(No Model.) 2 Sheets—Sheet 1.

S. P. BAIRD.

PNEUMATIC GRIP.

No. 385,989. Patented July 10, 1888.

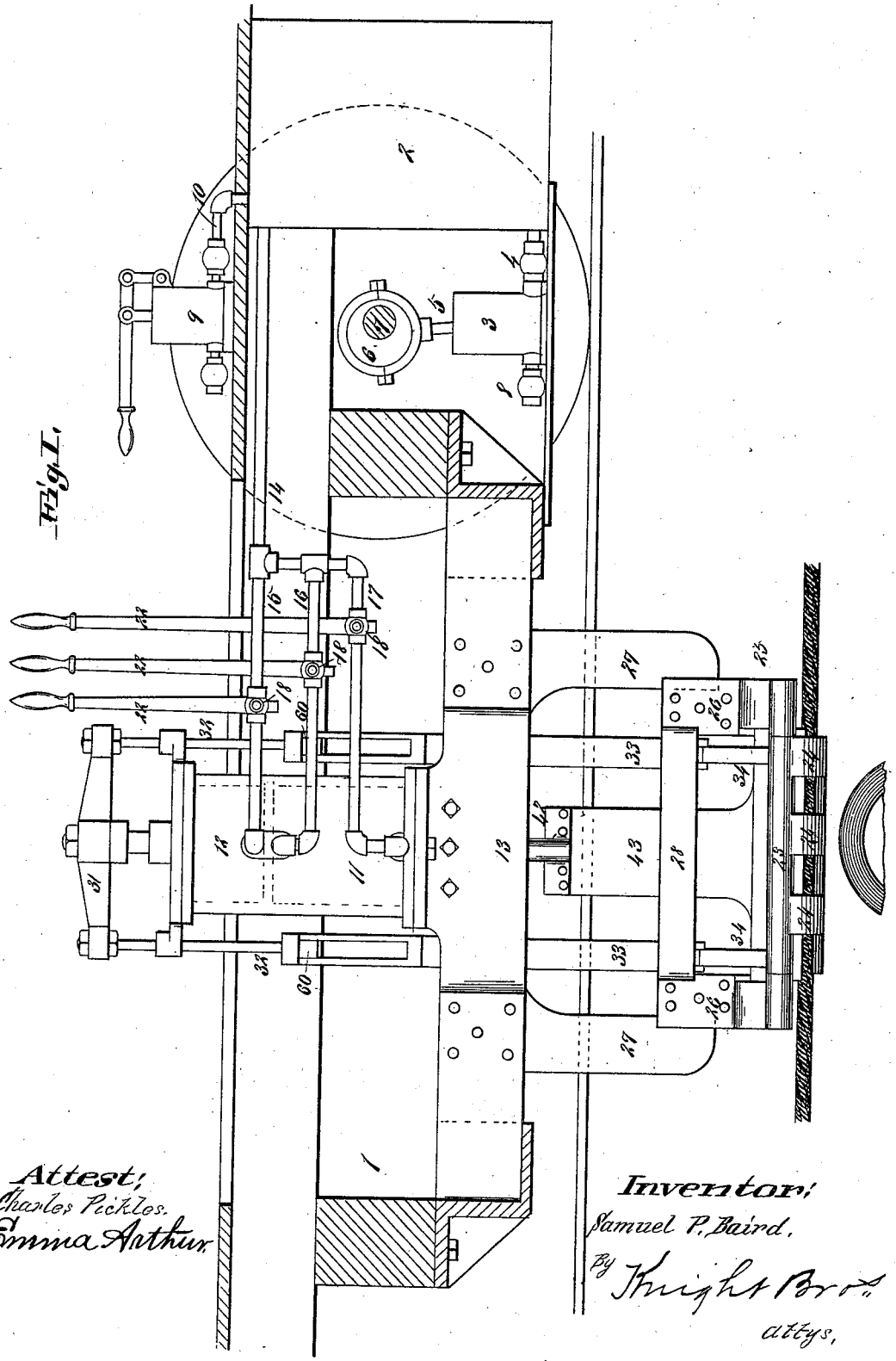

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. II.

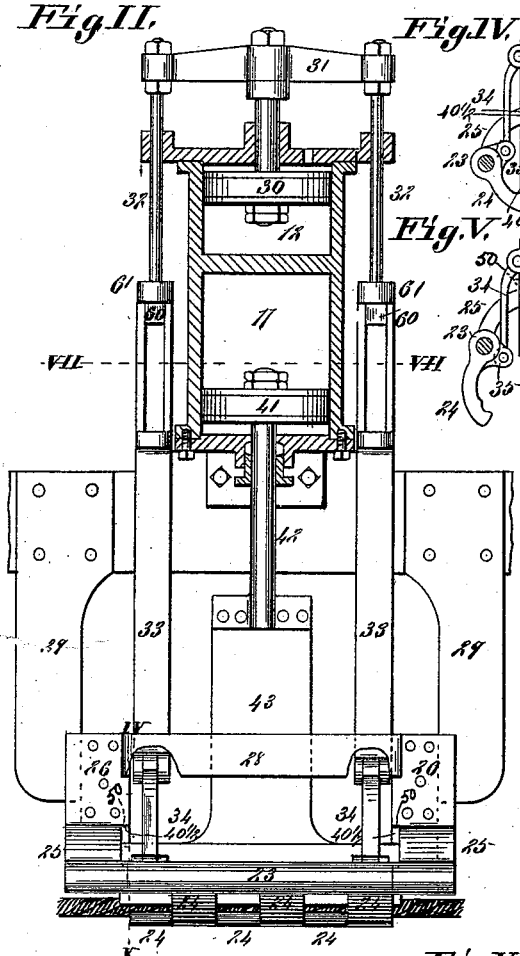


Fig. IV.

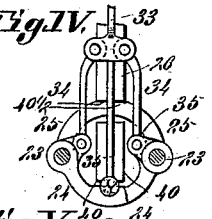


Fig. V.

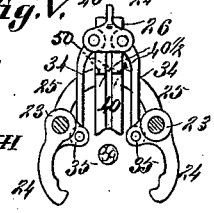


Fig. III.

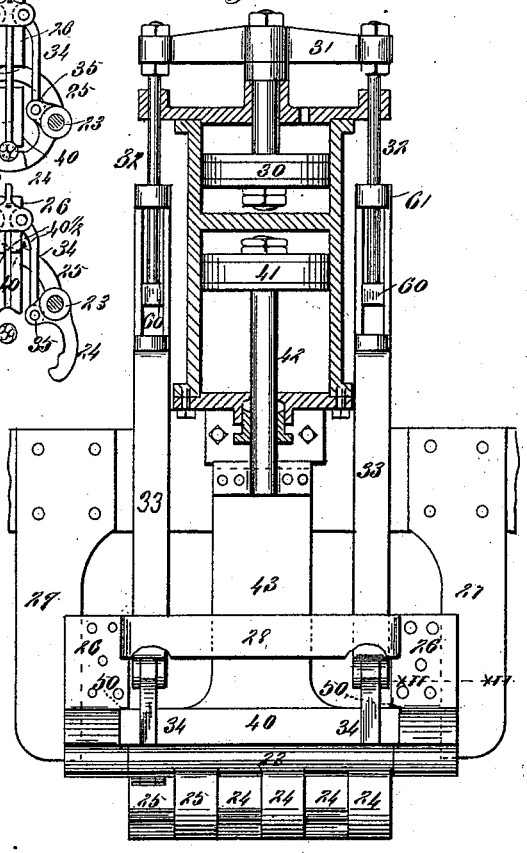


Fig. VI.

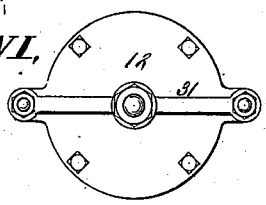


Fig. VIII.

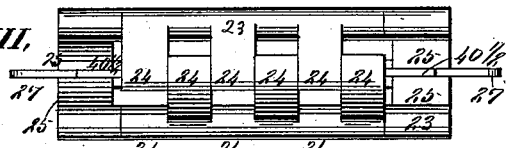


Fig. IX.

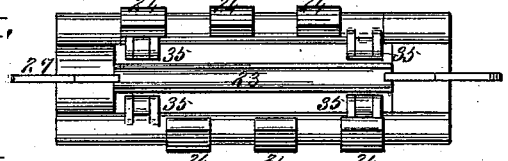


Fig. VII.

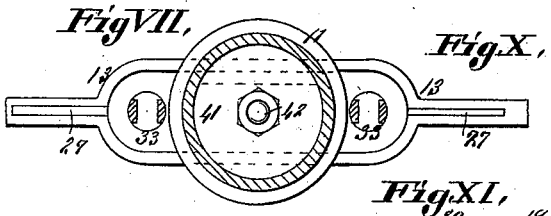


Fig. X.

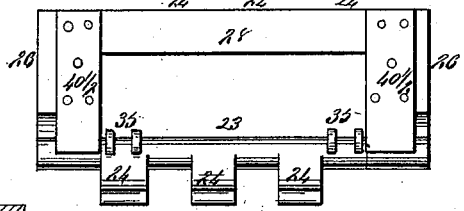


Fig. XI.

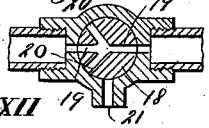
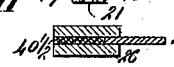


Fig. XII



Attest;
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Samuel P. Baird.
By Knight Bros.
Att'ys

UNITED STATES PATENT OFFICE.

SAMUEL P. BAIRD, OF ST. LOUIS, MISSOURI.

PNEUMATIC GRIP.

SPECIFICATION forming part of Letters Patent No. 385,989, dated July 10, 1888.

Application filed September 1, 1887. Serial No. 248,558. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL P. BAIRD, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Pneumatic Grips, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure I is a side elevation of my improved grip, showing part of a street-car. Fig. II is a similar view with the cylinders in section. Fig. III is a similar view to Fig. II, with the cable released and the jaws raised. Figs. IV and V are detail vertical sections taken on line IV V, Fig. II, Fig. V showing the cable released. Fig. VI is a top view of the upper cylinder and cross-head. Fig. VII is a transverse section taken on line VII VII, Fig. II. Fig. VIII is a bottom view of the jaws, showing them closed. Fig. IX is a similar view with the jaws open. Fig. X is a side view of one member of the lower jaw. Fig. XI is an enlarged section through one of the valves for admitting air to and from the cylinders. Fig. XII is a section taken on line XII XII, Fig. III.

My invention relates to an improved pneumatic grip; and it consists in features of novelty, hereinafter fully described, and pointed out in the claims.

Referring to the drawings, 1 represents part of the car supporting and carrying an air reservoir or chamber, 2.

3 represents a pump connected to the reservoir by a pipe, 4, and the piston-rod 5 of which is connected by means of an eccentric and ring, 6, to one of the axles 7 of the car. The air enters the pump through an automatic valve, 8. It will be understood that as the car moves along the pump will compress the atmospheric air under the chamber of reservoir 2.

For the purpose of applying the grip before any air has been compressed when first starting the car, a hand-pump, 9, connecting with the chamber 2 by means of a pipe, 10, may be employed.

11 12 represent cylinders located on a stationary beam or bar, 13, secured to the body of the car.

14 represents a pipe forming a communication between the chamber 2 and branch pipes 15, 16, and 17. The branch 15 leads from the pipe 14 to the chamber 12, the branch 16 to the upper end of the cylinder 11, and the branch 17 to the lower end of the cylinder 11. Each of these branches is provided with a valve, 18, constructed as shown in Fig. XI, having a port, 19, for the passage of the air to the cylinders and having a triangular-shaped port, 20, for the exhausts of the air through a nipple, 21. Each valve is provided with a lever, 22, and by moving the lever in the proper direction the valve is moved into the position shown in Fig. XI, and the air allowed to enter either the cylinder 12 or the upper or lower end of the cylinder 11, (according to which valve is operated,) and by moving the lever in the other direction the valve is turned to permit the air to escape from the cylinder.

The lower jaw of the grip is composed of two bars or shafts, 23, provided with fingers 24. The bars 23 are journaled on prongs 25 of sliding plates 26, held in guides 27, depending from the beam 13. The plates 26 are connected at their upper ends by means of a cross-bar, 28. The prongs 25 are of the shape shown in Figs. IV and V, and the bars 23 are journaled in them, as shown, so as to be moved to close the fingers, as shown in Fig. IV, or moved to open the fingers, as shown in Fig. V. When the fingers are open, as shown in Fig. V, the cable is allowed to drop from the grip or the grip permitted to be moved upward from the cable. The fingers are opened and closed by a piston, 30, in the cylinder 12, to which they are connected by a cross-head, 31, rods 32, plates 33, and links 34, the links forming a connection between the lower ends of the plates 33 and the bars 23, the bars having lugs 35, to which the links are secured. It will thus be seen that when the valve 18 of the pipe 15 is opened the air entering beneath the piston 30 will, by raising the piston, move upward the rods 32, plates 33, and links 34, and in doing this close the fingers from the position shown in Fig. V to the position shown in Fig. IV. Before doing this the grip is lowered, so that the cable is within the grasp of the fingers, (the fingers having been opened sufficiently far to straddle the cable and also the pulleys in the conduit, so that if the car is moving the fingers will not come in contact with the pulleys.) The cable can thus be "picked up" any time it may be "lost" by

the grip-man. When the cable is thus embraced by the fingers of the lower jaw, the upper jaw, 40, is forced down upon the cable, as shown in Fig. IV. This is done by means of a piston, 41, in the cylinder 11. When the cable is to be gripped, the valve 18 of the pipe 16 is opened, and the air entering the cylinder 11 above the piston 41 will force the piston and the jaw 40 down upon the cable, the piston being connected to the jaw by a rod, 42, and plates 43. Then, when the cable is to be released, the valve of the pipe 16 is turned to allow the air to exhaust, and the valve of the pipe 17 is opened to allow the air to enter beneath the piston 41 and force it upward from the position shown in Fig. II.

If it is desired to lift both of the grip-jaws from the cable, the piston 41 is moved upward toward the position shown in Fig. III. (It will be understood that it is only necessary to move it a very small proportion of this distance in order to release the cable; but to raise the jaws entirely from the cable this movement is provided.) The plate 43 lifts the jaw 40 of the grip upward until it comes against shoulders 50 on the plates 26. The plates 26 are then raised, (it has already been stated that these plates carry the lower member of the grip,) and then, as the piston continues to move upward, both the jaws are carried up from the position shown in Fig. II to the position shown in Fig. I, and may be lowered again by reversing the valve of the pipe 17 and opening the valve of the pipe 16. The jaw 40 is held in position and guided by plates 40½, held in the plates 26 and extending beneath the prongs 25. (See Fig. XII.) It will thus be understood how the upper grip-jaw may be moved to and from the lower one and how the two can be raised and lowered from or to the cable. As the jaws are raised together, the rods 32 move in the upper slotted ends of the plates 33, the rods having heads 60, that fit in the slots of the plates, and which come against stops 61 on the upper ends of the plates when the jaws have been lowered into using position, thus stopping or limiting the downward movement of the lower jaw.

I claim as my invention—

1. In a cable-grip, the combination, with the lower jaw formed in two members fulcrumed on a vertically-movable plate, of a rod or rods connected to said members and adapted to open and close and raise and lower the same, as set forth.

2. In a grip, in combination with the upper jaw, the lower jaw, consisting of hinged bars provided with fingers, and means for opening and closing the fingers, substantially as set forth.

3. In a grip, in combination with the upper jaw, the lower jaw, composed of hinged bars and fingers formed upon the bars, and means for moving the upper jaw and for opening and closing the fingers of the lower jaw and for raising and lowering the latter, substantially as and for the purpose set forth.

4. In combination with the cylinders 11 and 12 and their pistons, the upper jaw of the grip connected to the piston of the cylinder 11, and the lower jaw of the grip connected to the piston of the cylinder 12, the parts being so arranged that either member may be operated independently of the other, substantially as and for the purpose set forth.

5. In a grip, in combination with the upper jaw, piston to which the jaw is secured, and cylinder in which said piston is located, the lower jaw provided with fingers, piston, cylinder in which said piston is located, and connection between the piston and the jaw, whereby the fingers may be opened and closed, substantially as and for the purpose set forth.

6. In a grip, in combination with the air-chamber, pump connected to the axle of the car for forcing air into the chamber, cylinders, pipes provided with valves, forming communication between the chamber and cylinders, upper and lower grip-jaws, pistons located in the cylinders, and connection between the respective jaws and pistons, substantially as and for the purpose set forth.

7. In a pneumatic grip, the combination, with the jaws of the grip and cylinders having pistons connected to the jaws, of an air-supply connected to the cylinders and controlled by suitable valve-levers, a main pump operated by the car-axle, and a supplemental pump operated by a hand-lever in convenient reach of the grip-man, as set forth.

8. In a grip, in combination with the cylinders and pistons and means for admitting and exhausting air therefrom, the upper vertically-movable grip-jaw connected to one of the pistons, and the lower vertically-movable grip-jaw connected to the other piston, substantially as and for the purpose set forth.

9. In a grip, in combination with the cylinders and means for admitting and exhausting air therefrom, the upper grip-jaw connected to the piston in one of the cylinders, lower grip-jaw connected to the piston in the other cylinder, plates provided with prongs to which the lower jaw is pivoted, guides upon which said plates work, and shoulders 50 on said plates, against which the upper jaw impinges when both of the jaws are to be raised from the cable, substantially as and for the purpose set forth.

10. In a grip, in combination with the cylinders and means for supplying and exhausting air therefrom, the piston 30, cross-head 31, rods 32, having head 60, slotted plates 33, links 34, bars 23, having fingers 24, plates 26, having prongs 25, to which said bars are pivoted, jaw 40, guide-plates 40½, shoulders 50 on the plates 26, and plates 43, connecting the jaw 40 to the piston of the cylinder 11, substantially as and for the purpose set forth.

11. A grip consisting of an upper vertically-

movable jaw and a lower jaw formed of two meeting or overlapping members adapted to close beneath and pick the cable and then grip it, in connection with the upper jaw, as set forth.

12. In a grip operated by compressed air, the combination, with an air-supply for the grip-operating mechanism, of a main compressing mechanism operated by the car-axle and a supplementary compressing mechanism adapted to be operated by independent means, whereby sufficient air may be compressed to operate the grip before the car starts, as set forth.

SAMUEL P. BAIRD.

In presence of—
BENJN. A. KNIGHT,
JAS. E. KNIGHT.