No. 869,665. PATENTED OCT. 29, 1907.

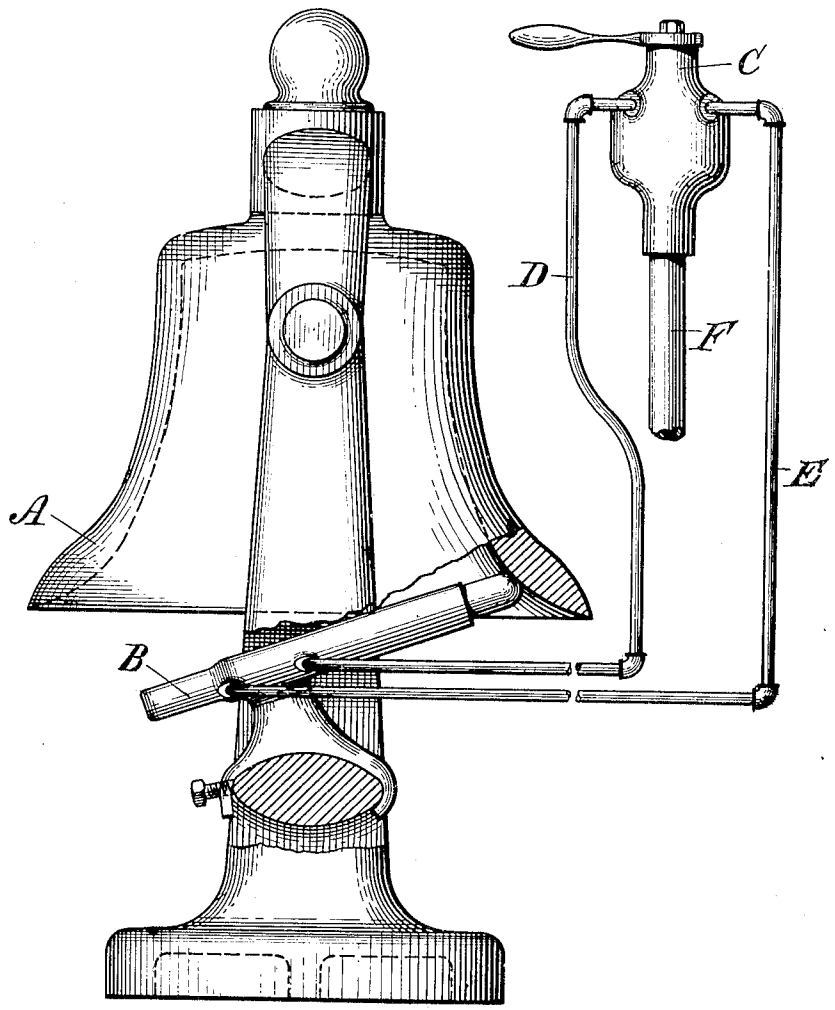
W. A. STEARNS.

BELL RINGING MECHANISM.

APPLICATION FILED MAR. 4, 1907.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

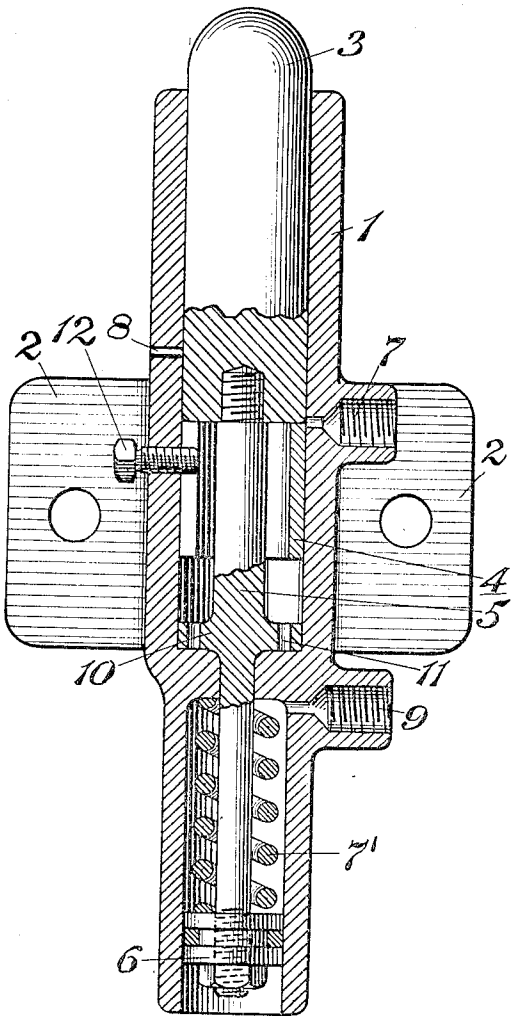


Fig. 3.

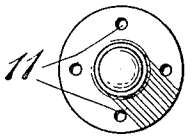
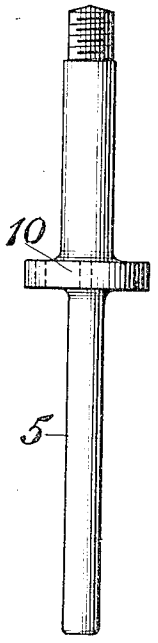
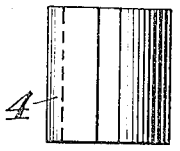


Fig. 4.





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3 SHEETS—SHEET 3.

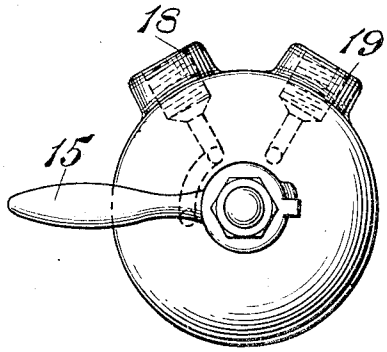


Fig. 5.

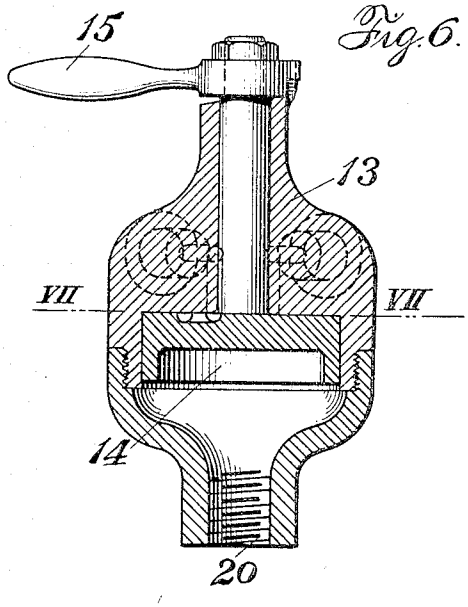
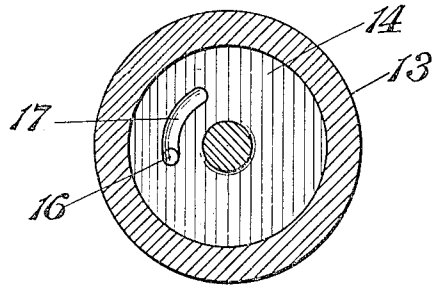


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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BELL-RINGING MECHANISM.

No. 869,665. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed March 4, 1907. Serial No. 360,326.

To all whom it may concern:

Be it known that I, WALTER A. STEARNS, a citizen of the United States, residing at Louisville, in the State of Kentucky, have invented certain new and useful Improvements in Bell-Ringing Mechanisms, of which the following is a specification.

My invention relates to bells, and particularly to the mechanism for ringing bells such as are used on locomotives, street cars and motor vehicles. The invention has for its objects; to provide an automatic system including a ringer which may be controlled to ring a bell with variations in speed; to provide a bell ringer of compact form and simple construction; to provide an arrangement of bell and ringer wherein the ringer may be placed inside the bell; to provide a simplified and improved form of valve control for a continuous ringer; and finally to provide an arrangement wherein a continuous ringing of the bell may be secured by the mere operation of the handle of the controlling valve. One embodiment of my invention is shown in the accompanying drawings, wherein

Figure 1 is a diagrammatic view showing the general arrangement of the parts of the system,

Figure 2 is a transverse section through the bell ringer itself,

Figure 3 is a detail in side and end elevation of the piston of the ringer shown in Figure 2

Figure 4 is a detail in side and end elevation of the split ring valve, and Figures 5, 6 and 7 are detail views of the controlling valve, Figure 5 being a plan view, Figure 6 being a longitudinal section, and Figure 7 being a transverse section on the line VII—VII of Figure 6.

Referring to the general arrangement as indicated in the diagrammatical view, Figure 1, A is the bell which in the present instance is an ordinary locomotive bell held stationary, B is the vibratory ringer operating upon the inside of the bell, C is the controlling valve located intermediate the source of air supply and the pneumatic ringer B, D is the connecting pipe for operating the ringer under service condition, E is a secondary connection for securing a more rapid or emergency application of the ringer, and F is the admission pipe connected to the source of air pressure. As shown the ringer B is secured to a transverse strut beneath the bell by means of the clamp with its set screw shown.

The ringer which constitutes an important feature of my device, is shown in detail in Figures 2, 3 and 4. The ringer comprises a casing 1 adapted to be secured by means of the lugs 2 to the clamp fastened to the strut beneath the bell as shown in Figure 1, a striking piston 3 fitted into the upper part of the casing, a split valve ring 4 for controlling the ports in the casing, a rearwardly extending member 5 secured to the striking piston at its front end and provided with a piston 6 at its rear end, and the spring 7′ for normally holding the member 5 and the striking piston 3 in their rearmost positions. The casing 1 is provided with the admission port 7 on one side, and the exhaust port on the other side, while the cylinder formed in the lower part of the casing is provided with an admission port 9 to which air is admitted when the emergency application is desired, which operation will be described more fully hereinafter. The rearwardly extending member 5, which is screw threaded at its forward end into the striking piston 3, is provided intermediate its ends with the part 10, which part 10 is provided with the openings 11 and is adapted to operate the valve ring 4. The valve ring 4 is split along one side as indicated in Figure 4, and is of spring material so that when placed inside the cylinder it will press against the sides thereof and maintain itself frictionally in the position in which it is left by the operating part. This sleeve is prevented from turning in the cylinder by means of the screw 12 which fits in the slot. The operation of the ringer is as follows, assuming that the parts are in the position shown in Figure 2, and that air is being admitted into the admission port 7. The air which enters the port 7 presses behind the striking piston forcing it forward to strike the bell, at which moment the rear end of the striking piston passes the exhaust port 8, and at the same instant the projecting ledge 10 comes in contact with the valve ring 4 and moves it over the admission port 7, thus simultaneously cutting off the supply of air and permitting the air in the cylinder to exhaust through the port 8. The pressure having been removed from the rear side of the piston the spring 7′ which has been placed under tension, exerts its force and brings the striking piston back again to its starting point, after which the operation is repeated. It will be seen that this operation will be continued indefinitely as long as the air is admitted at the port 7, and that the rapidity of vibration will depend upon the strength of the spring 7′ and upon the pressure of the air entering the port 7. When it is desired to make an emergency application and secure a more rapid vibration of the striking piston, air is admitted simultaneously through the ports 7 and 9. This puts the pressures in the two cylinders in opposition, but as the area of the upper piston is greater than that of the piston 6, the striking piston will be forced forward as before and because of the pressure on the piston 6 augmenting the strength of the spring, the piston will be returned more rapidly to its starting position than in the preceding operation in which only the one admission port was open. This quick return of the piston to its starting point has been found to greatly increase the rapidity with which the piston reciprocates, and the resulting sound is much accentuated.

The valve for controlling the flow of air through the admission port in the ringer is shown in detail in Figures 5, 6 and 7. As here shown the valve consists primarily of a casing 13 in two parts, a rotary valve 14, and

a handle 15 for operating the rotary valve. The rotary valve is provided with a trahsverse opening 16 (see Fig. 7) and has on its upper surface a slot 17. The casing 13 is provided with two inwardly directed passages 18 and 19, which passages lead radially and then downwardly to the top of slot 17. The passage 18 is connected by means of the pipe D (see Fig. 1) to the port 7, while the passage 19 is connected by means of the pipe E to the port 9, and the lower end of the valve 20 is connected to the source of air pressure by means of the pipe F, shown in Figure 1. When the handle is in the position shown in Figure 5, the ringer is in service application, that is, the air admitted to the passage 20 passes up through the perforation 16 in the valve B, across the top of the valve through the passage 17, and thence through the passage 18, and pipe D to the port 7. To give the emergency application the handle D is moved clockwise until the end of the passage 17 comes opposite the downwardly directed end of the passage 19, at which time air is admitted to both passages 18 and 19, and pressure is thus applied to both of the pistons in the ringer. In order to stop the ringing of the bell the handle is moved counter clockwise to a position at which the passage 17 registers with neither the passage 18 or the passage 19.

It will be apparent from the foregoing that my device provides a means whereby a very loud and continuous ringing of the bell may be secured with slight effort, and that this ringing may be easily increased by changing the position of the valve, and furthermore, that the apparatus whereby this result is accomplished is very compact, and simple and very positive in its action. It will be further apparent that the application of the ringer is not limited to bells of the type shown, but that it may be applied to any style of bell or gong, and is equally applicable to locomotive, street car and automobile use. It will also be apparent that the location of the ringer might be changed, although for the style of bell shown the arrangement illustrated is perhaps the most advantageous, as the ringer is out of the way and partially concealed. Various other modifications which will be apparent to those skilled in the art are comprehended by my invention and intended to be covered by the claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:

1. The combination with a source of air pressure, and a bell, of a ringer comprising a cylinder having admission and exhaust ports, a striking piston passing over and controlling the exhaust port, yielding means for normally holding the piston in rearward position and a movable valve operated by the piston for opening the admission port on the rearward stroke and closing it on the forward stroke, together with a connection from the source of air pressure to the admission port and a controlling valve for the operator in the said connection whereby any desired period of continuous ringing may be secured.

2. The combination with a source of air pressure of a bell, a ringer comprising a pneumatic cylinder, a hammer and a valve adapted to secure the continuous reciprocation of the hammer while pressure is admitted to the cylinder, a connection from the source of air pressure to the ringer, a controlling valve whereby any desired period of continuous ringing may be secured, and a second connection controlled by the valve whereby the speed of operation of the hammer may be augmented.

3. The combination with a source of air pressure, and a bell, of a ringer comprising a casing provided with an operating cylinder, a return spring, and a return cylinder, a hammer extending into both cylinders, and a valve for securing a continuous reciprocation of the hammer when air is admitted, connections from the source of supply to the two cylinders, and a controlling valve in the line of connections whereby air is admitted either to the operating cylinder alone for service application, or to both cylinders simultaneously for emergency application.

4. In combination, a cylinder having admission and exhaust ports, a striking piston therein controlling the exhaust port and adapted on its forward stroke to uncover such port and on the rearward stroke to cover such port, yielding means for normally holding the piston in rearward position, and a movable valve controlled by the piston for opening the admission port on the rearward stroke thereof and closing it on the forward stroke.

5. In combination, a cylinder having admission and exhaust ports, a striking piston therein controlling the exhaust port and adapted on the forward stroke to uncover such port and on the rearward stroke to cover such port, a spring for normally holding the piston in rearward position, and a movable controlling sleeve for the admission port controlled by the piston for opening the admission port on the rearward stroke thereof and closing it on the forward stroke.

6. In combination, a cylinder having admission and exhaust ports, a striking piston therein controlling the exhaust port and adapted on the forward stroke to uncover such port and on the rearward stroke to cover such port, a spring for normally holding the piston in rearward position, a split ring controlling sleeve for the admission port controlled by the piston for opening the admission port on the rearward stroke thereof and closing it on the forward stroke.

7. In combination, casing provided with two cylinders, one of which has admission and exhaust ports, and the other of which has an admission port, a striking piston fitting the first cylinder and having its rear end extended to the rear of the second cylinder and provided at such end with a piston, a spring for holding the piston normally rearward, and a movable controlling valve operated by the striking piston for opening the admission port in the first cylinder on the rearward stroke of the piston and closing it on the forward stroke.

8. In combination, a cylinder having admission and exhaust ports, a striking piston therein adapted to control the exhaust port, yielding means for normally holding the piston in rearward position, a movable valve controlled by the piston for opening the admission port on the rearward stroke thereof and closing it on the forward stroke, and means for supplementing the yielding means whereby a quicker return of the piston is secured.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

WALTER A. STEARNS.

Witnesses:
E. G. NORTON,
T. W. BAYER.