

(No Model.)

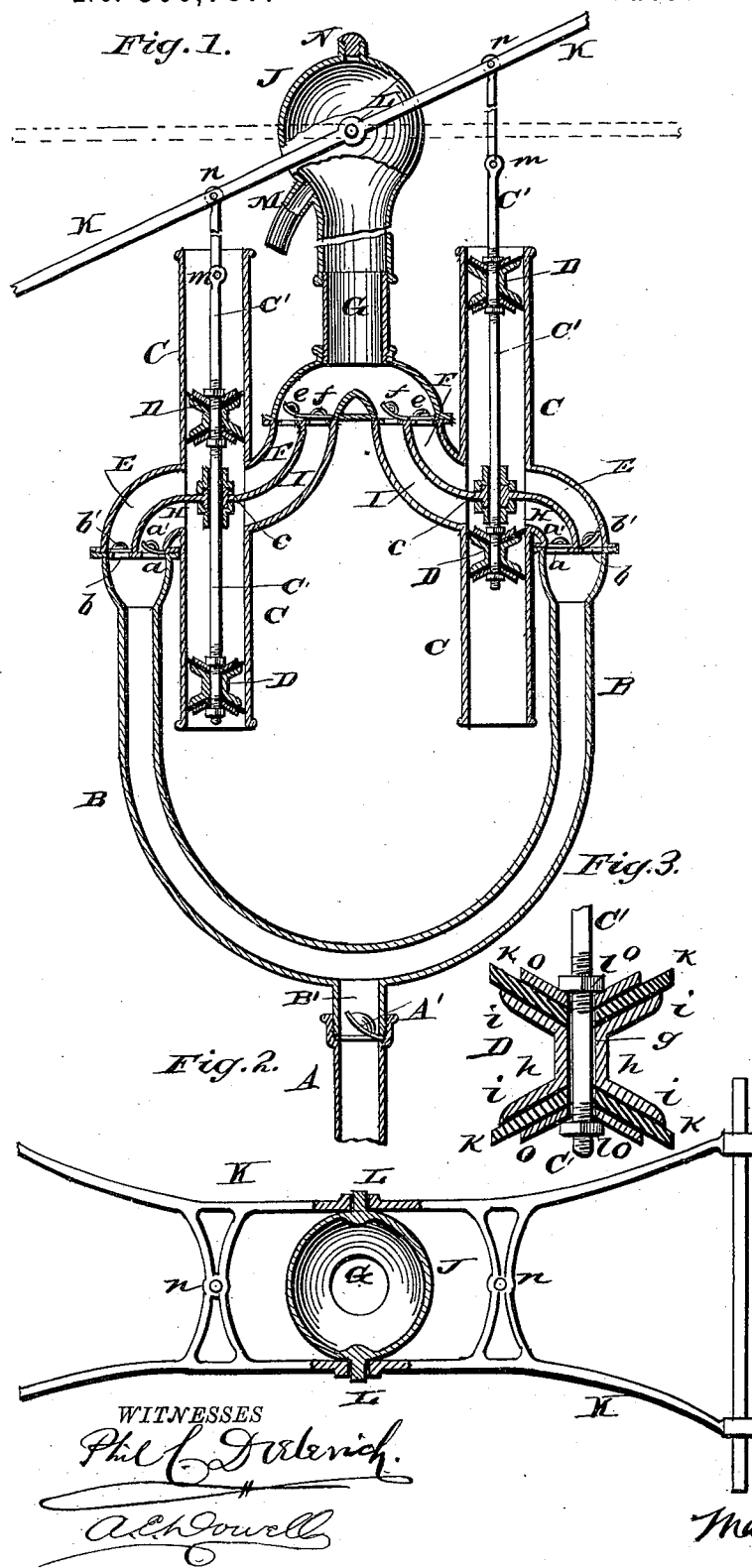
2 Sheets—Sheet 1.

M. F. McNELLY.

DOUBLE FORCE PUMP.

No. 300,787.

Patented June 24, 1884.



(No Model.)

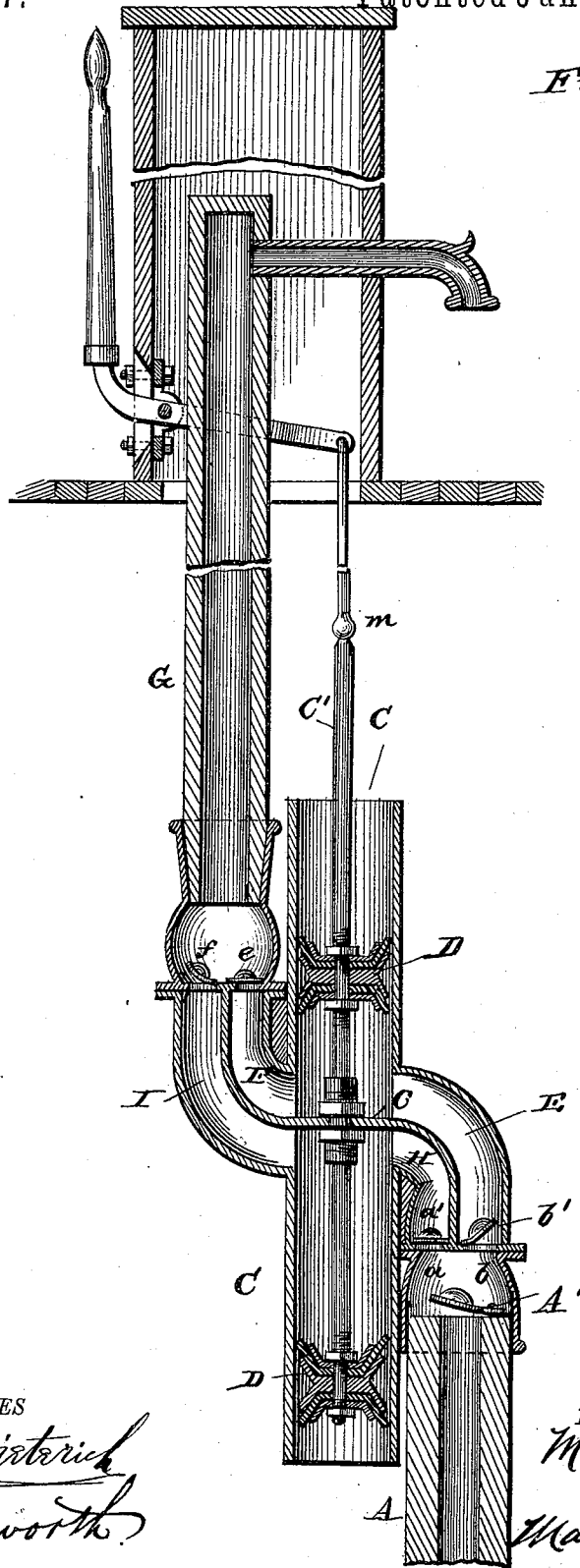
2 Sheets—Sheet 2

M. F. McNELLY.
DOUBLE FORCE PUMP.

No. 300,787.

Patented June 24, 1884.

Fig. 4.



WITNESSES

Phil. Dietrich
W. R. Keyworth

INVENTOR

M. Frank McNelly

by:

Marshall Ward
Attorneys

UNITED STATES PATENT OFFICE.

M. FRANK. McNELLY, OF STERLING, ILLINOIS.

DOUBLE FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 300,787, dated June 24, 1884.

Application filed November 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, M. FRANK. McNELLY, a citizen of the United States, residing at Sterling, in the county of Whiteside and State of Illinois, have invented certain new and useful Improvements in Double Force-Pumps; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention has reference to certain improvements in pumps, and pertains to certain novel arrangements, hereinafter described, for quadrupling the stroke, novel construction of the buckets, and peculiar method of fulcruming the lifting-lever.

In the drawings, Figure 1 is a vertical section of a pump embodying my invention. Fig. 2 is a plan view illustrating my mode of constructing the fulcrums of the lever. Fig. 3 is a detached view of one of the buckets. Fig. 4 shows the adaptation of my cylinder for use singly with either iron or wooden stock.

Referring to the drawings, A is the main pump-stock, which communicates with the water in the well. In the upper end of the stock A, and at or near its point of junction with pump, is seated the upwardly-opening automatic valve A'.

B B are pump-tubes, curved upward and outward, as shown, intercommunicating at their base, and at their lower extremity having the downwardly-extending stem B', which is inserted in the upper end of the stock A, and forms the communication from such stock into the tubes B B. The upper ends of the tubes B B are formed into two outlets, *a b*, on which are respectively seated the upwardly-opening automatic valves *a'* and *b'*.

C C are vertical cylinders, in which are reciprocated the pistons or buckets D D. The cylinders C C are provided, respectively, with the centrally-located transverse partition, *c*, in which the piston-rod C' has a bearing by passing through such partition, the latter being suitably packed at the point of passage through it of the rod C', to prevent leakage of the water through such partition. The upper buck-

ets D are attached to the rods C' at such point as, in the movements of such rod, to traverse that portion of the cylinder C above the partition *c*. The lower buckets, by the same movement, are caused to traverse that portion of the cylinder C respectively below the partitions *c*. Through the valve *b'* in the upper end of the tube B communication is afforded through the curved channel E, the lower portion of the upper half of the cylinder C, and the channel F into the main pump-stem G. In like manner, through the valve *a'* in the other division of the upper end of the tube B, communication is obtained through the channel H, the upper portion of lower half of the cylinder C, and the channel I into the main stem G. In the channel F is seated the upwardly-opening automatic valve *e*, and in the upper end of the channel I is seated the like valve, *f*.

K is a double lever fulcrumed on the trunnions L, which latter are cast solid in the side of the air-chamber J, and thus rendered integral with the latter.

M is the outlet for the water, and N a screw-capped opening in the upper end of the air-chamber J, through which the pump can be primed when necessary. The buckets D are constructed of the solid core *g*, having the annular-recessed sides *h* and the concave upper and lower faces, *i i*. An annular leather, *k*, is placed in the faces *i*, projecting slightly beyond the edges of the latter, and a supplementary concavo-convex disk, *o*, having its convex side to correspond to the concave face *i* of the core *g*, is placed against the outside of the leather *k*, and by means of nuts *l* on the rod C' the leathers *k* are clamped in position. The upper and lower ends of the cylinders C are open, and not only is all compression of the air in such cylinders thereby avoided, but by forcing the rod C' to the lower end of its stroke and removing the lower nut *l* the lower bucket D may be removed for repairs, and then by drawing the upper bucket D out of the upper end of the cylinder C the latter bucket can be easily and readily reached for the same purpose. A joint, *m*, is formed in the rod C' a short distance above the upper bucket D, to permit that portion of such rod in the cylinder C to have a purely vertical action, without sharing in the oscillations of the upper portion of such rod, caused by its

upper end traversing an arc at its point of junction with the lever K.

As will be seen, the two sides of the pump are counterparts of each other, having their points of mutual approach in the stock A and stem G.

The operation of my invention is as follows, the description of one side answering for both: The rods *C* are respectively connected pivotally to the lever K at *n*, and are actuated by such lever. On one side, it will be observed, the buckets D D on one rod, *C'*, are at the limit of their upstroke, and the upper end of the cylinder C, traversed thereby, is full of water, which has passed into such upper end through the tube B and valve *b'* therein, the upper movement of such upper bucket D having closed the valve *e*. As the upper bucket D descends, the resultant pressure upon the water within the upper portion of the cylinder C closes the valve *b'* and opens the valves *e'*, the water in such upper portion of the cylinder C passing as the upper bucket D descends through the channel F and valve *e* into the stem G. The upper return of the upper bucket D will again close the valve *e*, open the valve *b'*, and cause an ingress of water from the tube B to fill such upper portion of the cylinder C. Coincident with such action in the upper portion of the cylinder C, a like action, only in reverse, is had in the lower portions of such cylinder. The downward movement of the lower bucket D closes the valve *f* in the channel I and opens the valve *a'* in the upper end of the tube B, and causes an ingress of water from the tube B to pass through the valve *a'* and fill the lower portions of such cylinder. The upstroke of the lower bucket D closes the valve *a'*, opens the valve *f*, and drives the water in such lower portion of the cylinder C through the channel I and valve *f*, into the stem G. Thus at each half-motion of the lever K two streams of water are forced into the stem G, to be from there discharged through the spout M.

My pump is adapted to be mounted on wheels and used as a fire-engine or portable pump for any purpose, in which case the

stem B' would be placed horizontally and fitted to be attached to a hydrant.

I find that the use of a single cylinder of the conformation of that shown in the figures is very advantageous with a single stock, which may be made of wood or iron, and by using a tube or cup-shaped attachment, A''' in Fig. 4, with a flange around its lower end, it can be seated upon and bolted to the flange to which are attached the valves *e* and *f*, in Fig. 1. A wooden tube can be driven into such attachment, or, when furnished with a thread, an iron pipe can be screwed into such attachment. A like attachment can be used in a similar manner for the pump-stock, which extends into the well from the other side of the cylinder.

When I use the single cylinder, I extend the pump-stock up through the curb and box it over, as shown in Fig. 4, and operate the piston by a lever standing perpendicular to the curb, and thus make a tight, close curb and hide the piston-rod out of sight.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In combination with the stem G and stock A, the tube B, channels E, F, H, and I, the cylinder C, provided with the partition *c*, the rod *C'*, and buckets D D, substantially as shown, and for the purpose mentioned.

2. The tubes B, provided with alternately acting valves *a'* and *b'*, the channels E, F, H, and I, rod *C'*, cylinder C, and buckets D D, in combination, whereby a constant stream of water is drawn into the tube B and discharged from the cylinder C, substantially as shown, and for the purpose named.

3. The combination of air-chamber J, provided with trunnions L L integral therewith, lever K, rods *c'*, buckets D D, and cylinders C, substantially as shown, and for the purpose described.

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

M. FRANK. McNELLY.

Witnesses:

WALTER N. HASKELL,
GEO. B. QUIGLEY.