(No Model.)

F. BETTS.

SUCTION PIPE FOR PUMPS.

No. 534,191. Patented Feb. 12, 1895.

Fig: 1.

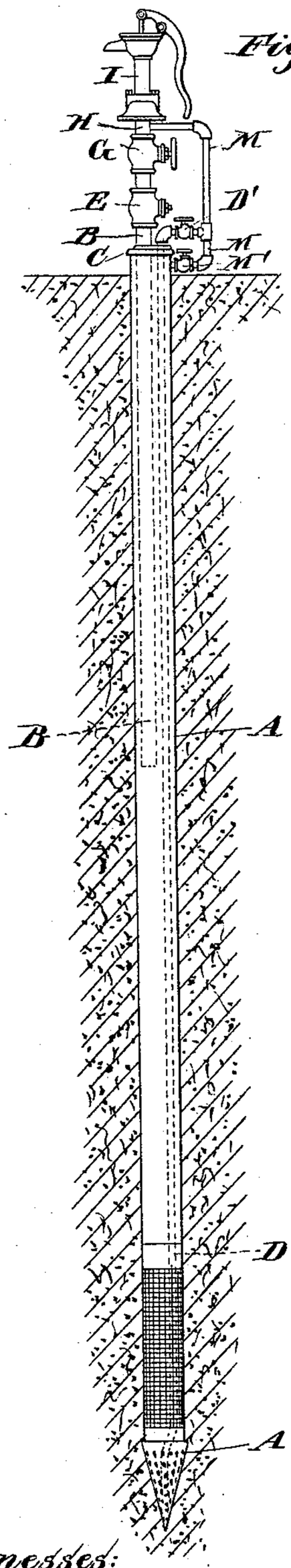
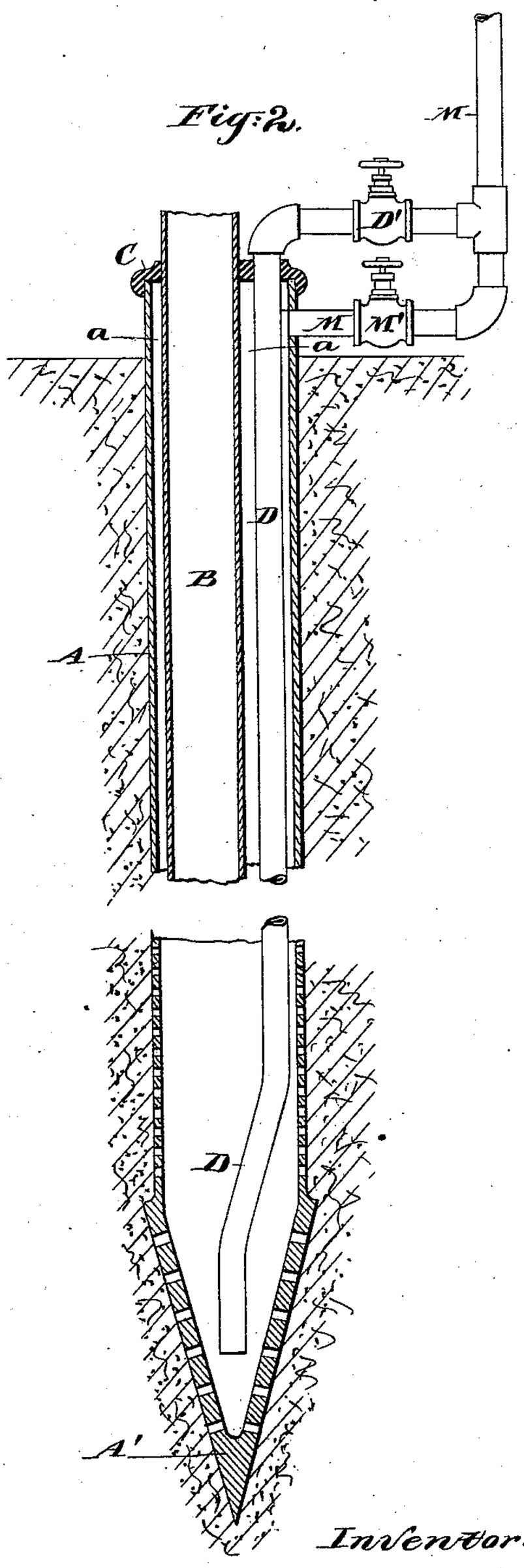


Fig: 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

FREDERICK BETTS, OF BROOKLYN, NEW YORK.

SUCTION-PIPE FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 534,191, dated February 12, 1895.

Application filed February 17, 1894. Serial No. 500,590. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK BETTS, a citizen of the United States, residing in the city of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Suction-Pipes for Pumps, of which the following is a specification.

My improvement provides a large foraminous area at the base, obtaining the effect of a vacuum chamber by a space provided in the upper portion of the well between an inner and an outer tube, which inner tube serves as the eduction passage through which the water is raised, while the outer tube forms a smooth and continuous casing, properly shod and equipped for being forced down into the earth.

I equip the device with a valve for stopping the inner pipe tightly when desired, and provide what I term a "sand-pipe" for drawing strongly from the bottom of the interior of the outer tube by simply closing the main stop valve and opening a cock in such sand-pipe, and working the pump with the valves thus adjusted. I provide a by-pass valve and a controlling cock therefor which enables me to increase or reduce the air in the vacuum chamber at will.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation showing the entire apparatus, and Fig. 2 is a central vertical section through certain portions.

It will be understood that the several joints and other parts not specifically described, may be of any ordinary and suitable construction.

Referring to the drawings and the letters of reference thereon, A is the outer casing, made of cast iron or other suitable material in one or more lengths, and A′ a pointed shoe, adapted to separate the earth when the tube is driven down. The tapering shoe, or the lower portion of the cylindrical part A, or both, are perforated to admit the water, and the tube is sunk below the line of complete saturation, or what is ordinarily termed the "water line" in the earth.

B is the inner tube, mounted a little out of center within the tube A, and extending downward a part of the distance therein with the lower end open to receive the water.

D is what I term a sand-pipe, extending down through the reducer.

C is a cap, performing the functions of a reducer, and fitted tightly and strongly to the top of the outer tube A and to the exterior of the inner tube B, and terminating near the bottom of the interior of the apparatus.

On the top of the inner pipe B is a casing E, which incloses a self-acting valve, which may be a clapper-valve of any ordinary construction, adapted to allow the water a free passage upward and forbid its return. Above this is a globe valve G, of any ordinary or suitable construction, adapted to completely arrest the flow of the water in either direction, when required.

H is an extension of the pipe farther upward, and I is a pump of any ordinary or suitable pattern, represented as a reciprocating, single-acting hand-pump.

The pump may deliver the water in the approximately intermittent manner common to this class of pumps, while the induction from the porous earth at the bottom of the apparatus is less intermittent. This end is attained by partially exhausting the air under the cap in the space marked *a*, between the inner pipe B and the upper portion of the outer pipe A. In case there should be too little or too much air at this point, I provide for avoiding the difficulty by a by-pass M, which may be much smaller than the delivery pipe, and is provided with a small cock M′, which is ordinarily closed during the time while the pump is working.

Whenever the working of the apparatus indicates a surplus of air, or for any reason it is desired to reduce the quantity of air which remains under the cap C, the cock M′ may be opened momentarily while the pump is working, and any desired quantity of the air may flow up through the pipe M and pass away through the pump. When, on the contrary, the harsh and inelastic action of the pump, or any other indication makes it apparent that there is too little air under the cap, the pump is stopped, and the cock M′ being opened the water is allowed to flow downward through it, and when the upper

end of the pipe M is uncovered, air will descend through the pipe M. When a sufficient quantity has descended and is ready to perform its useful function in the space *a*, the cock M′ is closed, and the action of the pump may be resumed in the ordinary manner.

The sand-pipe D is inserted tightly through the cap C, and presents its open lower end in the interior of the apparatus near the bottom, ready to draw out any sand which may accumulate therein.

D′ is a cock, which is ordinarily closed, but whenever it is suspected that there is an injurious accumulation of sand, this cock is opened and the pump being worked with the globe-valve G closed, the strong current of water upward through the sand-pipe will draw the sand with it. I have shown this pipe as connected to the by-pass pipe M, and prefer such construction; but it may be carried up independently, if desired.

In starting the apparatus, the globe-valve G is closed, and the cock M′ is opened. Now the pump being well wetted and worked vigorously, the air will be drawn out through the pipe M and the water will rise. When this has proceeded sufficiently, the cock M′ is closed, and the globe-valve G cautiously opened. On further working the pump the water will now be drawn up through the inner tube B, and the smaller quantity of air remaining in the space *a* causes that space to serve as a vacuum chamber, the water-level therein rising and lowering with each motion of the pump, and maintaining a substantially uniform vacuum in the well, and drawing the water nearly uniformily inward through the foraminous surface at the bottom.

The self-acting valve E serves as a check-valve, preventing the return of the water and holding the apparatus always ready for immediate use.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention.

I can set the inner pipe B centrally within the outer pipe A, and in case the sand-pipe D is dispensed with I prefer to do so.

I claim as my invention—

1. In a driven well, the large tube A, having its lower end properly conditioned for driving into the earth, and receiving water therefrom, in combination with the smaller tube B, extending down a part of its length within it, and with the pump I, cap or reducer C joining these parts tightly and strongly, the valve G and by-pass pipe M and cock M′, all arranged for joint operation substantially as herein specified.

2. In a driven well, the outer pipe A, properly shod for being driven down in the earth and receiving water at or near the lower end, the smaller pipe B extending partially down in its interior, cap C tightly joining these parts, the pump I, and globe-valve G, in combination with each other and with the sand-pipe D communicating between the bottom of the apparatus and the space above said valve G, and controlling cock or valve D′ in said pipe, all arranged for joint operation substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

FREDERICK BETTS.

Witnesses:

HENRY B. STRYKER,

OWEN MCQUAID.