(No Model.) 3 Sheets—Sheet 1.

J. ASHWORTH & C. S. PETRIE.

EXTENSION PIPE FOR FIRE APPARATUS.

No. 257,635. Patented May 9, 1882.

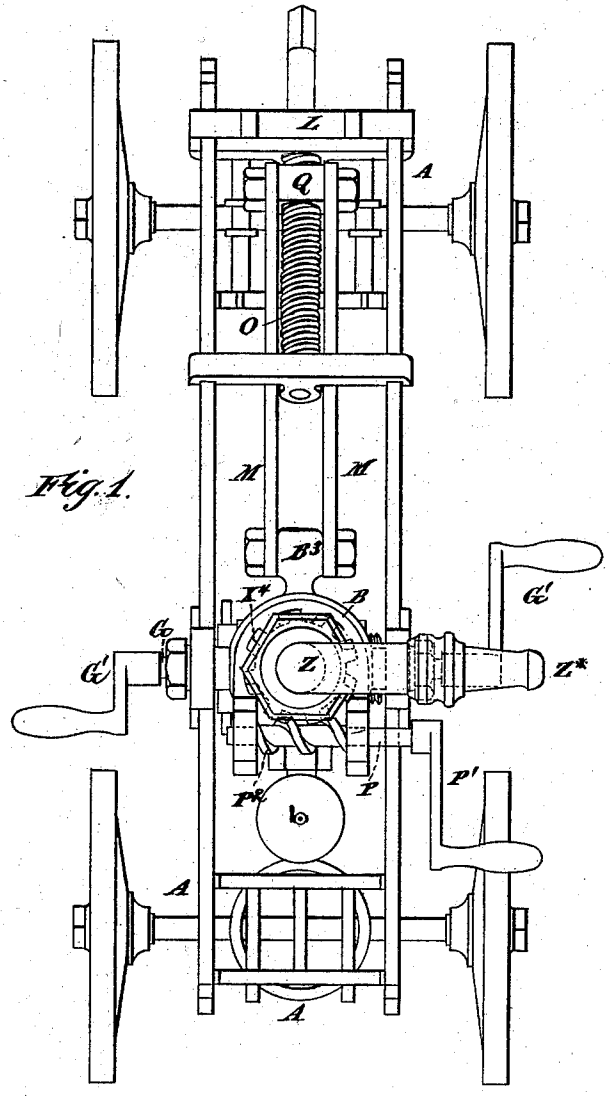

Fig. 1.

WITNESSES

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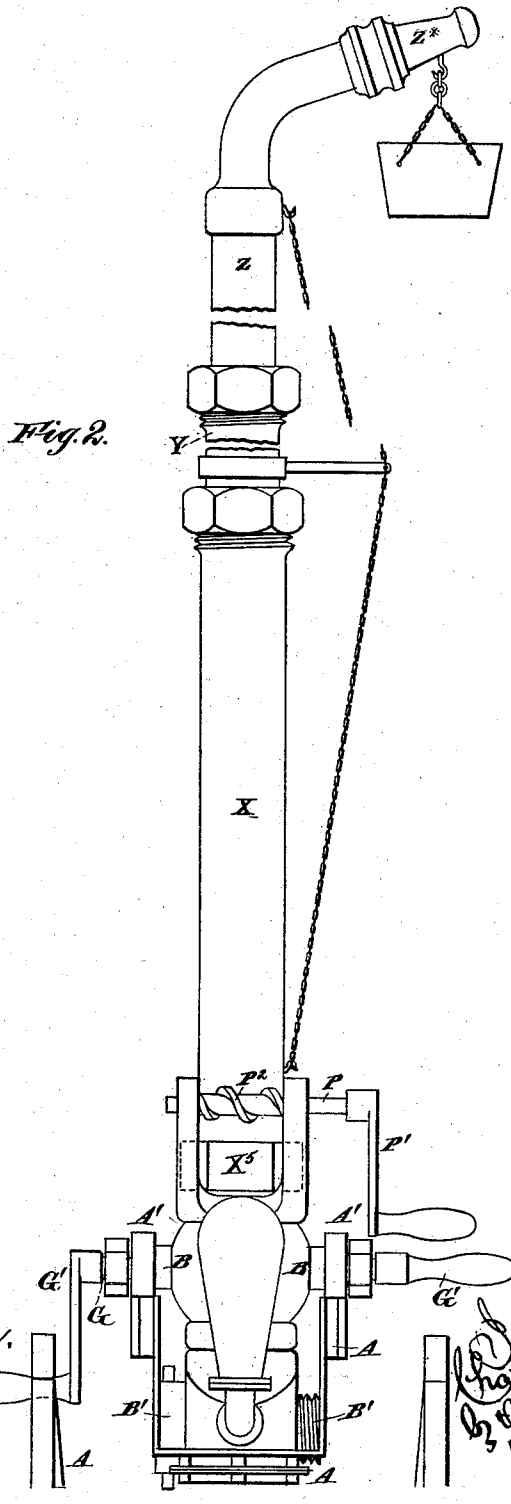
Fig. 2.



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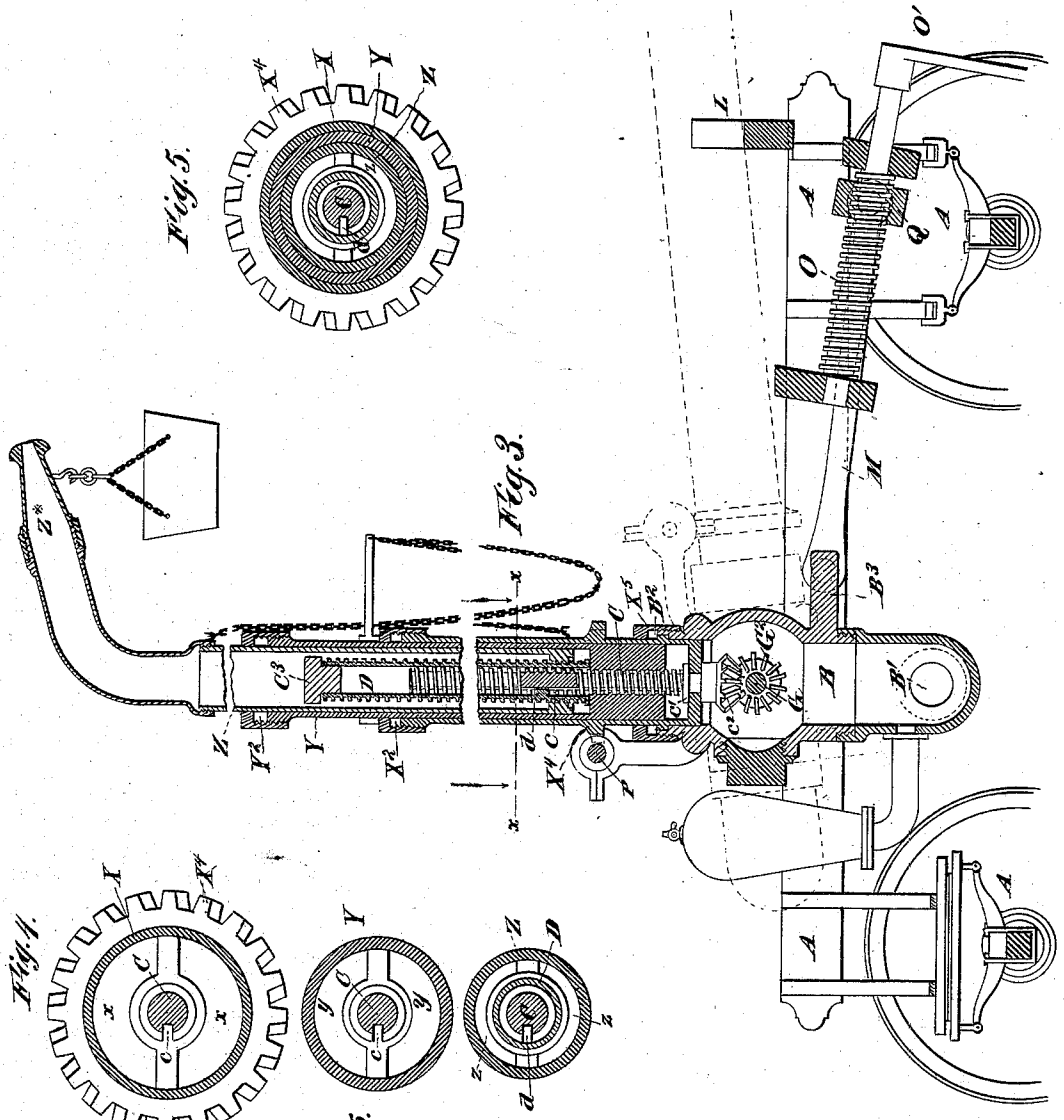

Fig. 5.

Fig. 3.

Fig. 4.

Fig. 6.

Fig. 7.

WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN ASHWORTH AND CHARLES S. PETRIE, OF CHICAGO, ILLINOIS.

EXTENSION-PIPE FOR FIRE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 257,635, dated May 9, 1882.

Application filed February 4, 1882. (No model.)

To all whom it may concern:

Be it known that we, JOHN ASHWORTH and CHARLES S. PETRIE, of the city of Chicago, Cook county, in the State of Illinois, have invented certain new and useful Improvements relating to Extension-Pipes for Fire Apparatus; and we do hereby declare the following to be a full and correct description of the same.

Our apparatus is especially adapted for reaching a fire in the remote part of a burning building, and is of the class known as "fire-towers." We provide a long pipe, which is divided into three sections fitting telescopically into each other, the lowermost forming the covering and support of the other two.

We also provide an internal screw-threaded shaft projecting through a considerable portion of the length of the pipes, receiving motion through bevel-gear wheels at the base from a crank at the base of the lowermost pipe. This screw-threaded shaft operates directly to raise the second section of the pipe, and by means of a long screw-threaded sleeve, also in the interior of the pipes, to raise the farthest and smallest section.

The extensible part of our apparatus lies almost horizontal when it is being hauled through the streets, or when not in use, and is raised to a vertical position by the aid of a further screw-threaded shaft firmly set in the framework and operating by means of links.

The lowermost pipe or section is provided with a worm-wheel and screw, which may be operated by means of a crank to turn all the sections longitudinally around together, so as to point the stream of water in a different direction. The water enters in the receiving-chamber at the bottom of the lowermost pipe.

We provide a stay or brace to withstand the lateral tendency to bend the pipes when extended to their full length and the engine is working vigorously.

The accompanying drawings form a part of this specification and represent what we consider the best means of carrying out the invention.

Figure 1 is a plan view of our apparatus; Fig. 2, an end view from the left in Fig. 1, a considerable part of the length of two sections of the apparatus being broken away. Fig. 3 is a central vertical section, some of the parts being in elevation. Fig. 4 is a vertical section on the line *x x* in Fig. 3, which intersects the three principal parts of my extensible tower and the means for extending them. Figs. 5, 6, and 7 are sections through parts detached. Fig. 5 is a vertical section of the outside pipe X. Fig. 6 is a section through the intermediate extensible pipe, and Fig. 7 a section through the uppermost pipe.

Similar letters of reference indicate like parts in the several figures where they occur.

The object of our invention is to facilitate the delivering of water at elevated points for the extinguishment of fires.

We employ a carriage, A, having the necessary wheels, springs, and attachments for horses. On this we mount a capacious socket-piece, B, turning in bearings A′ on the carriage A as the inclination of the pipes is changed.

B′ is a receiving-nozzle, to which hose may be attached to supply water from a hydrant or a fire-engine.

Our pipes are capable of extension telescopically. The system consists of three separate pipes of different diameters, the largest, X, fitting in the socket-piece B. Successive smaller pipes, Y Z, are placed concentrically within X. Each is capable of moving endwise, so as to be projected out nearly its entire length from the next larger one which incloses it.

C is an elevating screw-shaft, certain portions being designated, when necessary, by additional marks, as C′ C², &c. It is mounted in the line of the axis of the pipes, and has a deep longitudinal groove or spline, *c*, extending its whole length. Its lower end bears a collar, *c′*, and a bevel-gear wheel, *c²*.

D is a corresponding screw-threaded sleeve loosely surrounding the screw-shaft C, and provided with a feather, *d*, which engages in the spline *c*, so that it is compelled to rotate with the screw C, but is at liberty to move endwise thereon in obedience to any force. Its upper end carries a knob, C³. These screw-threaded parts C and D are of nearly the same length as the several lengths of pipes X Y Z.

A horizontal shaft, G, extends through the socket-piece B in the line of the axis of motion thereof. It is turned by hand-power ap-

plied to cranks G′, and carries a miter gear-wheel, G^2, which engages with a corresponding gear-wheel, C^2, on the screw C.

Liberal provision is made for the movement of water upward from the socket-piece B through the interior of the apparatus, to be delivered at the top, which will be described farther on.

We will first describe the provisions for thrusting out and contracting the telescopic pipes.

The lower end of the pipe X is contracted and engages between collars on the screw C. The next smaller pipe, Y, is contracted at the bottom and screw-threaded in its interior, and engages with the screw-threads of the screw C. It follows that in extending the apparatus the turning of the screw C elevates the pipe Y. The threaded sleeve D rests on the contracted base of the pipe Y, and is elevated with it while turning at the same rate as the screw C. The lower end of the inner and smallest pipe, Z, is contracted at the base and engages with the screw-threads on the sleeve D. It follows that the inner pipe, Z, is elevated faster than the intermediate pipe, Y. This is due to the fact that the screw-sleeve D lifts it by its rotary motion received from the screw C, while abutting itself on the contracted base of the part Y, which itself is being elevated by the screw C. It is thus subject to the double influence, first, of the screw C to elevate the base on which the screw-sleeve D rests, and, second, the screw D, which itself contributes another increment to its rising motion. If the threads of the screw D are of the same pitch as those of the screw C, the small pipe Z will rise twice as fast as the intermediate part, Y. The ratio may be changed as required.

To provide for the passage of water, there is a sufficient annular space between the screw-sleeve D and the interior of the inner pipe, Z, and sufficient openings through the contracted base of each pipe. The openings in the base of the lowermost pipe, X, are shown in Fig. 4, and are marked *x*. The openings in the base of the intermediate pipe, Y, are shown in Fig. 6, and are marked *y*. The openings in the base of the smallest pipe, Z, are shown in Fig. 7, and are marked *z*. The upper end of the lower pipe is provided with a stuffing-box, X^2, which forms a tight fit against the exterior of the intermediate pipe, Y. The upper end of the intermediate pipe, Y, is equipped with a stuffing-box, Y^2, which forms a tight contact with the exterior of the pipe Z. The upper end of the pipe Z is equipped with a bent discharge-nozzle, Z*.

To control the height at which the stream is projected, the operator turns the shaft G, and consequently the screw C and screw-sleeve D, in one direction or the other, and thus raises or lowers the delivering-nozzle Z*.

To control the horizontal direction of the stream, the operator turns a crank, P′, fixed on a shaft, P, which rests in bearings supported on the socket-piece B. A worm, P^2, on this shaft engages with a worm-wheel, X^4, on the exterior of the largest and outer pipe, X.

The junction of the pipe X with the socket-piece B is effected through a collar, X^5, and a stuffing-box, B^2. These parts hold the pipe X firmly endwise, but allow it to be turned around.

O is a nearly horizontal screw-shaft, turned by a crank, O′, and carrying a nut, Q, which is connected by stout links M to an arm, B^3, fixed on the socket-piece B.

After our system of pipes has been shortened to the condition shown in the figures by turning the shaft G, the operator turns the shaft O and allows the system of pipes to change its inclination until it lies in the nearly horizontal position indicated in dotted lines, resting in the saddle L.

When it is desired to raise the pipes for action the screw-shaft O is turned in the opposite direction, and, either alone or by the aid of the hands of men applied directly to the pipes, it raises the pipes to the perpendicular or other elevated position desired, and holds them there.

The pressure of the water may be applied to aid in lifting the parts when the pipes are to be extended.

The strong flow of water may be shut off wholly or entirely when the crank-shaft G is turned in the opposite direction to contract the pipes.

We propose to brace or stay the tubes X Y Z by means of a chain, as shown in Figs. 2 and 3, which slides freely through an arm from a collar on the end of the part X. It will be readily seen that this can be rapidly adjusted to the different heights to which the pipes will be extended by engaging a different link in the hook provided at the base of the pipe X.

Modifications may be made in the forms and proportions of the details. We can provide several nozzles B′, to allow the application of a hose from any side. We can provide longitudinal grooves in the exterior of the pipes Y and Z and corresponding internal projections on the corresponding outer pipe, or on the stuffing-box thereon, to engage therewith and insure against a turning of the pipes one within the other; but such will not, we believe, be ordinarily necessary or expedient. We can vary the form of the discharge-nozzle Z*. We can provide for connecting hose thereto which may be led to any desired point on the top or any high floor of a building.

It may be desirable to provide an air-chamber or cushioning means in connection with our apparatus, in which case we propose to place such chamber at the base of the part B, as shown in the drawings.

We can also attach to the nozzle of our apparatus an open-top basket or box as a life-saving means, which may be used to rescue people from the upper stories of a burning building by running the apparatus to the side of the building and slanting the pipes X Y Z

by means of the parts O Q M sufficiently to reach the windows and then lowering. This may be very important in some cases, as the pipes can be put into places where ordinary ladders would not stand, it being perfectly practicable to run our nozzle of the pipe X into a window from which flames are pouring.

We claim as our invention—

1. The screw C, having the longitudinal groove *c*, and the threaded sleeve D, having the feather *d*, in combination with the pipes X Y Z, substantially as herein specified.

2. The pipes X Y Z, in combination with the socket-piece B, central screw, C, and concentric sleeve D, and provided with passages *x y z* and stuffing-boxes X^2 Y^2, adapted to serve as herein specified.

3. The socket-piece B, supported on the carriage A, with liberty to turn in a vertical plane, in combination with the pipe X and its connections, socketed in one end, with one or more hose-couplings, B′, on the opposite end, and the operating-shaft G, mounted in the line of axis of motion, arranged for joint operation as herein specified.

4. The elevating-screw O and its operating means O′, in combination with the nut Q, links M, arm B^3, and socket-piece B and its connections, arranged to serve as herein specified.

5. In a series of telescopic pipes, the head C^3 on the screw-threaded sleeve D, in combination with the pipes Y Z, arranged to prevent the elevating of the pipes beyond the proper limit, as herein specified.

In testimony whereof we have hereunto set our hands, at the city of Chicago, Illinois, this 7th day of November, 1881, in the presence of two subscribing witnesses.

JOHN ASHWORTH.
CHARLES S. PETRIE.

Witnesses:
P. J. MOLONY,
HENRY COX.