(No Model.)

2 Sheets—Sheet 1.

W. B. MANN.

CAN TESTING MACHINE.

No. 369,539. Patented Sept. 6, 1887.

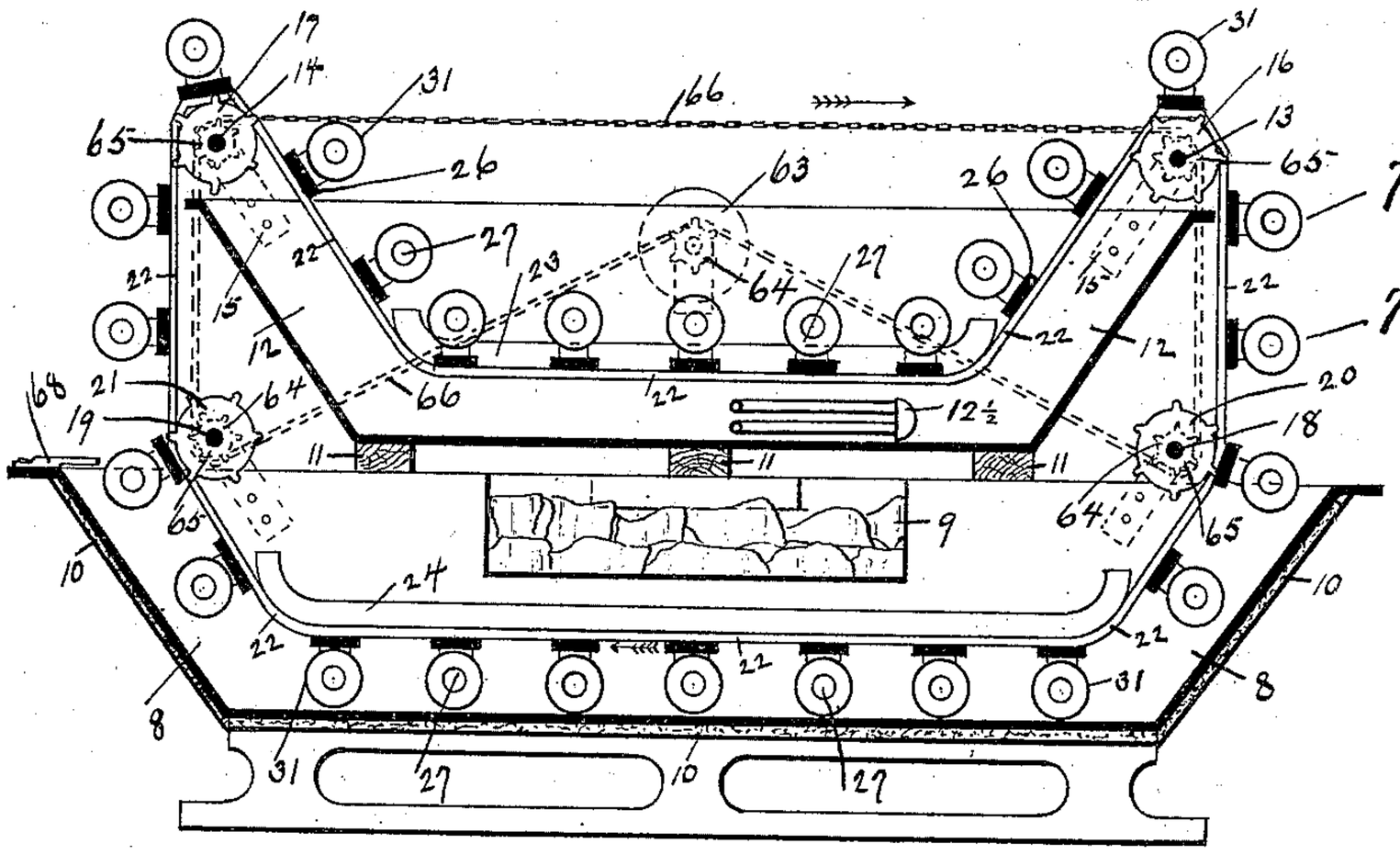

Fig. 1.

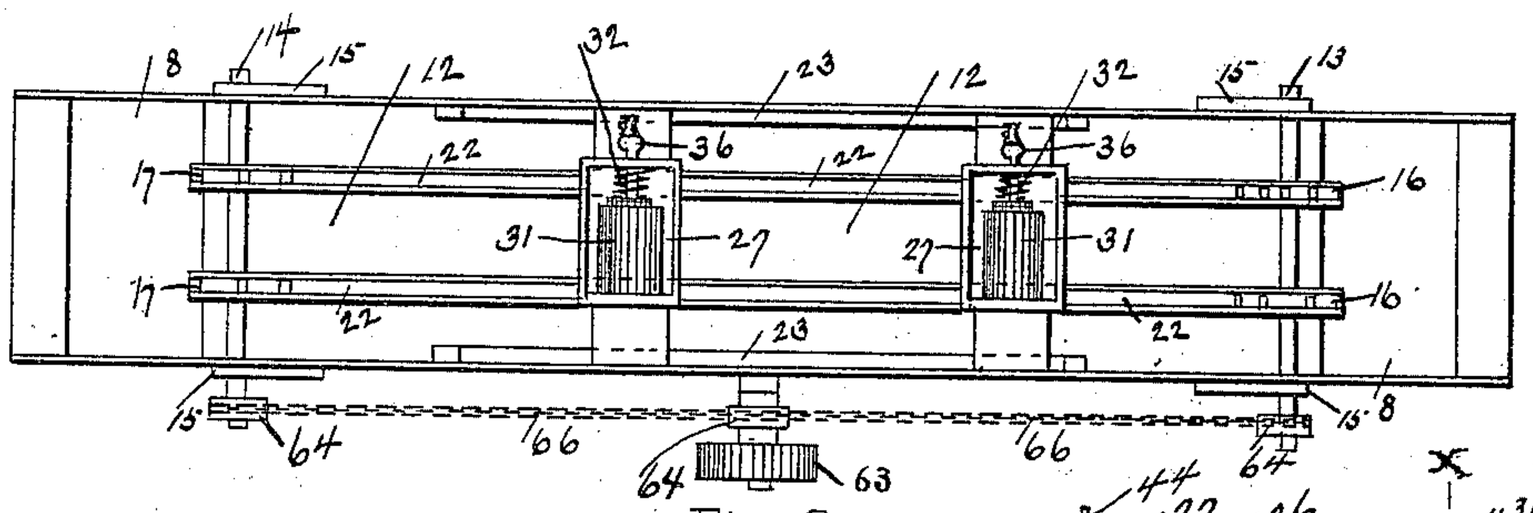

Fig. 2.

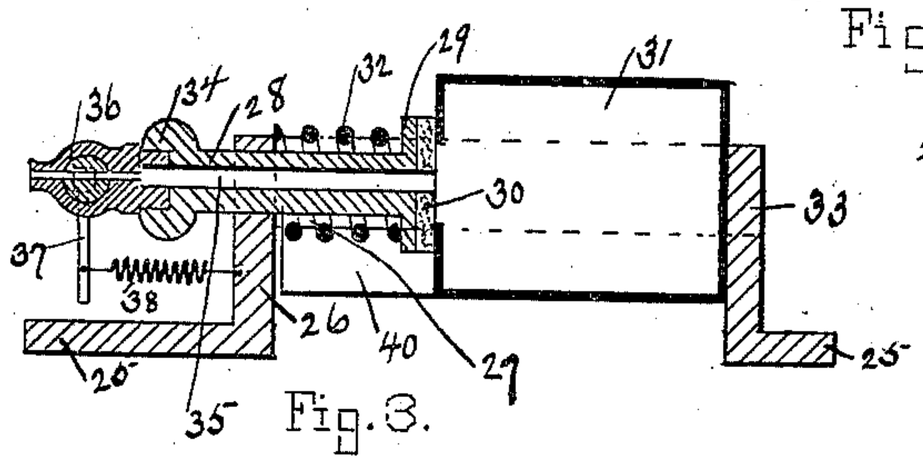

Fig. 3.

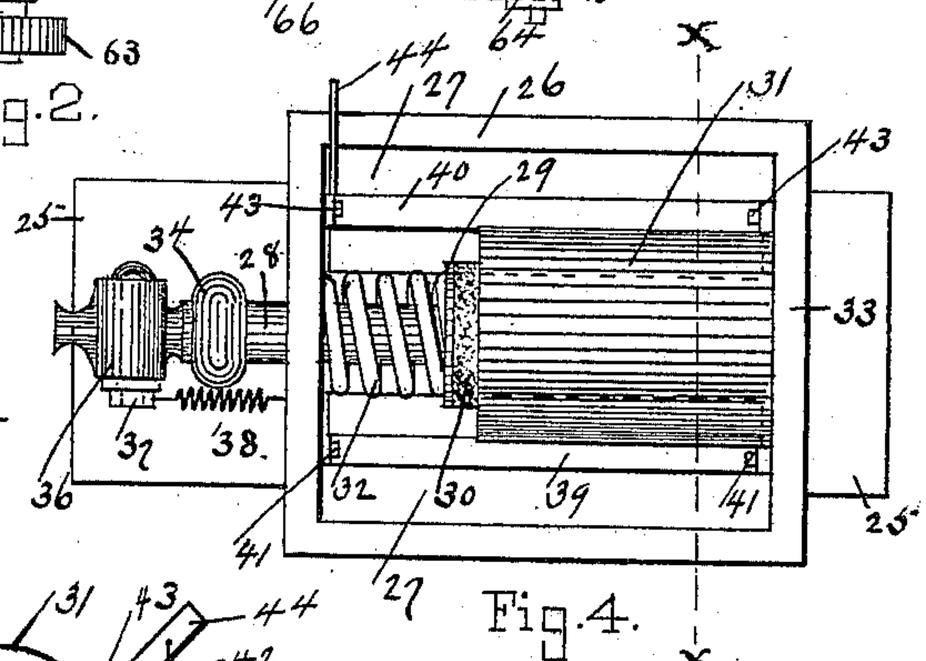

Fig. 4.

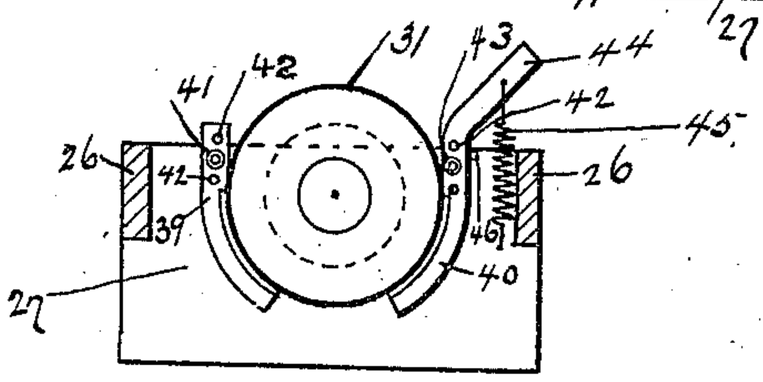

Fig. 5.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 6.

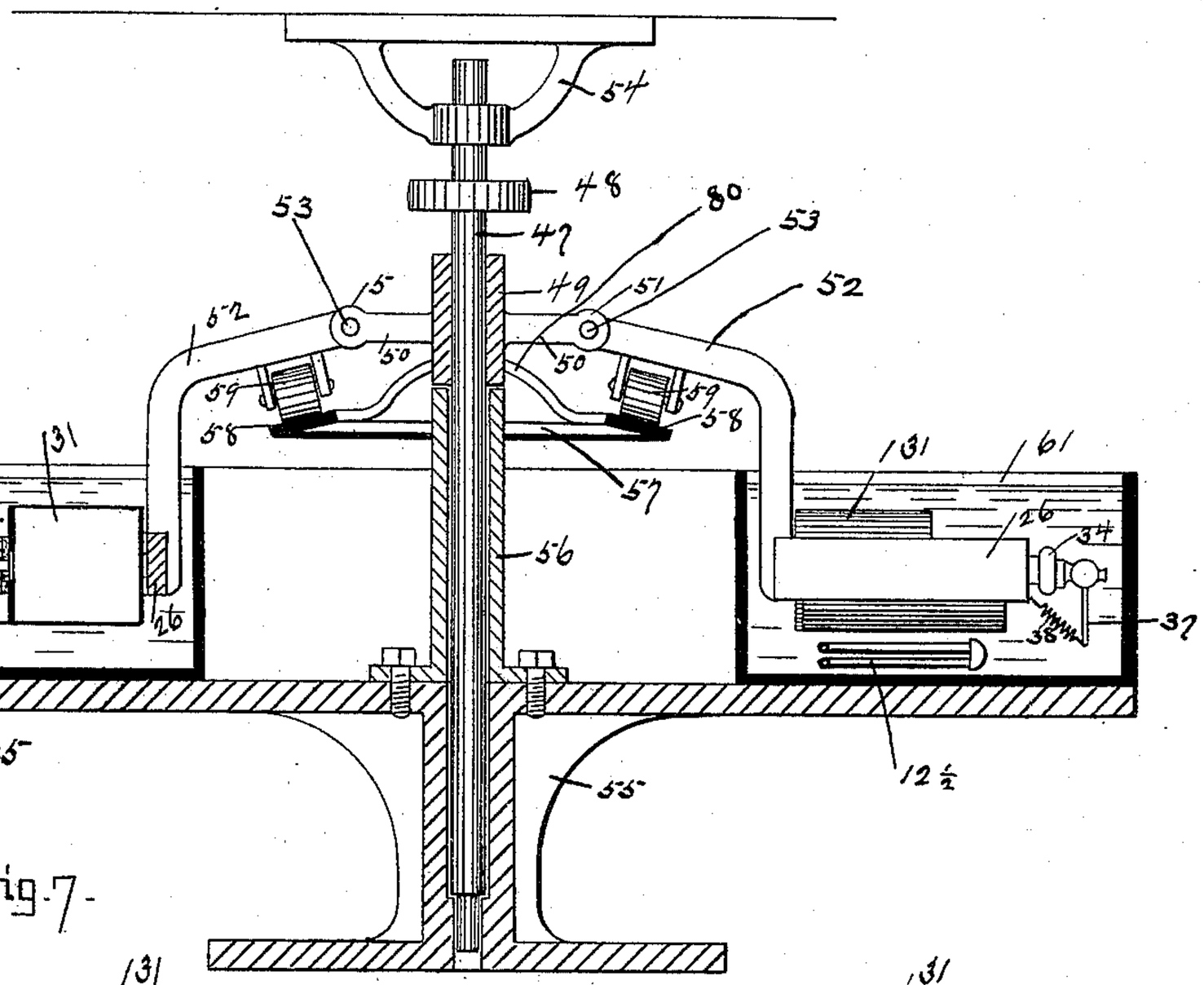
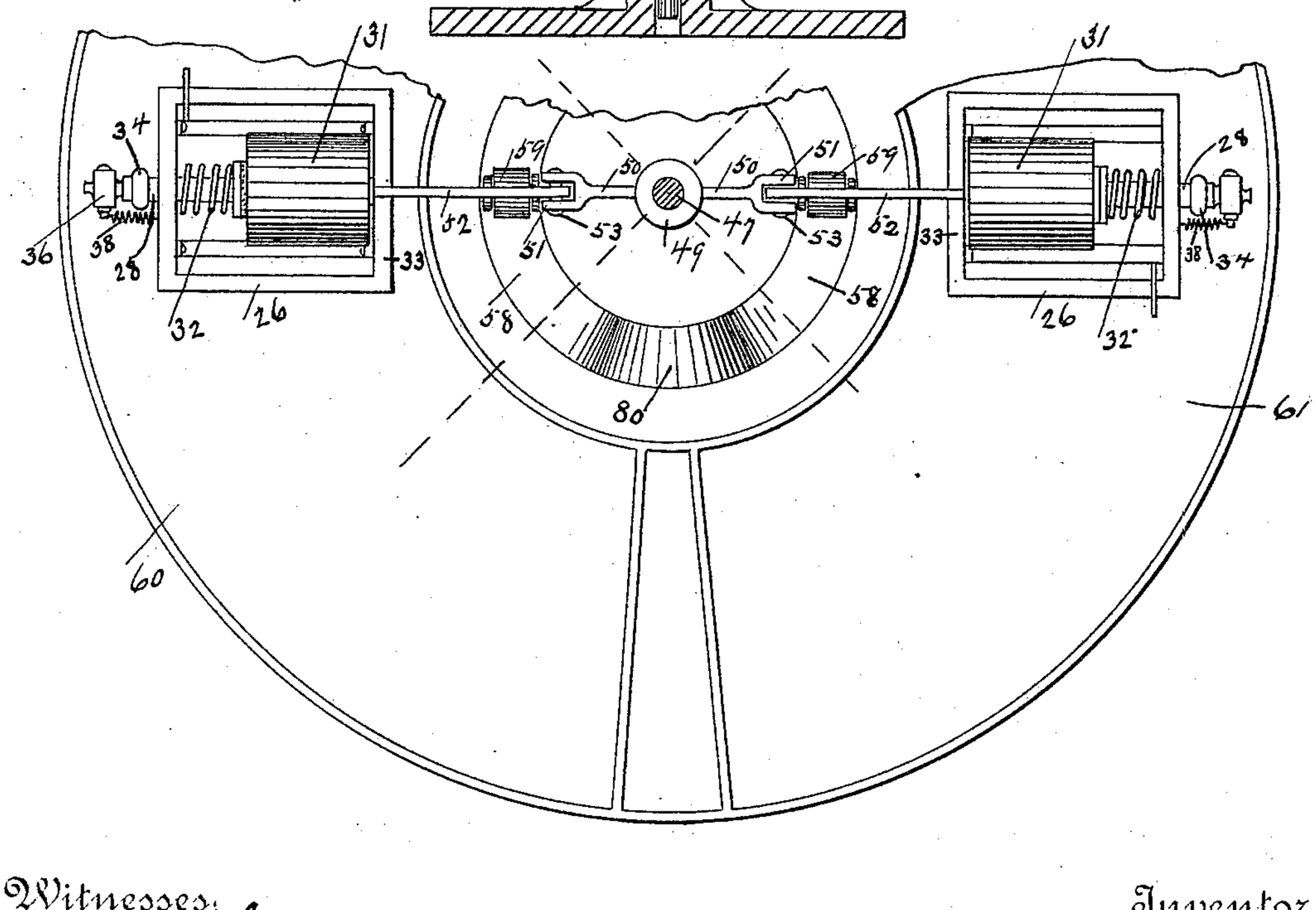


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM B. MANN, OF BALTIMORE, MARYLAND.

CAN-TESTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 369,539, dated September 6, 1887.

Application filed March 22, 1887. Serial No. 232,010. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. MANN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Can-Testing Machines; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in machinery for testing sheet-metal cans, wherein I employ the method of first exposing the can to some cooling agent, and whereby the air within is made more dense than exists under ordinary conditions of the atmosphere. With the air within the can in this dense condition it is hermetically sealed by proper sealing mechanism, and is then submerged-in hot water, which will cause the air within the can to expand to a greater degree, and a greater pressure result than if the can had been at first charged with air under ordinary conditions, and the leaks in the can may be easily detected by the escaping air therefrom, which will be manifested by the bubbles arising in the hot water, into which it has been submerged, the hot water being kept just below the boiling-point to insure a quiet state.

In the further description of my invention reference is had to the accompanying drawings, in which—

Figure 1 is a side elevation of the device in section. Fig. 2 is a plan of the devices shown in Fig. 1. Fig. 3 is a detailed enlarged elevation of the can-holding device. Fig. 4 is a plan of the device shown in Fig. 3. Fig. 5 is a section through *x x* of the device shown in Figs. 3 and 4. Fig. 6 is a side elevation in section of a modification of a can-testing device. Fig. 7 is a plan of the device shown in Fig. 6.

The same figures refer to the same or similar parts throughout the several views.

The figure 8 in Fig. 1 denotes the cooling-tank, which may be constructed of either wood or iron, and has within it the compartment 9, which is to contain the refrigerating mixture for cooling the solution which the tank 8 contains, the said solution being carried at sufficient height in the tank 8 to insure the proper submersion of the can to be tested, the temperature of this solution being maintained at as low a point as is possible, and the tank 8 protected by some insulating material, 10, to prevent its absorption of heat.

Placed over the tank 8, and supported thereon by the blocks or pillows 11, is the tank 12, which contains pure water, which is kept as near the boiling-point as will insure the water being quiet, and at sufficient height to insure a proper submersion of the cans to be tested, the heat within this tank being maintained by a steam-heating coil, 12½, or any of the common devices in use for this purpose. At the ends of the tank 12 are the shafts 13 and 14, which are supported by bearing-plates 15, secured to the side of the said tank 12. Fixed to these shafts 13 and 14 are the sprocket-wheels 16 and 17. Located on top of the cooling-tank 8, in proper line with the shafts 13 and 14, are the shafts 18 and 19, that are supported by plates secured to the sides of the cooling-tank in like manner to those attached to the tank 8. Fixed to these shafts 18 and 19 are the sprocket-wheels 20 and 21, which are in line with their corresponding sprocket-wheels, 16 and 17. Passing over and operated by the said sprocket-wheels are the chains 22, the chains forming the bite in each of the tanks 8 and 12, and is caused to travel in this form by means of the guide-plates 23 and 24, with which the inner sides of the tanks are provided, and the projections 25, Fig. 3, on the frames 26 of the clamping devices 27, which are secured at intervals to the sprocket-chain 22. The said clamping devices 27 consists of the frame 26, which is secured to the sprocket-chain 22 in such secure manner that the chain 22 will be kept equidistant and the clamping devices 27 be caused to move with a steady motion.

Through one end of the frame 26 passes the spindle 28, which is provided at its inner end with the flange 29, to which is secured the rubber gasket 30 for properly sealing the opening in the can 31, the said can 31 being held in the frame 26 by means of the spring 32, which presses one end against the frame 26 and the other against the flange 29, with which the spindle 28 is provided, the bottom of the can

31 resting against the other end, 33, of the frame, the gasket 30 being held against the can 31 with sufficient pressure to hold the air-pressure which may be within the can. The outer end of the spindle 28 is provided with the knob 34 for convenience of releasing the pressure exerted by the spring 32, either by hand or it may be done automatically. The spindle 28 is also constructed with the opening 35, in the outer end of which is tapped the pet-cock 36 for the purpose of admitting more air into the can when a partial vacuum shall have been produced by its passage through the cooling-tank 8. The handle 37 of this pet-cock 36 is provided with the spring 38, whereby the said cock may be operated either by the operator or automatically, the said handle 37 being kept in the closed position against a stop by the spring 38, as in common usage.

In order that the different-sized cans may be properly adjusted in the clamping device when the spindle 28 is drawn outward and the can dropped therein from the top, the frame 26 is provided with the chutes 39 and 40, which are made in the curved form represented in Fig. 5, approximating the curvature of the cans and forming a support thereof to insure the proper adjustment of the gasket 30 for hermetically sealing the said can during the process of testing. The chute 39 is fixed rigidly to the frame 26 by means of bolts 41, several holes, 42, being provided in the said chute 39, by which it may be secured to the frame in a position to suit the size of can to be tested.

The chute 40 is made movable in order to drop the cans after the process of testing. It is secured to the frame 26 by means of the bearing-bolt 43, on which it is permitted to vibrate, several holes, 42, being provided in this chute 40 for adjustment as described in the case of the fixed chute 39. This movable chute 40 is further provided with the extended arm 44, to which is attached one end of a spring, 45, the other end of the said spring 45 being secured to some part of the frame 26, whereby the said chute 40 is kept in the closed position and against the stop 46, which is provided to maintain the proper position of this movable chute 40 when it is closed.

The extended arm 44 of the chute 40 may be operated by hand or automatically. When the spindle 28 has been drawn outward, and it is desired to drop the can from the clamping device, the arm 44 is moved to the left, when the chute 40 will move outward and the space between the two chutes 39 and 40 be sufficiently enlarged to permit the can to fall therethrough, the curved form of the fixed chute 39 serving to shoot the can outward and drop it in the receptacle for the completed can. After the arm 44 has been released the spring 45 causes the chute 40 to be brought against its stop 46 in the closed position ready to receive another can.

Motion is conveyed to the sprocket-chains 22 by means of the pulleys 63, the shaft of which terminates in the sprocket-wheels 64, which in turn drive the sprocket-wheels 65, which are attached to the ends of the shafts 13, 14, 18, and 19 by means of the sprocket-chain 66.

Figs. 6 and 7 are modifications of mechanism, whereby the cans may be made to pass from one tank to the other, and consists of the spindle 47, which is caused to rotate by means of the pulley 48. Fixed to this spindle 47 is the hub 49, which is provided with the radial arms 50, the said arms terminating in the jaws 51, into which are pivoted, by means of the pivot 53, vibrating arms 52. The vibrating arms 52 are made in the bent form represented in Fig. 6, and the free end is provided with the can-clamping device, hereinbefore described. The spindle 47 is supported at its upper end by the hanger 54 and at the bottom by the table 55. To the table 55 is fixed, by means of the sleeve 56, the plate 57, the periphery of which forms a track, 58, upon which travels the roller 59, with which the vibrating arm 52 is provided, and thus forms a support and guide for the said vibrating arms 52. Placed on the table 55, within the circumferential path of the can-clamping device, which forms the free end of the vibrating arms, are the troughs 60 and 61, the trough 60 containing the cold solution and the trough 61 containing the pure warm water. In order to lift the vibrating arms 52 in their circumferential movement that the cans may clear the ends of the trough, the rise 80 in the track 58 is provided, which will cause the arms to rise and fall at these points, and thus pass from one tank to the other.

The manner of operating is as follows: The movement of the sprocket-chain is in the direction indicated by the arrows. The chutes 39 and 40 having been adjusted to suit the can to be tested and the spindle 28 drawn out, the can is dropped at 70 in the device and the spindle 28 released, when, by means of the spring 32, the gasket 30 will be pressed against the open end of the can with sufficient pressure to make this open end air-tight. The can from this point will be caused to pass through the cooling-tank 8, where, in consequence of the low temperature therein, the air within the can will be contracted and a partial vacuum formed. To maintain a low temperature in the tank 8 any of the refrigerating mixtures in common use may be employed, preferably by placing in the compartment 9, which is within the tank 8, a mixture of ice and salt, whereby a temperature of about zero Fahrenheit may be maintained. After the can has left the tank 8 the handle 37 of the pet-cock 36 comes in contact with a trip, 68, whereby additional air is drawn into the can 31 by the partial vacuum created therein by the cooling process. The pet-cock 36 and the opening 35 in the spindle may be dispensed with and the gasket 30 raised at this point, whereby additional air would be admitted through the opening in the can; but the pet-cock is preferred in consequence of less power being required to operate it. The can

from this point is carried over the sprocket-wheel 17 into the tank 12, where it is submerged in the quiet hot water, which is kept at about 208° Farenheit, this temperature giving a range of about 200° in the temperature of the air within the can and a pressure of about seven pounds to the square inch resulting therefrom. In this quiet warm water, should there be any leaks, it will be manifest by the bubbles which will arise therefrom by the escaping air from the defective can, when it may be marked by paint or some insoluble matter for repairs. The movement of the cans through these tanks is sufficiently slow to permit the air within to be brought to the temperature of the surrounding medium and to preserve the quiet state of the water for the detection of the leaks. After the cans have passed through the tanks 12 they are removed either by hand or automatically at 91 in the manner heretofore described, other cans placed in the device, and the operation may go on indefinitely.

In the modifications represented in Figs. 6 and 7 the cans are placed in the can-clamping device, as hereinbefore described, and are made to pass by the circumferential movement of the vibrating arms 52 first into the cooling-trough 60, where a solution of low temperature is maintained by some cooling agent and then carried over the ends of the trough and caused to pass through the second trough, 61, which contains the hot water, by the mechanism heretofore described, where the pressure which has been created within the cans by the range of temperature through which the cans have passed will make manifest any leaks which may be in the cans in the manner previously described. The same result might be attained by the employment of one tank only, that which contains the warm water, the cans being kept stored in some cold medium, whereby the air within the can will be reduced to a greater density and in this condition made air-tight and then subjected to a hot bath of pure water where the necessary range of temperature would be acquired and the leaks would be made manifest in this water.

Having described my invention and the manner of operating, what I claim, and desire to secure by United States Letters Patent, is—

1. The method of testing the sheet-metal cans, consisting in first sealing the can air-tight and then subjecting it to a low temperature, after which the seal is broken and air admitted to fill the vacuum created therein, and then the can is resealed and subjected to a higher temperature to cause a pressure, for the purpose set forth.

2. In a can-testing machine, the combination of the cooling-tank 8, provided with the refrigerating-compartment 9, the heating-tank 12, provided with a heater, 12½, for heating the water therein, and can-holding devices for carrying the cans from one tank to the other, the said can-holding devices consisting of the frame 26, the hollow spindle 28, the spring 32, and a cock or valve, 36, for admitting additional air to the can through the hollow spindle 28 after the said can has left the cooling-tank 8, for the purpose set forth.

3. In a can-testing machine, the combination of the cooling-tank 8, the tank 12, containing pure hot water, and the can-holding devices for carrying the cans from one tank to the other, the said can-holding devices being provided with the adjustable stationary-chute 39 and the movable chute 40, for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WM. B. MANN.

Witnesses:
CHAS. W. SMILEY,
JNO. T. MADDOX.