and 10 it will be observed that each carriage C is provided with a projection G, which is bored, as at *g*, the bore extending up through the standard C^2

to the gasket G′. In the projection G is a suitable recess or chamber G^2, in which is a valve g', provided with a stem g^2, the purpose of which will be hereinafter explained. It will also be observed by reference to Fig. 2 that when the carriages reach the sprocket-wheel the projection G bears upon the gasket F. Thus when the roller d^6 is in the portion d^8 of the channel d^7 there is a clear opening from the space D′ in the sprocket-wheel through to the end G′ of the standard, and with the can in the carriage there is a clear opening from the interior of the sprocket-wheel through to the can. Carried by the sprocket-wheel are two pumps or air-compressors H H′, although a greater or less number might be used, if desired. Loosely sleeved on the shaft E is a pinion J, on the hub of which is a band-wheel J′, driven by a belt. (Shown by dotted lines J^2, Fig. 1.) Meshing with the gear J is a gear J^3, the revolution of which acts through the crank-arms J^4 to operate the pistons of the pumps H H′. The pumps or air-compressors H H′ both communicate with the interior chamber D′ of the sprocket-wheel, as shown in Fig. 19, so that there is always a quantity of compressed air in this chamber D′.

K, Fig. 1, is a tank filled with water or other liquid.

M is a suitable chute down which the cans are rolled to the machine. At the end of the chute (see Figs. 5, 6, 7, and 8) is a frame N, carrying rollers N′ N^2. This frame N is pivoted, as at m, in projections m' on the frame M and is held in a yielding upright position by a rod or arm N^3, entering an orifice or bore in the frame M, a spring N^4 bearing on the arm.

O is a shield or stop supported by the frame of the machine. As the can rolls down the chute and strikes this shield it is held there between the shield and the roller N′ until a carriage C comes along with a rod C^6, carried by the standard C^3 on the carriage, strikes the can and moves it down, as shown in Fig. 1, the rollers N′ tilting slightly to allow it to pass, as shown by dotted lines, Fig. 6. As this takes place the lever C^4 strikes the roller C^7, (see Figs. 1 and 14,) and a continued movement of the carriage carries the lever C^4 to the position shown in Fig. 13, with the pivotal point c^3 slightly beyond the center, thus clamping the can between the uprights C^2 C^3 and holding it there. As soon as the can has passed the roller N′ it strikes the rollers N^2 and tilts the frame in the opposite direction until the can has passed the rollers N^2, thus maintaining a pressure on the can from the time the can is engaged by the carriage until it has been clamped. As soon as the can leaves the rollers N^2 the spring N^4 returns the rollers to their normal position, and the next can rests between the rollers N′ and the shield O until it is picked up, as above described, by the next carriage.

P is another chute, on which the tested cans are discharged. On the frame of the machine is a beveled projection P′, and the end p of the lever C^4, Fig. 13, striking this beveled projection P′, tilts the lever to the position shown in Fig. 14, thus releasing the can, which, striking the chute P, rolls down out of the way. Carried by the frame of the machine is an arm Q, and pivoted thereto is an arm Q′, having an end q. (See Fig. 16.) This end q is normally kept out of the path of the lever C^4 by the spring q', Fig. 15. On each carriage is a pin R, carried by the socket R′ and provided with a wire R^2, which extends out to the side of the carriage. (See Figs. 13 and 14.) When this pin R is thrown to the position shown in Fig. 14, it strikes the pivoted arm Q′ and throws it down to the position shown by full lines, Fig. 16, so that the end q will lie in the path of the end p of the lever C^4. When the end p strikes this arm Q′, the lever C^4 is tilted to the position shown in Fig. 14 and the can released. This releasing mechanism just described is located on the machine adjacent to the chute S.

We will now describe the operation. The sprocket-wheel D is driven by the shaft E, which is in turn driven through the gear E′, the latter being driven through the train of gears E^2 E^3 E^4, a band-wheel E^5 being upon the shaft of the gear E^4. As the sprocket-wheel revolves the sprockets d d' engage a carriage and carry it with it, and thus the carriages in advance are pushed along. When a carriage reaches the chute M, it picks up a can, as above described, the can being clamped when the carriage comes opposite the roller C^7, and when the carriage reaches the portion d^8 the valve d^2 is opened, as above described, and the compressed air in the chamber in the sprocket-wheel allowed to enter the can, the valve being closed again when the carriage reaches the point d^9. At this point the can enters the tank K and passes along through the water until the curve of the carriage-way carries the can out of the water. An operator stands at this point and watches the cans as they pass, and if he sees bubbles rising from a can he knows that it leaks and he grasps the wire R^2 and forces the pin R to the position shown in Fig. 14. This, as above described, throws down the arm Q′ and the can is released by the movement of the lever C^4, the can rolling down the chute S. If the can is a perfect one, the operator pays no further attention to it and it passes around until it reaches the chute P, where the lever C^4, striking the projection P′, releases the can. Meantime the belt J^2 has kept the compressors in operation, so that the chamber d' is always filled with compressed air.

In the operation of this machine it has been found that the pressure of air in the can is apt when the can is being released at the chute P to spring or strain the parts. In order that the pressure may be relieved before the can is released, we provide on the valve G a stem g and on the frame of the

machine a wheel T. (See Figs. 17 and 18.) As the carriage passes this wheel the stem, bearing on the periphery thereof, throws the valve G down and relieves the pressure in the can, there being no need of pressure thereon after the can has passed out of the water. In order that the release of pressure may be regulated, we support the axle T′ of the wheel T in a slot *t*, so that the wheel may be moved toward or from the carriages, and thus open the valve a greater or less extent.

It is obvious that many details of our construction might be altered without departing from the spirit of the invention.

While we have above described the chamber D′ as within the wheel D and *t* therefore movable, yet it is obvious that a stationary storage-chamber might be provided and the air carried to the cans by any suitable conduits, such as arms arranged like the spokes of a wheel; but we prefer to arrange the parts as shown, so that as many intermediate conduits, &c., between the compressor and can as possible will be dispensed with.

What we claim is—

1. In a can-testing machine the combination with a pneumatic chamber of a series of can-carriers independent of said chamber, mechanism for carrying said carriers to the chamber to bring them into pneumatic connection therewith and means for carrying the cans entirely away from the chamber, substantially as described.

2. In a can-testing machine the combination with a movable pneumatic chamber, of a series of can-carriers independent of the chamber and means for bringing the carriers and cans successively into pneumatic connection with the chamber, substantially as described.

3. In a can-testing machine the combination with a pneumatic chamber of a series of can-carriers independent of said chamber, a way in which the carriers travel, means for moving the carriers and cans to the chamber to bring them into the pneumatic connection therewith and means for carrying the cans entirely away from the chamber, substantially as described.

4. In a can-testing machine the combination with the pneumatic chamber, of a series of pneumatic can-carriers independent of said chamber, an endless way on which the carriers travel, and means for bringing the carriers and cans successively into pneumatic connection with the chamber, substantially as described.

5. In a can-testing machine the combination with a movable pneumatic chamber of a series of can-carriers independent of the chamber, an endless way on which the carriers travel, and means for bringing the carriers and cans successively into pneumatic connection with the chamber, substantially as described.

6. In a can-testing machine the combination with a pneumatic chamber of a series of can-carriers, each independent of the chamber and each disconnected from the adjacent carrier and means for bringing the carriers and cans successively into pneumatic connection with the chamber, substantially as described.

7. In a can-testing machine the combination with a sprocket-wheel carrying a pneumatic chamber of a series of can-carriers independent of the sprocket-wheel and means for bringing the can-carriers successively into pneumatic connection with the sprocket-wheel chamber, substantially as described.

8. In a can-testing machine the combination with a revolving wheel carrying a pneumatic chamber and a series of valves on the periphery of said wheel, of a series of can-carriers on an endless track or way, and means for bringing the carriers into pneumatic connection with the conduits controlled by said valves, substantially as described.

9. In a can-testing machine the combination with a revolving wheel carrying a pneumatic chamber provided with a series of pneumatic connections between the chamber and the periphery of the wheel and a series of sprockets on the wheel of an endless series of can-carriers adapted to be engaged and moved by the sprockets on the wheel, valve mechanism on each carrier and on each conduit governing the admission to and exit of air from the can and a tank of liquid through which cans are successively passed after having pneumatic connection with the wheel, substantially as described.

10. In a can-testing machine the combination with a revolving wheel carrying a pneumatic chamber, one or more air-compressors arranged to supply compressed air to the chamber, a series of valves on the periphery of said wheel controlling the exit of air from the chamber, a series of can-carriers each carrying a can and adapted to engage the periphery of said wheel adjacent to the valves, means for opening said valves when the can-carriers are connected with the periphery, means for closing said valves after compressed air has been supplied to the can, and a tank through which the can is passed after being supplied with compressed air, substantially as described.

11. In a can-testing machine the combination of an endless track carrying a series of can-carriers, a chute for supplying the cans to the carriers, a revolving wheel carrying compressed-air chamber and provided with valves adjacent to its periphery, a conduit controlled by each valve extending from the compressed-air chamber to the periphery of the wheel, a conduit on the carriage adapted to connect with the conduit on the wheel, means for opening the valves after the can is pneumatically connected with the chamber, means for closing the valve when the can has been supplied with compressed air and a tank of liquid through which the can is passed, substantially as described.

12. In a can-testing machine the combination of a chute through which the cans are fed to the machine, a series of can-carriers

arranged on an endless track or way, stop mechanism at the end of the chute to prevent more than one can being fed to a carrier, clamping mechanism on the carrier adapted to engage and hold the can, means engaged to a stationary point to operate said clamping mechanism, a revolving wheel carrying a pneumatic chamber, a series of valves controlling the exit of air from said chamber, a conduit on each carriage adapted to register with the conduit controlled by each valve, means engaged to a stationary point to open said valve after the can has pneumatic connection with the chamber, means for closing a valve after the can has been charged with compressed air, a tank of liquid through which the can is passed after being charged with compressed air, a chute on which the cans are discharged and means connected with a stationary point for opening said can-clamping mechanism after the can is passed through the liquid, substantially as described.

13. In a can-testing machine the combination of a series of can-carriers, clamping mechanism adapted to engage and hold the can on the carriage, a compressed-air supply for charging the can with compressed air, a tank through which the can is passed, mechanism on the carrier connected with the clamping mechanism and adapted to be moved by the operator, consisting of a longitudinally-movable rod and mechanism on a stationary point against which said operator-moved mechanism will strike to release the clamping mechanism and thus release the can, substantially as described.

14. In a can-testing machine the combination of a series of can-carriers each having clamping mechanism to clamp the can, a compressed-air supply arranged to charge each can with compressed air, valve mechanism governing the exit of air from the can and means adjacent to and short of the terminus of the way on which the carrier travels for opening said valve mechanism and thus relieve the pressure in the can before the can is unclamped, substantially as described.

15. In a can-testing machine the combination of a series of can-carriers, each carrying a can, a compressed-air supply adapted to charge each can with compressed air, valve mechanism governing the exit of air from the can, and mechanism adjacent to the way on which the can travels for opening said valve mechanism before the can is released from the carriage, one of said parts being adjustable to regulate the amount of air released from the can substantially as described.

16. In a can-testing machine the combination of a series of can-carriers, each carrying a can, a compressed-air supply adapted to charge each can with compressed air, valve mechanism governing the exit of air from the can, and means adjacent to the way on which the can travels for opening said valve mechanism before the can is released from the carriage, said release mechanism being adjustable, substantially as described.

17. In a can-testing machine the combination of a series of can-carriers, each carrying a can, a compressed-air supply adapted to charge each can with compressed air, valve mechanism on the carriage connected with the can, each valve provided with a projecting stem, and a wheel carried by the stationary frame against which the stem rides as it passes the wheel and thus opens the valve and relieves the pressure in the can, substantially as described.

18. In a can-testing machine the combination of a series of can-carriers, each carrying a can, a compressed-air supply adapted to charge each can with compressed air, valve mechanism on the carriage connected with the can, each valve provided with a projecting stem, and an adjustable wheel carried by the stationary frame against which the stem rides as it passes the wheel, substantially as described.

19. In a can-testing machine the combination with a supply-chute of a series of can-carriers adapted to pass said chute and pick up the cans, and stop mechanism at the lower end of the chute consisting of a tilting frame so arranged in the path of the picked-up can that the latter will tilt first one end and then the other in passing, and a stop carried by the frame against which the can strikes, substantially as described.

20. In a can-testing machine the combination of an endless track or way, a series of can-carriers substantially filling said track or way, mechanism on each carrier for engaging and clamping a can, a roller on the frame adapted to engage said clamping mechanism and operate it to clamp the can, a revolving sprocket-wheel located at one end of the track or way provided with sprockets adapted to engage and move each carrier, a compressed-air chamber carried by the wheel, a series of valves adjacent to the periphery of said wheel adapted to control the exit of air from the compressed-air supply, means for supplying said chamber with compressed air, cam mechanism on the frame adapted to open each valve after a carrier and can have been connected to the periphery of the wheel, cam mechanism on the frame for closing the said valve after the can has been charged with compressed air, a tank through which the can is passed, means to be operated by the operator for opening the can-clamping mechanism to release the can after it has passed through the tank and means on the frame for opening said clamping mechanism adjacent to a discharge-chute, substantially as described.

21. In a can-testing machine the combination with a revolving wheel carrying a compressed-air supply, said wheel provided on its periphery with a series of conduits into the compressed-air chamber, valves controlling said conduits, and a series of can-carriers

each provided with a conduit adapted to register with a conduit on the periphery of the wheel, said conduit on the carrier provided with a valve adapted to prevent the escape of compressed air from the can, substantially as described.

22. In a can-testing machine the combination of a series of carriers, each provided with a stationary upright and a movable upright between which the can is clamped, one of said uprights provided with a conduit extending from the mouth of the can, a bell-crank lever connected with the movable upright for moving it to clamp the can and a valve located in the conduit to prevent the escape of compressed air from the can, substantially as described.

23. In a can-testing machine the combination of a series of can-carriers, a revolving wheel, a pneumatic chamber carried by the wheel, one or more pneumatic pumps also carried by the wheel, and means for pneumatically connecting the cans to the chamber, substantially as described.

24. In a can-testing machine the combination of a revolving sprocket-wheel, a pneumatic chamber carried by the wheel, one or more pneumatic pumps also carried by the wheel and a series of can-carriers propelled by the wheel adapted to successively come into pneumatic connection with the wheel-chamber, substantially as described.

In testimony whereof we sign this specification in the presence of two witnesses.

EDWARD P. HOLDEN.
JAMES L. BOARD.

Witnesses:
W. H. CHAMBERLIN,
FLORENCE KING.