(Model.) 2 Sheets—Sheet 1.

J. WOTAPEK.

INJECTOR AND EJECTOR.

No. 298,329. Patented May 6, 1884.

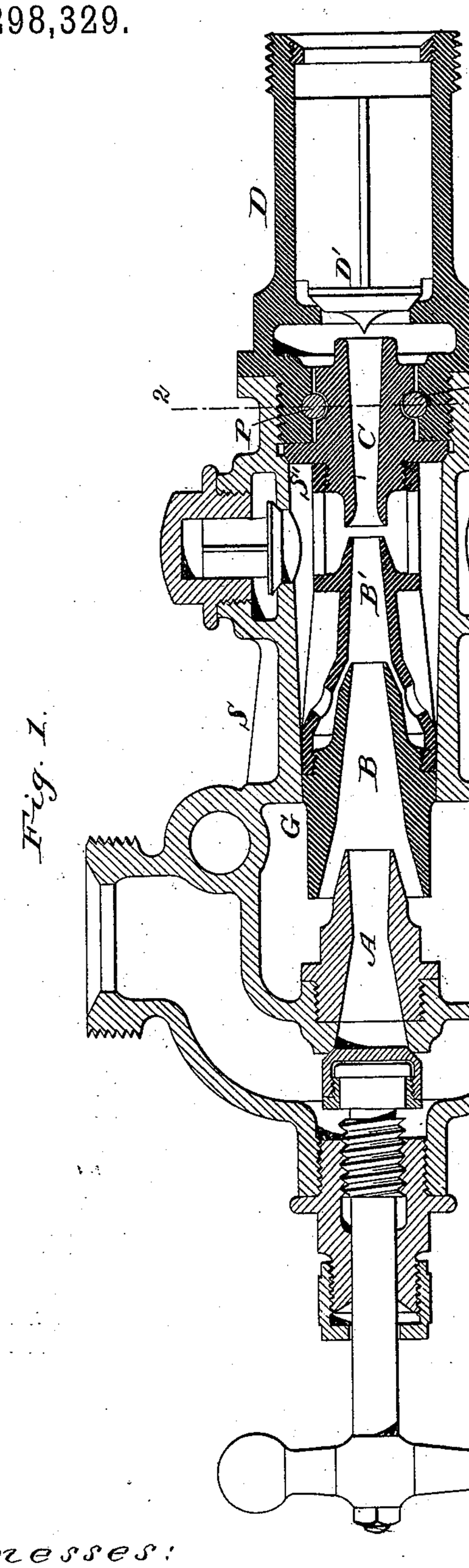

Fig. 1.

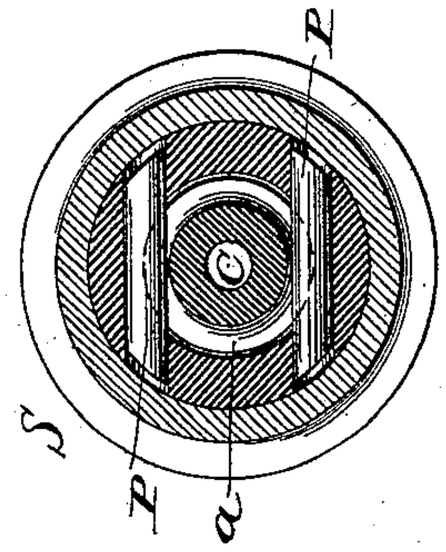

Fig. 2.

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(Model.)

2 Sheets—Sheet 2.

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Fig. 4.

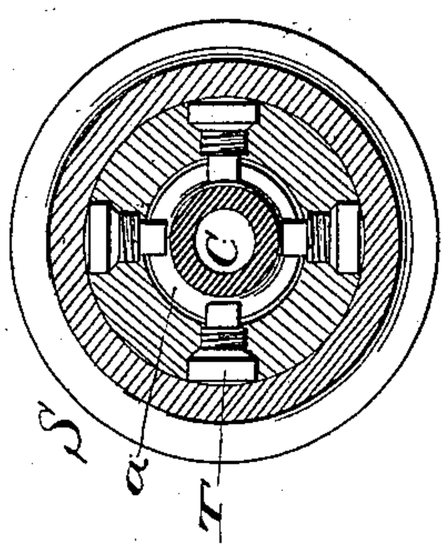


Fig. 3.

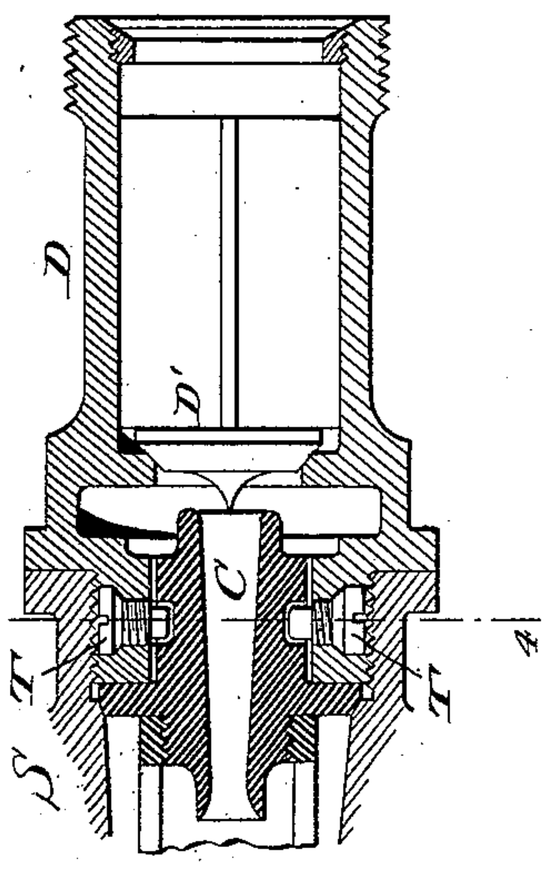
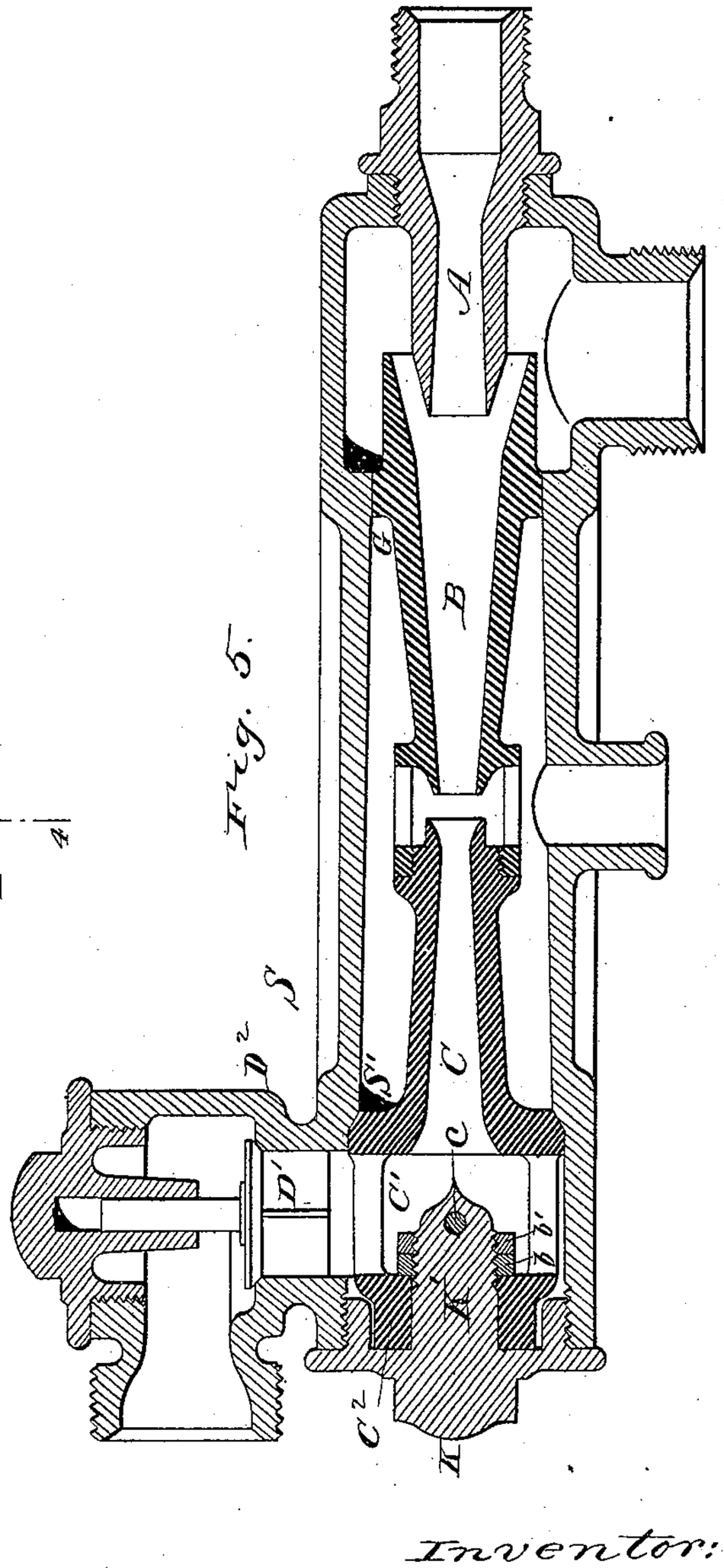


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOSEPH WOTAPEK, OF NEW YORK, N. Y., ASSIGNOR TO THE NATHAN MANUFACTURING COMPANY, OF SAME PLACE.

INJECTOR AND EJECTOR.

SPECIFICATION forming part of Letters Patent No. 298,329, dated May 6, 1884.

Application filed March 5, 1884. (Model.)

To all whom it may concern:

Be it known that I, JOSEPH WOTAPEK, of the city, county, and State of New York, have invented certain new and useful Improvements in Injectors and Ejectors, of which the following is a specification.

When injectors and ejectors are used, their interior nozzles are very liable to become corroded by and incrusted with lime and other impurities contained in the water. Whenever this occurs, it becomes necessary to remove the nozzles for the purpose of cleaning them as well as the other parts of the injector or ejector. This operation in existing forms of such instruments is always attended with great trouble and expense, and at times, owing to the accumulation of deposits, it has been found impossible to remove the nozzles without destroying the injector or ejector.

The object of my invention is to obviate this difficulty and to secure the easy withdrawal of the nozzles or interior working parts. To this end I combine with the shell or body of the injector and the nozzles which are to be withdrawn a device, which, for convenience' sake, I term the "nozzle-holder," connected to the shell or body by a screw-joint, and swiveled or equivalently attached to the nozzles in such manner that while the nozzles and their holder move bodily and together in a longitudinal sense the holder can be rotated independently of the nozzles. Thus, by unscrewing the holder I can draw the nozzles lengthwise out from the shell without putting upon them torsional strain. I also make the interior of the shell for that portion of its length which contains the nozzles to be withdrawn conical or flaring, so as to gradually increase in size toward the nozzle-holder and give this portion of the interior surface a smooth finish. By making the interior of the shell of this shape the operation of withdrawing the incrusted nozzles is facilitated, and by giving a smooth finish to the same the deposits adhere with less tenacity to the shell, and can be more easily withdrawn with the nozzles.

In illustration of my invention I have represented in the accompanying drawings an injector. It will, however, be understood that the invention is applicable to ejectors equally as well.

In the drawings, Figure 1 is a longitudinal central section of an injector embodying my invention in its preferred form. Fig. 2 is a cross-section on line 2 2, Fig. 1. Fig. 3 is a longitudinal central section of the "line-check" end of an injector representing a modified form of joint between the nozzle-holder and the nozzles. Fig. 4 is a cross-section on line 4 4, Fig. 3. Fig. 5 is a longitudinal central section of a modified form of injector, hereinafter described.

The injector shown in the drawings is in its general features of well-known construction, and requires, therefore, no particular description here. It is sufficient to say that S is the shell or body of the injector. A is the steam-nozzle. B B′ are the two condensing chambers or nozzles, and C is the receiving-nozzle, beyond which is the short tube D, usually termed the "line-check," which contains the check-valve D′, for preventing back-pressure, and screws at one end into the shell A, and at the other end is adapted to be connected to the delivery-pipe. The parts thus generally mentioned operate together in the same way as in other injectors, and need not be further described.

I now proceed to a description of the manner in which my invention is carried into effect.

The nozzles to be withdrawn in the present instance are the two condensing-nozzles B B′ and the receiving-nozzle C. They are connected together to move as one, in this respect not differing from other known forms of injectors. The line-check D in the arrangement shown in Figs. 1, 2, 3, and 4 constitutes the nozzle-holder. To permit it to be used as a means of withdrawing the nozzles without rotating or twisting the latter, it is swiveled to the delivery end of the receiving-nozzle C. Manifestly this swivel-joint can be made in various ways. In Figs. 1 and 2 it is formed by fitting the cylindrical neck of the delivery end of receiving-nozzle C into the mouth of the line-check tube D, and then fastening the two together by means of tangential pins P in the line-check, which enter an annular peripheral groove, *a*, in the neck of receiving-nozzle C. The line-check is thus connected to the nozzles, so that they all must necessarily move together in a longitudinal sense, but at

the same time, so that the line-check can be rotated independently of the nozzles. Thus, by unscrewing the line-check, it will gradually draw with it the nozzles, and the power requisite for this purpose can readily be applied under advantageous conditions. The only difference between the arrangements shown in Figs. 1 and 2 and Figs. 3 and 4 is that in the latter screw-studs T are used instead of the tangential pins P in the former. In the arrangement shown in these figures it is requisite to unscrew the line-check in order to draw out the nozzles, thus necessitating a break in the delivery-pipe joint. Fig. 5 shows an arrangement whereby the nozzles can be drawn out independently of the line-check. In this arrangement the line-check, as indicated at D^2, extends from the side instead of from the end of the shell or body A of the injector. The delivery end of the receiving-nozzle C is formed with a yoke, C′, (to permit the water to be delivered to line,) and terminates beyond the yoke in an annular hub, C^2, through which passes the inner cylindrical stem, K′, of a plug, K, which screws into the end of the shell. The inner end of the stem K′ projects beyond the hub, and has on it some means by which it is prevented from being withdrawn from the hub, these means consisting in the present instance of two nuts, *b b′*, screwed onto the projecting inner end of the stem, and also a cross-pin, *c*, driven into the stem just beyond the nuts. The nuts draw the plug up against the hub C as closely as desired. At the same time the cylindrical stem of the plug is left free to rotate in the hub, thus securing the requisite swivel-joint between the nozzles to be withdrawn and the holder, which in this instance is the plug.

Referring now to Fig. 1, the shell or body A is, as usual, formed so as to encircle and be a guide for the condenser-nozzle B at the point G. It is also formed, as customary, at the point S with a seat, against which a corresponding part on the receiving-nozzle bears when the nozzles are in place. That portion of the interior of the shell or body between the points G S—which, in this instance, is the portion which covers or surrounds the nozzles to be withdrawn—is made conical or flaring, as indicated, increasing gradually in diameter toward the delivery end, and the walls of this portion are free from recesses or depressions. It is in the space included between the nozzles and the walls of this portion of the shell or body that the deposit from the water mainly accumulates until it fills said space more or less completely, forming a solid mass adhering to the shell and nozzles, and oftentimes of such hardness as to be broken or chipped off with difficulty by the use of a chisel. By making the interior of this portion of the shell of the form shown I facilitate greatly the operation of withdrawing the nozzles, since the incrustations when once started will move with the nozzles and will not afterward be liable to stick, there being, moreover, no recesses or depressions in the walls in which the incrustations can gather, and, as it were, act to dovetail together the nozzles and the shell. To further provide for the ready separation of the deposit from the shell, I give this portion of the interior surface of the latter a smooth finish, as can easily be done by the use of proper tools. The deposit in this case will adhere much less tenaciously to the shell, and can be started with much less trouble. On the other hand, as the exterior of the nozzles is necessarily rough and comparatively unfinished, it adheres to them tightly and is carried out with them.

I remark at this point that I may use this feature of my invention to advantage even if the nozzles to be withdrawn are arranged as in existing forms of injectors or ejectors; and, on the other hand, I may with advantage employ the swiveled joint between the nozzle-holder and the nozzles to be withdrawn, even if the conical or flaring conformation of the interior of the shell or body be dispensed with. It is, however, by the use of both features in conjunction that the best results are realized. The same conformation of the interior of the shell is shown in Fig. 5, there being in this case, however, but one condensing-nozzle.

Having now described my invention and the best way known to me of carrying the same into effect, I state my claim as follows:

I claim—

1. The combination, with the shell or body and the nozzles to be withdrawn, of a nozzle-holder screwed to the shell and connected to the nozzles, substantially in the manner hereinbefore set forth, so that while the two shall move longitudinally bodily and together the holder may rotate independently of the nozzles.

2. The combination, with the nozzles to be withdrawn, of the shell having that portion of its interior which surrounds said nozzles made conical or flaring without recess or depression, so as to gradually increase in diameter toward the delivery end, substantially as and for the purposes hereinbefore set forth.

3. The combination, substantially as hereinbefore set forth, of the nozzles to be withdrawn, the shell or body having that portion of its interior which surrounds said nozzles made conical or flaring, so as to gradually increase in diameter toward the delivering end, and the nozzle-holder screwed to the shell or body and connected with the nozzles, substantially in the manner described, so that while the two shall move longitudinally bodily and together the holder may rotate independently of the nozzles.

In testimony whereof I have hereunto set my hand this 4th day of March, 1884.

JOSEPH WOTAPEK.

Witnesses:

JACOB W. MACK,

CHARLES JUDGE.