No. 843,637. PATENTED FEB. 12, 1907.

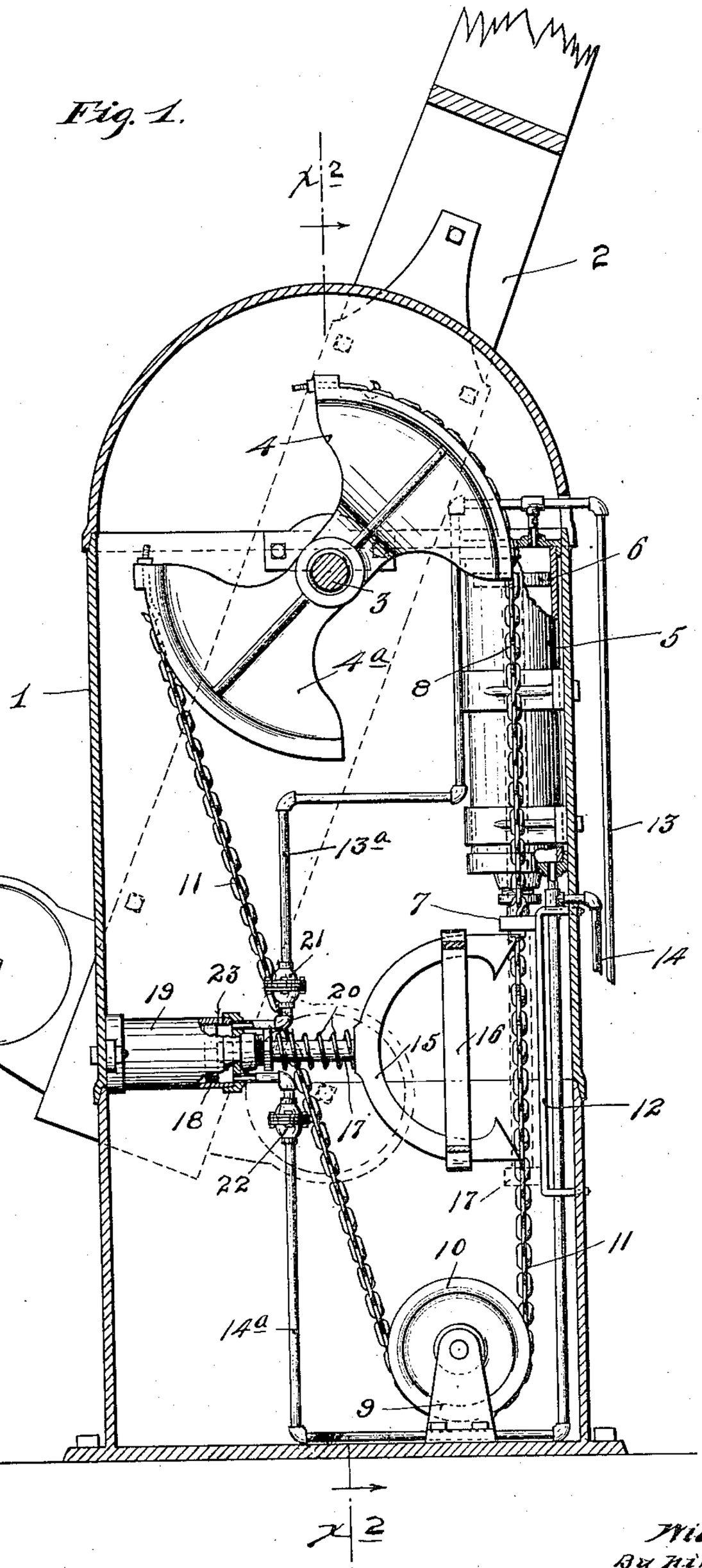
W. C. SMITH.

LOCK FOR CROSSING GATES.

APPLICATION FILED SEPT. 24, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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2 SHEETS—SHEET 2.

Fig. 2.

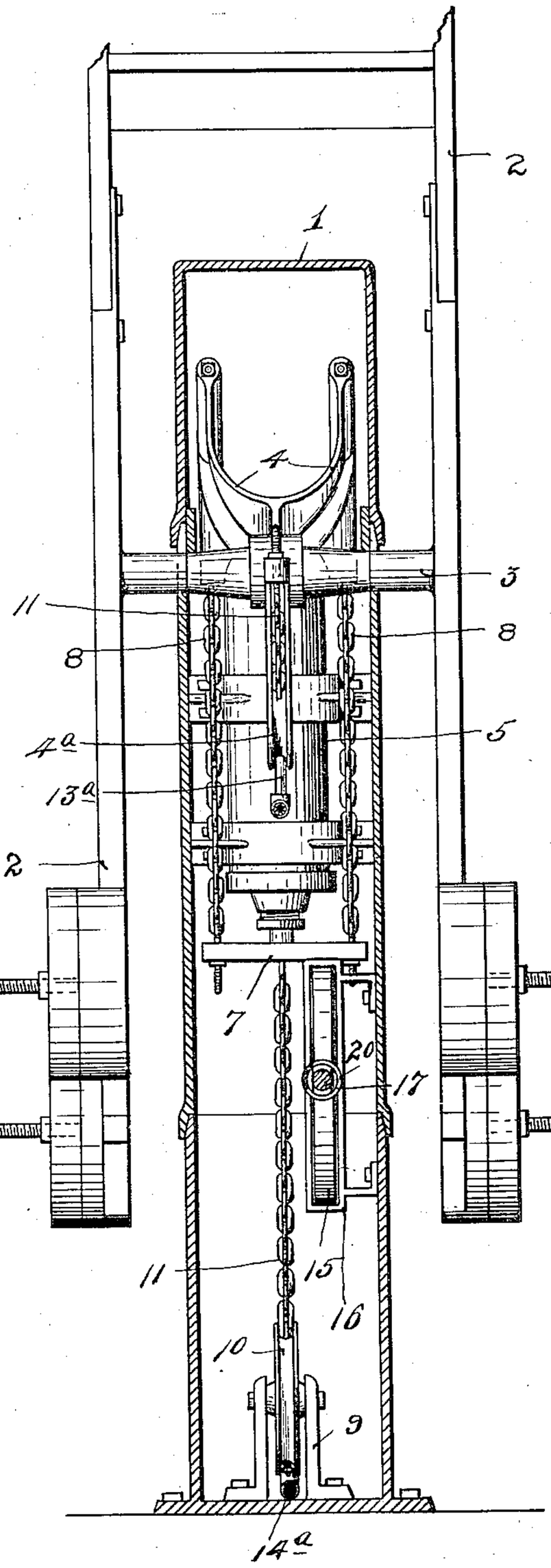
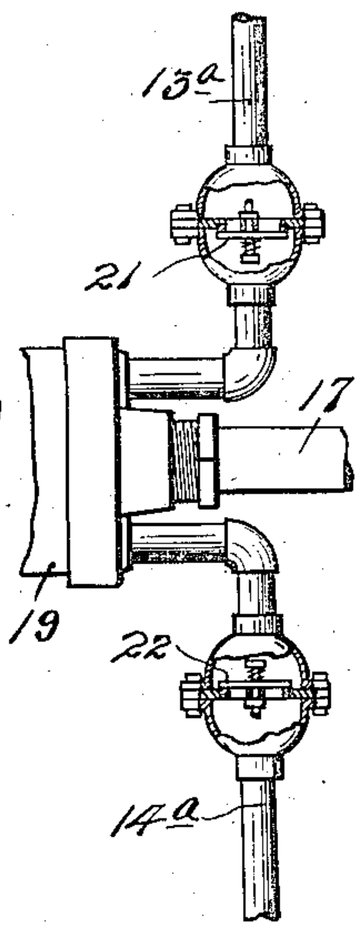


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM C. SMITH, OF MINNEAPOLIS, MINNESOTA.

LOCK FOR CROSSING-GATES.

No. 843,637. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed September 24, 1906. Serial No. 336,054.

To all whom it may concern:

Be it known that I, WILLIAM C. SMITH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Locks for Crossing-Gates; 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.

My invention relates particularly to railway-crossing gates, and has for its especial object to provide an improved lock mechanism for a pneumatically-actuated gate-operating mechanism. The improved lock mechanism is not, however, limited to use in connection with railway-crossing gates, but is capable of much more general use in connection with pneumatically-actuated mechanism employing reciprocatory or vibratory devices which should be locked in predetermined or extreme positions.

The invention is, in the accompanying drawings, illustrated as applied to and incorporated in the pneumatically-actuated mechanism of a railway-crossing gate.

In the drawings like characters indicate like parts throughout the several views.

Figure 1 is a view, partly in elevation and partly in vertical section, showing the improved gate-actuating mechanism of a railway-crossing gate, some parts being broken away. Fig. 2 is a view, principally in vertical section, on the line x^2 x^2 of Fig. 1 with some parts left in full; and Fig. 3 is a detail view, on a large scale, showing the air-supply pipes and check-valves that lead to the cylinder of the lock-actuating motor.

The numeral 1 indicates a hollow casing to which the gate-arms 2 are pivotally mounted in the usual way, the said arms being rigidly secured to a rock-shaft 3, that passes through and is journaled in the sides of said casing. Sheave-segments 4 and 4^a are rigidly secured to the rock-shaft 3 within the casing 1. There are two sheave-segments 4, and these are laterally spaced, so that they may work on opposite sides of a vertically-disposed cylinder 5, which is rigidly secured to and within the casing 1 and is provided with a piston 6, the stem of which works downward, and to the lower end of which stem is secured a cross-bar 7. Chains 8 connect the ends of the cross-bar 7 with the sheave-segments 4. Mounted in a bearing-bracket 9, secured to the bottom of the casing 1, is an idle guide-sheave 10. A chain 11 runs under this guide-sheave 10, and one end is attached to the sheave-segment 4^a and its other end is attached to the center portion of the cross-bar 7. A guide-plate 12, secured to and within the casing 1, holds the cross-bar 7 against horizontal vibrations while it is being moved upward and downward by the piston 6. Air-supply pipes 13 and 14 lead from a suitable source of air-supply under pressure and open, respectively, into the upper and lower ends of the cylinder 5.

The construction so far described is that which is found in extensive use in connection with railway-crossing gates. It is evident that when the air is introduced into the upper end of the cylinder 5 and the lower end of the cylinder 5 is open to exhaust the piston 6 will be forced downward and the gate-arm 2 will be lowered, and, on the other hand, when air under pressure is admitted into the lower end of the cylinder 5 and the upper end of the cylinder 5 is open to exhaust the piston 6 will be raised and the gate-arms 2 will also be raised. In the standard arrangement the air-pipes 13 and 14 usually lead from the source of air-supply through a controlling-valve, which is arranged to connect the pipes 13 and 14 to the air-supply and to exhaust in alternate order.

My improved lock is arranged to be actuated by an automatically-controlled cylinder and piston-engine, and the lock proper is conveniently made to operate directly upon the cross-bar 7, which is carried by the piston 6 of the gate-actuating engine. The lock-piece, which directly engages the said cross-bar 7, may take various forms, but, as shown, is in the form of a curved yoke 15, the prongs of which are guided by a bracket 16, secured to one side of the casing. The said lock-piece 15 is directly secured to the outer end of the stem 17 of the piston 18, which piston works within a cylinder 19, rigidly secured to one side of the casing 1. The cylinder 19 is small as compared with the cylinder 5. A coiled spring 20 on the piston-stem 17 reacts against the cylinder 19 and the lock-piece 15 and normally holds the latter in its operative position. (Shown in Fig. 1.) The air-pipe 13 is provided with an extension-pipe 13^a and the air-pipe 14 is provided with an extension-pipe 14^a, both of which extension-pipes open into the inner end of the cylinder 19. Check-valves 21 and 22, inter-

posed in the pipe extensions 13ª and 14ª, respectively, are arranged to permit air to flow into the cylinder 19, but to check a return or diverse flow. In the cylinder 19, near its forward end, is a small air-leakage passage 23.

When compressed air is admitted into the cylinder 5, either through the air-pipe 13 or 14, air will also be admitted into the inner end of the cylinder 19 through one or the other of the branch pipes 13ª or 14ª, and the initial effect of this is to force the piston 18 toward the left with respect to Fig. 1, and hence to carry the prongs of the lock-piece 15 out of the path of movement of the cross-bar 7, so that the said crass-bar may be freely moved with the piston 6, as is of course necessary in order to operate the gate. The upper prong of the lock-piece 15 serves to lock the cross-bar 7 in its uppermost position, as indicated in full lines in Fig.1, and the lower prongs of said lock-piece serves to lock said cross-bar 7 in its lowermost position, as indicated by dotted lines in Fig. 1. The prongs of said lock-piece at their ends are beveled inward, so that they cannot possibly lock the said cross-bar in an intermediate position.

In operating the gate by means of the cylinder and piston-engine 5 6 it is desirable to cut off the air as soon as the gate has been moved to either of its extreme positions, and the lock of course serves to positively hold the gate in whichever extreme position it may be set. When the supply of air is cut off from the cylinder 5, the supply of air is also cut off from the cylinder 19, and leakage through the small air-passage 23 will allow the spring 20 quite quickly to move the lock-piece 15 into its operative position. The said air-passage 23 is, however, so small that leakage therethrough when air is being supplied through one of the pipes 13ª or 14ª will not be sufficient to prevent the inflowing air from overcoming the spring 20, as required to move the piston 18 and lock-piece 15.

It will of course be understood that the use of my improved lock mechanism above described is not limited to the particular application illustrated in the drawings; but, on the contrary, it is capable of general use for locking devices that receive motion from a cylinder and piston engine or motor. It will also be understood that any suitable motive fluid may be employed as a power medium.

What I claim is—

1. The combination with an oscillatory device, of a single cylinder and piston-engine having connections for oscillating the same, a pair of locks connected for simultaneous movements and operative to lock the movable part of said engine in extreme positions, a second cylinder and piston-engine operative to move said locks, and connections to the cylinders of said two engines for delivering the motive fluid thereto, substantially as described.

2. The combination with a cylinder and piston-engine and the part receiving motion therefrom, of a lock arranged to lock the piston of said engine in extreme positions, a second cylinder and piston-engine for actuating said lock, main conduits for conveying the motive fluid to the opposite ends of the cylinder of the first-noted engine, and branch conduits leading from said main conduits and opening into the same end of the cylinder of said lock-actuating engine, and check-valves in said branch conduits arranged to permit the flow of air into the cylinder of said latter engine, substantially as described.

3. The combination with a device, of a cylinder, and piston-engine the piston thereof having connections for moving the same, a lock operative on a part carried by said piston, to secure the same in extreme positions, a second cylinder and piston-engine, the piston thereof being connected to said lock for actuating the same, a spring operative to move the lock in one direction, main air-conduits leading to the opposite ends of the cylinder of the first-noted engine, branch conduits leading from said main conduits to the same end of the cylinder of the lock-actuating engine, and check-valves in said branch conduits arranged to permit the flow of air into the cylinder of said latter engine, but checking a reverse flow, the said lock-actuating engine having a small leakage-passage for permitting the slow escape of air from the air-receiving end thereof, substantially as described.

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

WILLIAM C. SMITH.

Witnesses:
H. D. KILGORE,
JAY D. CRANE.