A. W. QUICK.

AUTOMATIC BELL RINGER.

APPLICATION FILED JULY 31, 1908.

993,196. Patented May 23, 1911.

Fig. 2.

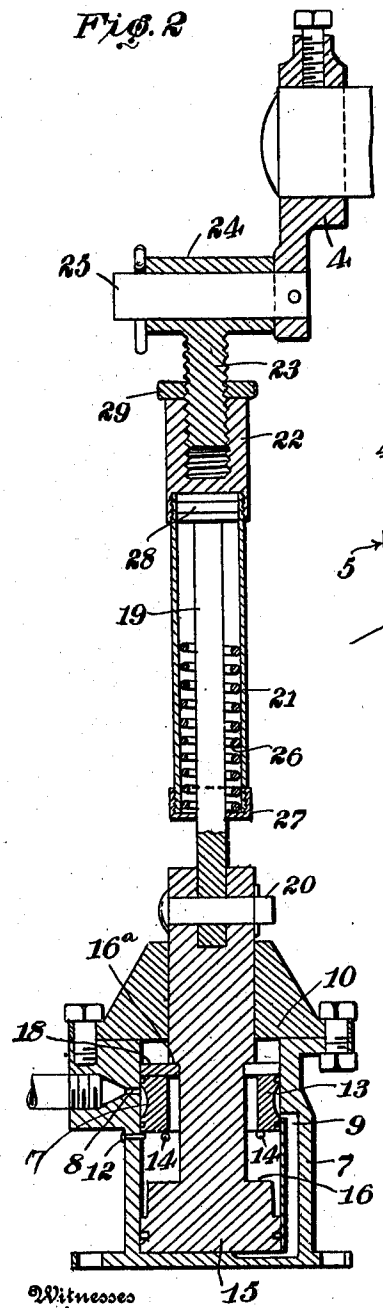


Fig. 1.

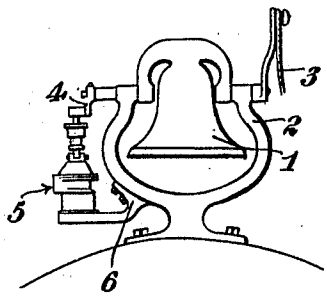


Fig. 4.

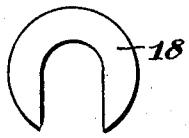
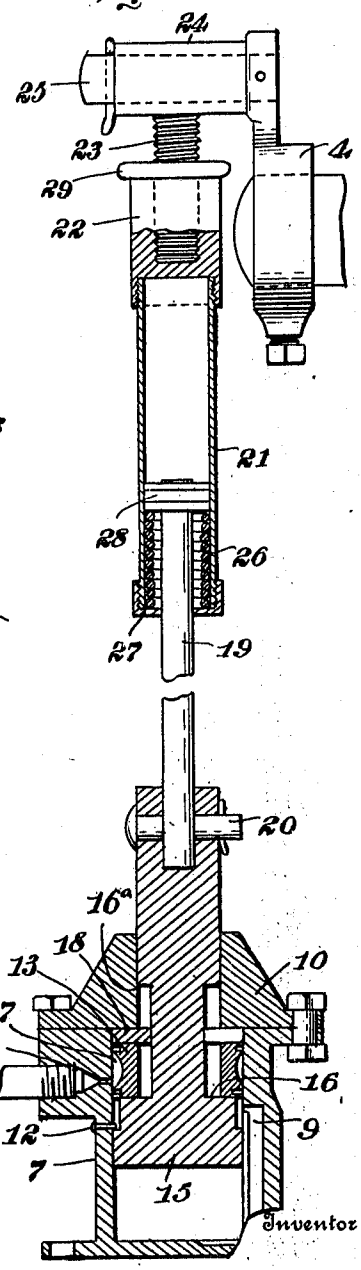


Fig. 3.



Witnesses

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AUTOMATIC BELL-RINGER.

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To all whom it may concern:

Be it known that I, ARCHIE W. QUICK, of Allentown, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Bell-Ringers; and I do hereby 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.

As heretofore constructed automatic bell ringers have not been provided with adequate means for insuring a rapid ringing of the bell and at the same time preventing the bell making a complete rotation upon its trunnions. When this latter action occurs the rapid movement of the bell, and the consequent centrifugal force, cause the clapper to swing with the bell instead of contacting with it, with the result that little, if any, sound is produced. When the device is intended for operating railway locomotive bells this difficulty is increased by the fact that the bell rope, which is usually maintained in the event of its use being desired for ringing the bell independently of the engine, becomes entangled or wound around the axis of the bell. Efforts have been made to quicken the bell action and yet prevent its complete rotation by regulating the thrust of the piston. This has been accomplished by adjusting the valves to control the supply of motive fluid to the engine according to the weight of the bell. This form of regulation meets the requirements when the motive fluid remains at constant pressure, but, as is well known, the pressure varies greatly in railway locomotives.

The importance of effecting a rapid ringing will be appreciated by comparing the number of bell strokes per minute with the distance traveled by the engine in that period of time. If for instance the bell rang only fifteen times while the engine was traveling a mile there would be only one stroke to every 352 feet of travel. Obviously this would fail to meet the requirements of fast trains when approaching crossings.

The primary object of my invention is to provide simple and highly efficient means by which the swing of the bell crank by the thrust of the piston will be arrested before it has caused a complete turn of the bell and which retarding means will effectively aid in quickly returning the bell.

Broadly stated, my invention comprehends a yielding connection between the piston rod and the bell crank normally forming part of the actuating mechanism whereby the piston in its reciprocation positively moves the bell crank, but reaches the limit of its travel well in advance of the bell crank completing a half turn, the balance of movement of the bell crank after the piston has stopped being against the resistance of spring tension which prevents the complete turn of the crank and exerts its force to return the bell.

A further object of my invention is to provide an improved form of engine adapted to the ringing of a bell, having special reference to the manner in which the motive fluid is conducted to and exhausted from the cylinder, and also to the relative arrangements of the piston and valve and the manner of assembling the parts and securing the engine to the bell frame.

In the accompanying drawing, Figure 1 shows a bell equipped with an automatic ringer embodying my invention. Fig. 2 is an enlarged vertical sectional view of the engine and its connections to the bell crank, showing the positions of the valve and piston when the bell crank is at or near its lowest position. Fig. 3 is a partial elevation and vertical section showing the positions of the parts when the bell crank has reached the upward limit of its movement. Fig. 4 is a plan view of the washer.

Referring to the drawing, 1 designates a bell of the form used on railway locomotives, mounted to swing in a frame 2 through the medium of a rope 3 or by power transmitted to the crank arm 4 for the accomplishment of the purpose automatically. I have shown the engine 5 mounted upon the lateral projection of a bracket 6 rigidly secured to the frame 2. By this means the engine may rest upon liners placed upon the bracket and thus be adjusted at the proper height to insure the thrust of the piston ringing the bell. This has been found of advantage as compared with the usual manner of securing the engine directly to the bell frame by bolts, which necessitated adjusting the length of the connecting rod to insure the ringing of the bell.

The cylinder 7 of the engine is provided with an inlet port 8 for the introduction of motive fluid and with a duct or passage 9

extending through the wall to the bottom. A cap 10 is shown bolted to the top of the cylinder and the latter is provided with a stop 12 to limit the downward movement of the valve 13, and with exhaust ports 14.

15 designates the piston movable within the cylinder 7 and reduced in diameter at its central portion, forming shoulders 16 and 16ª to engage the valve 13 in its movement, the valve encircling the piston and having an annular groove or channel 17. A washer 18, (shown in detail in Fig. 4) surrounds the piston and rests upon the valve and is preferably of U-shape to permit of ready insertion and removal. Thus it will be noted that the valve 13 is in advance of the piston and when the parts are at rest, as shown in Fig. 2, the valve is supported by stop 12 and its groove or channel 17 registers with inlet port 8 and with passage 9 so that when the operator admits the motive fluid the latter will flow to the bottom of the cylinder and raise the piston. In its upward movement the piston contacts with the valve by its shoulder 16 and raises the valve until the piston has reached the upward limit of its stroke, when the parts will assume the positions shown in Fig. 3. The valve has now been arrested by washer 18 and cap 10 and has passed sufficiently far to carry its groove out of alinement with passage 9 thus cutting off the motive fluid supply. In this movement and after the valve has passed beyond passage 9, the passage is open to the space within the cylinder surrounding the reduced portion of the piston and through this space to the atmosphere through the ports 14. Thus the steam or other motive fluid has its intake and exhaust to and from the cylinder through the passage 9. In the return of the piston its shoulder 16ª acts on washer 18 and lowers the valve.

I have shown the piston rod 19 secured to the piston by a pin 20 and extending into a sleeve 21 and in contact with a cap 22 screwed onto the upper end of the sleeve, the cap being bored and tapped to receive a post 23 on a thimble 24 loose upon the crank pin 25 of the crank arm 4. The sleeve 21 contains a spring 26 coiled therein and encircling the piston rod, the spring being held within the sleeve by a cap 27 through which the rod moves freely. A collar 28 is shown on the free end of the rod and a jam nut 29 secures the post 23 to the cap 22. The operation of the parts forming this yielding connection between the engine and the bell crank is that when in the positions shown in Fig. 2 with the crank arm slightly off the center the upward stroke of the piston causes the rod 19 to positively elevate the crank arm sufficiently to sound the bell. When the piston has traveled its full stroke, the crank arm and sleeve, as well as their intermediate connections, are free to move farther upwardly. Before the crank arm has completed a half turn, however, the spring 26 will contact with collar 28 carried by the rod and its compression will retard the movement of the crank arm, (see Fig. 3) stopping it entirely and tending to reverse it before the full turn has been completed. As the spring acting on cap 27 of the sleeve draws the crank arm down, the part 22 will contact with rod 19 and lower the piston.

It is to be noted that the spring performs the functions of retarding the movement of the crank arm and compensating for variations in the weight of the bell. Its force normally combines with the weight of the bell in tending to return the crank arm thus insuring the proper limitation of the arc described by the bell in its movement. Also it will be seen that the limiting means is wholly independent of the valve action in that the control of the crank in no way depends upon the control of the motive fluid supply to the engine. In fact the only effect upon the engine created by the limiting means is that the piston is relieved of the strain which would be consequent upon having the bell crank stopped in its movement and returned by direct connection to the piston rod.

In actual test a bell ringer embodying my invention was set in operation upon a train traveling a mile per minute. There were 45 strokes of the bell in that period of time or one to every 117 feet of travel. This is ample compliance with the law regarding signals for crossings, &c.

A feature characterizing the engine I have illustrated is the readiness with which the parts may be assembled. With cap 10 removed the piston is placed within the cylinder. The valve 13 is in one piece and its central aperture is sufficiently large to permit of its being slipped over the upper part of the piston, after which the slotted washer 18 may be placed upon the valve and the cap put on the cylinder.

It is apparent that my invention permits of variations in the mechanical means employed for attaining its purpose.

I claim as my invention:—

1. In an automatic bell ringer, an engine having a cylinder closed at its lower end, provided with an admission port and a passage extending to its lower extremity constituting an inlet and outlet for the operating pressure, a piston in said cylinder, and means for admitting and exhausting pressure through said passage.

2. In an automatic bell ringer, an engine having a cylinder closed at its lower end, provided with an admission port and a passage extending to its lower extremity constituting an inlet and outlet for the operating pressure, a piston valve encircling the

piston and adapted to alternately admit and release pressure to and from the underside of the piston.

3. In an automatic bell ringer, an engine having a fixed cylinder closed at its lower end, provided with an admission port and a passage extending to its lower extremity constituting an inlet and outlet for the operating pressure, and supplementary port holes leading to the atmosphere, a piston in said cylinder, and a piston valve encircling the piston and adapted to alternately admit and release pressure from the under side of the piston.

4. In an automatic bell ringer, the combination with the engine having a cylinder closed at its lower end and provided with an admission port and a passage extending to its lower extremity constituting an inlet and an outlet for the operating pressure, and having a piston in said cylinder and means for admitting and exhausting pressure through said passage, of a bell, a connection between said bell and said piston, and means forming part of said connection for controlling the oscillation of said bell and preventing its complete rotation.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

ARCHIE W. QUICK.

Witnesses:
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FRANCIS ECK.