(Model.)

4 Sheets—Sheet 1.

J. & R. BEAN.

PUMP.

No. 256,950. Patented Apr. 25, 1882.

Fig. 1.

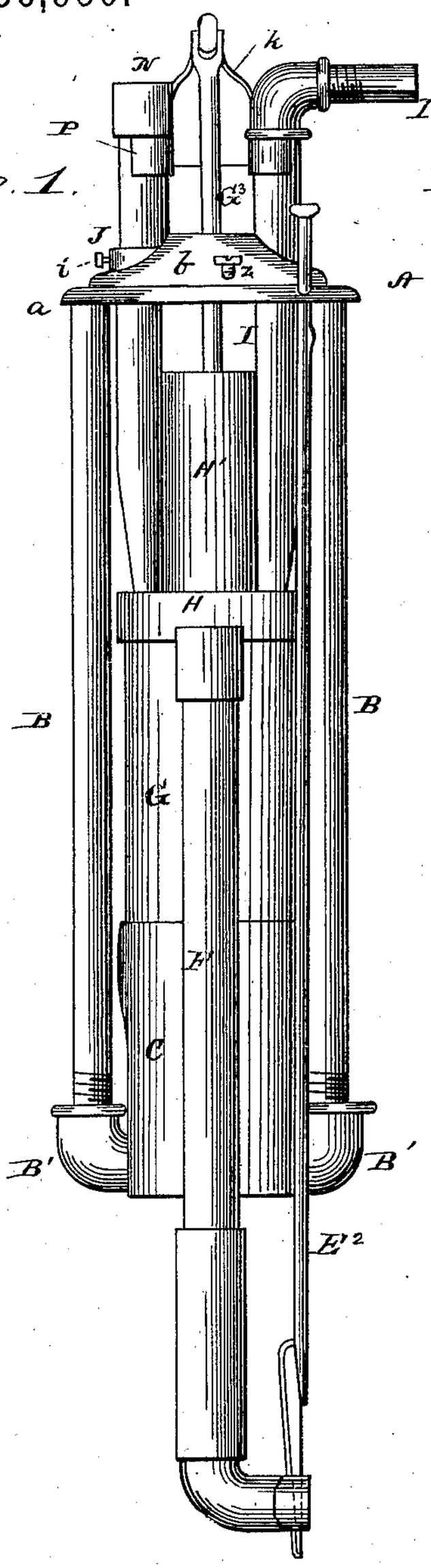
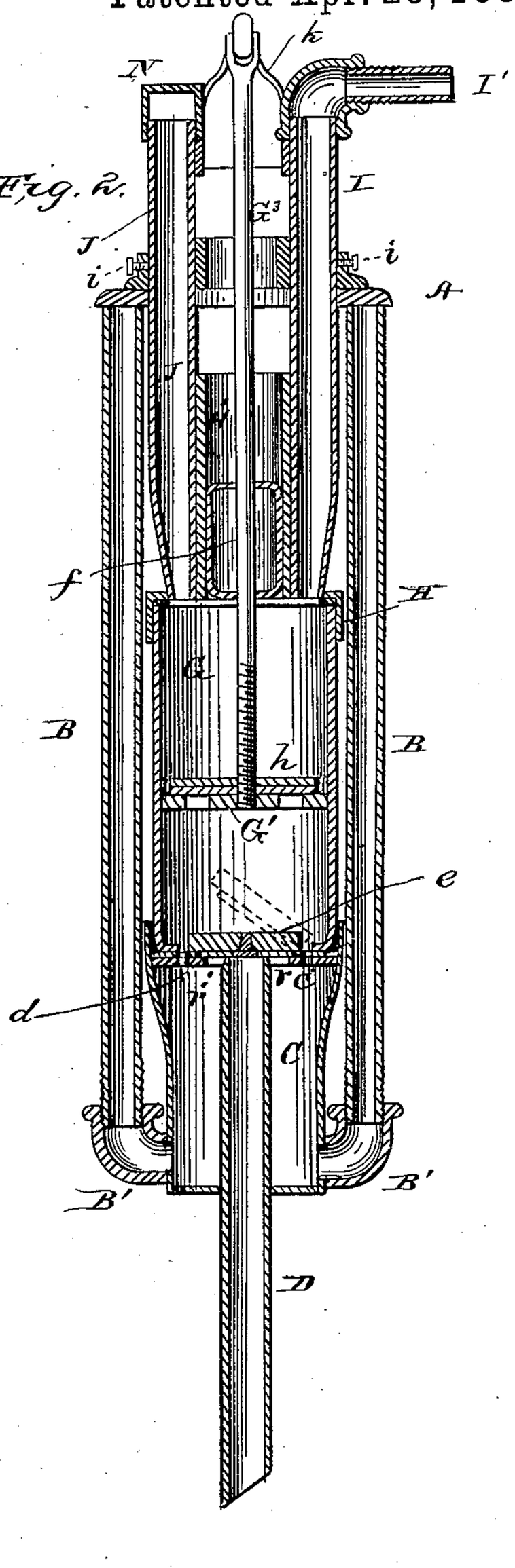


Fig. 2.



Witnesses:
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H. Aubrey Poulmin

Inventors:
John Bean and Roscoe Bean
By C. W. Alexander
their Atty.

(Model.)

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Fig. 3.

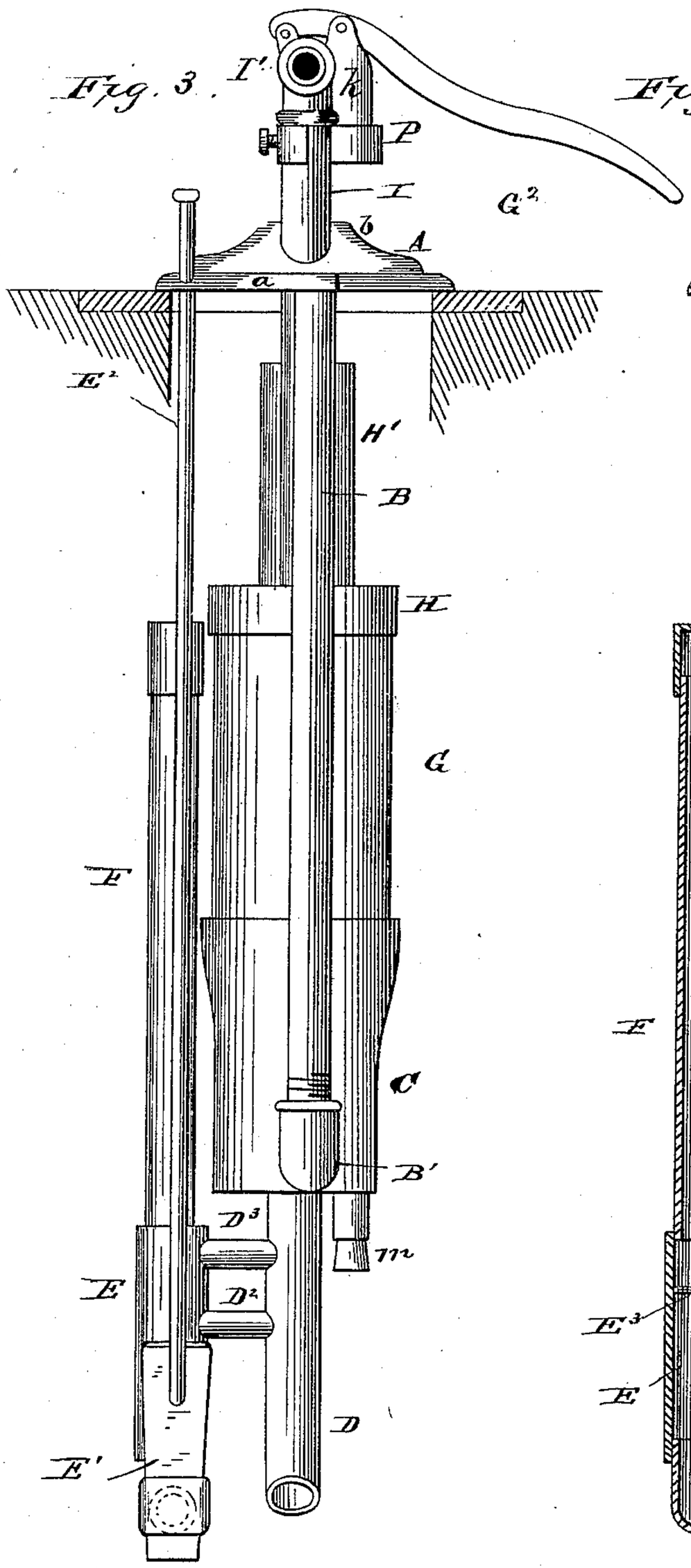
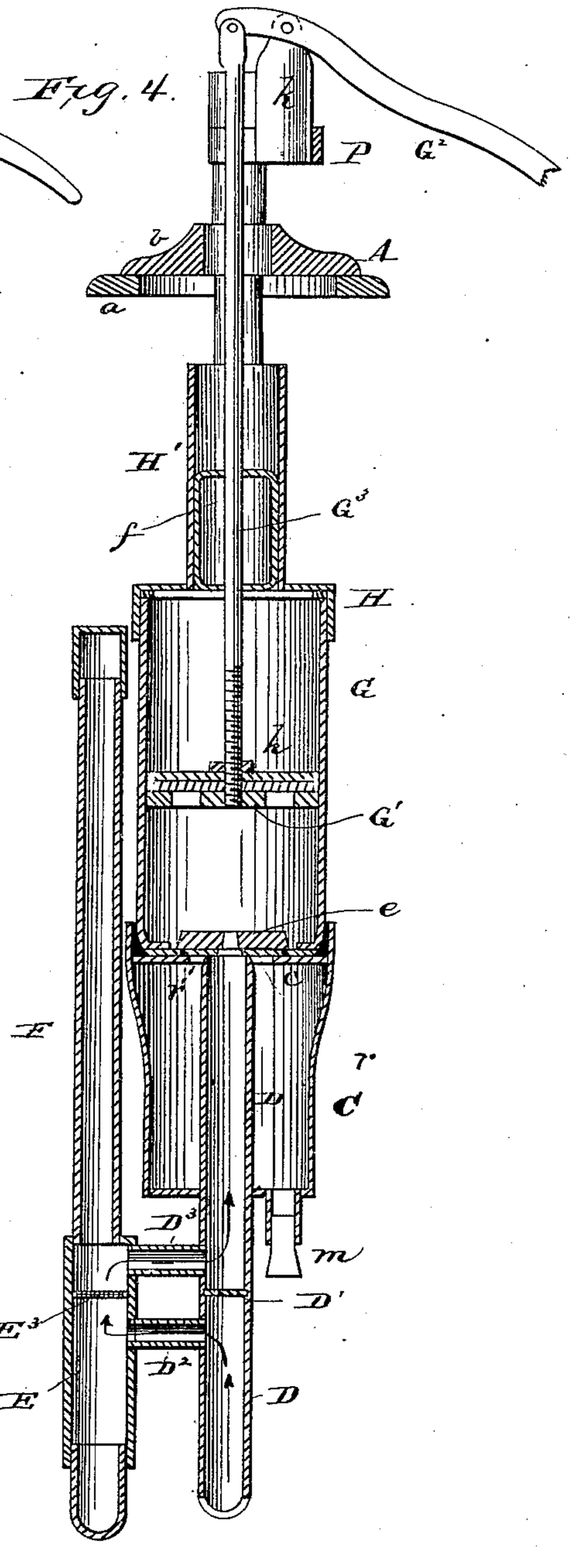


Fig. 4.



Witnesses.
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(Model.)

4 Sheets—Sheet 3.

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Fig. 5.

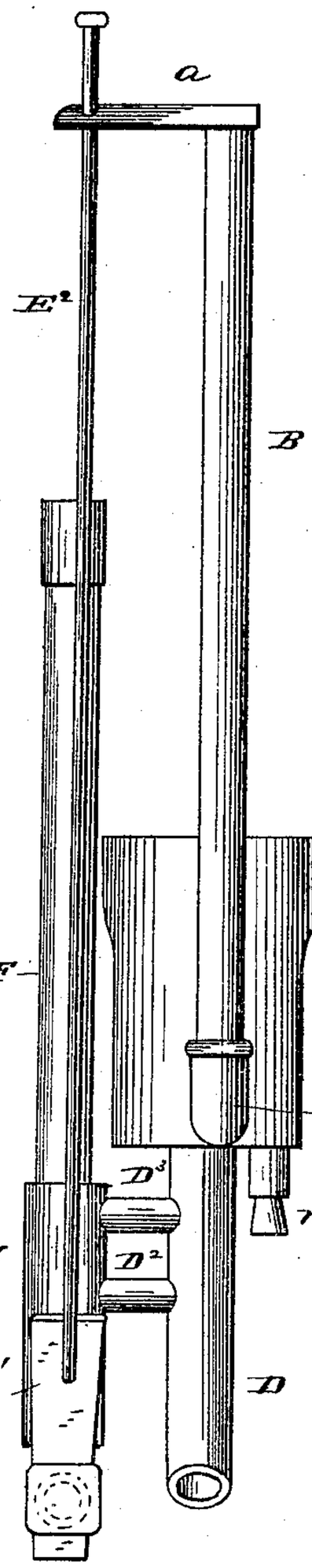


Fig. 6.

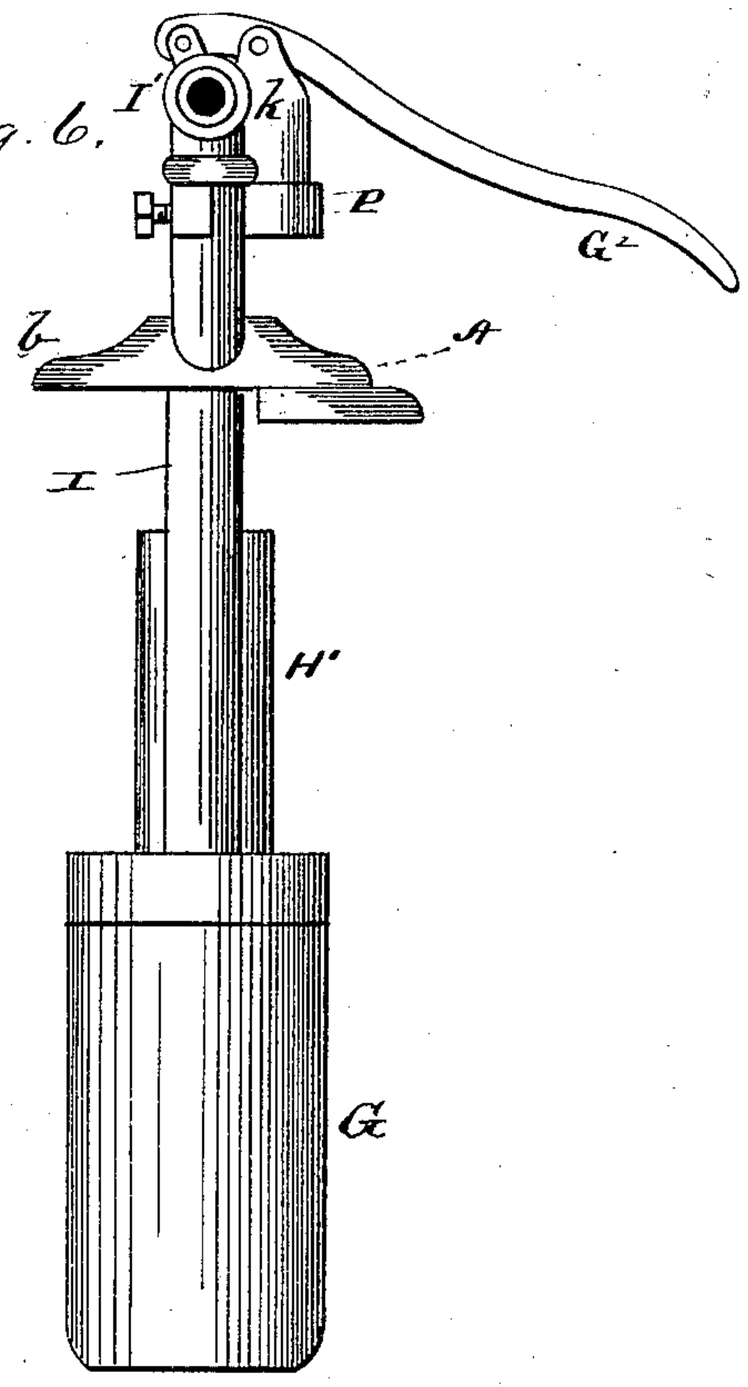
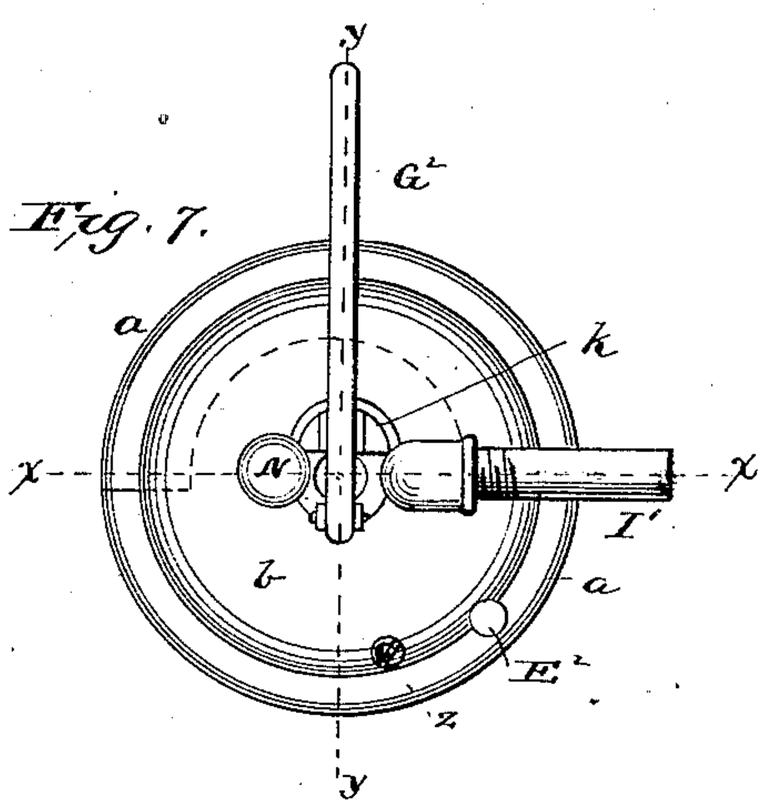


Fig. 7.



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(Model.) 4 Sheets—Sheet 4.

J. & R. BEAN.

PUMP.

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Fig. 8.

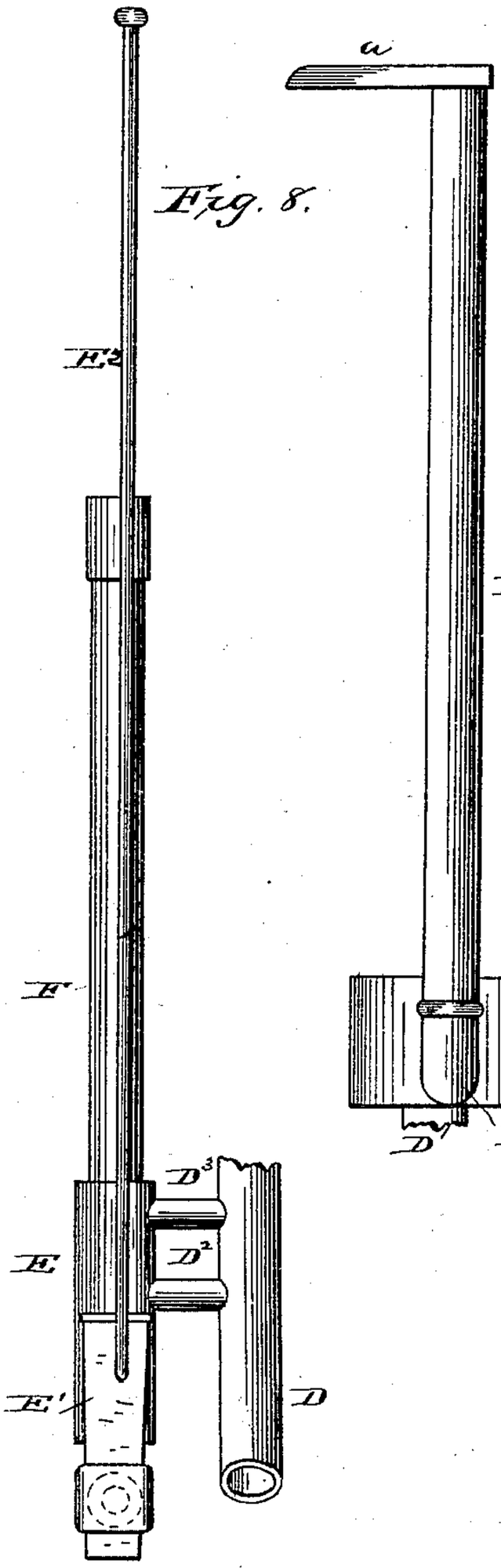


Fig. 9.

Fig. 10.

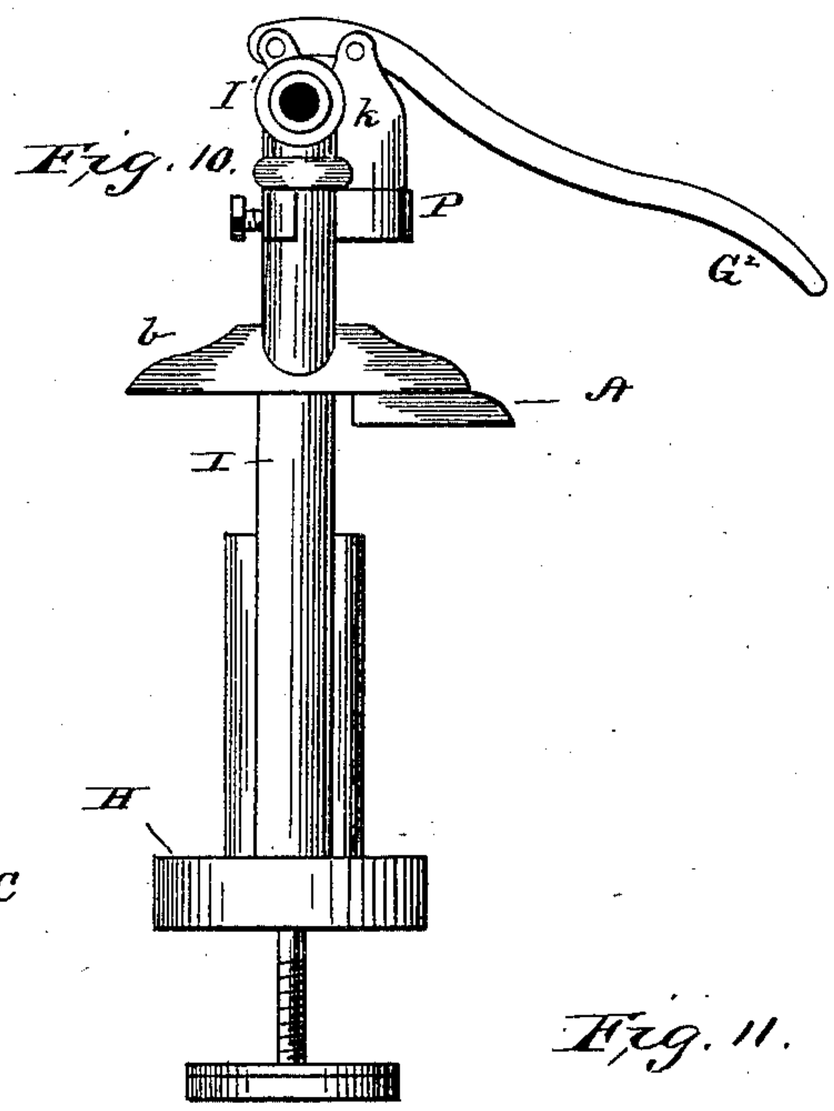
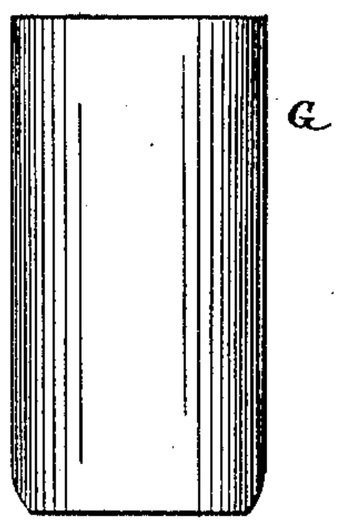


Fig. 11.



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H. Aubrey Toulmin.

Inventors:
John Bean and Roscoe Bean
By C. M. Alexander,
their Atty.

UNITED STATES PATENT OFFICE.

JOHN BEAN AND ROSCOE BEAN, OF SPRINGFIELD, OHIO.

PUMP.

SPECIFICATION forming part of Letters Patent No. 256,950, dated April 25, 1882.

Application filed December 17, 1881. (Model.)

To all whom it may concern:

Be it known that we, JOHN BEAN and ROSCOE BEAN, of Springfield, in the county of Clarke, and in the State of Ohio, have invented certain new and useful Improvements in Pumps; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention relates to certain novel parts and combinations of parts in pumps, which will be fully understood from the following description, when taken in connection with the annexed drawings, in which—

Figure 1 is an external view and elevation of one side of our improved pump complete. Fig. 2 is a vertical section through parts of the pump, taken in the plane indicated by dotted line *x x*, Fig. 7. Fig. 3 is a side elevation of the complete pump as seen by looking at it from the discharge-pipe side. Fig. 4 is a vertical section through the pump, taken in the plane indicated by dotted lines *y y* on Fig. 7. Fig. 5 is a side elevation of those parts of the pump which are to remain stationary in the well. Fig. 6 is a side elevation of those parts of the pump which can be detached from those parts which are shown by Fig. 5 and removed from the well. Fig. 7 is a top view of the pump complete. Fig. 8 is an elevation of the air-chamber sand-pipe, the valve therefor, and connections with the suction-tube. Fig. 9 is an elevation of our suspension-frame for supporting the working parts of the pump, and Figs. 10 and 11 show the working parts of our pump.

A designates the platform or foundation flange of the pump, which we construct of two parts, *a b*. The part *a* is a semicircular flange, or one-half of a ring, and the part *b* is formed of a corresponding semicircle, which abuts joints with *a*, and a circular portion, which overlaps the part *a* and is secured to it by a screw or other means. The part *a* is intended to be secured in a suitable manner to the curb or top of the well, and from this part depend two pipes, B B, which are closed at their upper ends and serve as air or vacuum chambers. Instead of pipes, solid suspending-rods may be used. The lower ends of the said pipes or rods are connected to offsets or elbows B′ B′, applied rigidly to the cylinder C at its lower end, as shown in Fig. 2. We thus suspend the cylinder C in the well at any desired depth. The cylinder C is provided with an annular flange, *c*, internally and near its upper end, which flange is preferably dished toward a central opening through it, and it has a small leak-hole, *d*, through it, for a purpose hereinafter explained.

D designates the suction-pipe, which passes through the bottom of the cylinder C and extends up through the opening in the center of the flange *c*, leaving a space between its upper end and the inner edge of said flange, as shown in Figs. 2 and 4. Below the cylinder C the suction-pipe D is sealed by a diaphragm, D′, and above and below this diaphragm are short horizontal pipes D^2 D^3, which establish communication between the said suction-pipe and a sand-box, E, which is provided with a wedge-shaped discharging-gate, E′, at its lower end, that may be raised or depressed from the top of the well by means of a rod, E^2. It will be seen by reference to Fig. 1 that the lower end of the sand-box E is curved laterally, so that the said gate can be opened and shut by a vertical movement. Other means may be adopted for applying a discharging-valve to the said box and operating the valve. A reticulated strainer, E^3, in the sand-box operates to check the upward flow of the sand with the water while passing from that part of the suction-pipe below the diaphragm D′, through pipes D^2 D^3, into that part of the suction-pipe above the diaphragm.

F designates a tubular air or vacuum chamber, which is secured to the upper end of the sand-box E, and which is hermetically sealed at its upper end. This air or vacuum chamber is especially useful for pumps used in driven wells and where the suction-pipes are very long and the pump-plungers work hard. In such cases the partial vacuum which is produced in the tube F during the ascent of the plunger will react, and thus assist in raising the water. There will of course be an air-chamber of greater or less capacity in the tube F at all times.

G designates the pump-cylinder in which the

valve-piston G′ works, connected to the pump-handle G^2 by means of a rod, G^3. (Shown in Figs. 2 and 4.) The lower end of this cylinder G has applied to it a valve, *e*, opening upward, which is designed for closing the upper end of the suction-pipe and the opening surrounding this pipe, but which does not close leak-hole *d*. The lower end of the pump-cylinder G is slightly tapered and packed, so that while it can be made to fit water-tight into the upper flaring end of the wall of cylinder C it can be removed from this cylinder, as will be hereinafter explained. The upper end of the pump-cylinder G is closed permanently or by a removable flanged cap, H, which is suitably packed, and which may be connected to the cylinder by a bayonet or other suitable positive fastening. From the center of the cap or cylinder-head H rises a pipe, H′, the interior diameter of which is one-half the interior diameter of the pump-cylinder, and in this pipe H′ is applied a long piston, *f*, which may be hollow or not, and which is rigidly connected to the piston-rod G^3, so as to move up and down with the valve-piston G′, and to descend into the pump-cylinder at each downstroke. By this arrangement of parts it will be seen that a continuous flow of water is caused to pass through the discharge-pipe I by reason of the long piston displacing a quantity of water in the cylinder during the descending strokes.

It should be stated here that the piston or bucket G′ is perforated and provided with a flexible disk-valve, *h*, which will allow any water remaining in the discharge-pipe I, when the bucket G′ is stationary, to slowly pass under it and descend through the small leak-hole *d* into the cylinder C, thus preventing water from freezing in the pump. The disk-valve *h* is made very thin and should not extend to the bore of cylinder G. The operation of this valve will then be as above described.

J designates a tubular air-chamber, which communicates at its lower end with the pump-cylinder G, and which is secured to the part *b* of the flange A by set-screws *i*, or by any other suitable means. This tubular air-chamber extends above the flange A, and is closed by a cap, N. The upper end of the discharge-pipe I has an elbow or spout, I′, attached to it, and below this elbow and the said cap N we connect to the tubular air-chamber and also to the discharge-pipe a cross-head, P, which is preferably yoke-shaped, and from the bend of the yoke rises a standard, *k*, to which the pump-handle has its fulcrum. The advantage of having the platform-flange or base-plate A made in the manner described is to afford convenient access to all of the working parts of the pump without removing the entire pump from the well.

By reference to Fig. 6 it will be observed that the actual working parts of the pump have been separated from the parts which are represented by Fig. 5. This is effected by simply removing the fastening-screw *z*, that holds the parts *a b* together, leaving a part of the pump suspended in the well, and by removing the bolt which holds the rod G^3 to the pump-handle the buckets *h f* can be removed; or the pump-cylinder G may be removed and the buckets repaired. The check-valve *e* may also be secured to the lower part of the pump-cylinder and removed for repairs. The flange *a* makes a substantial support for that part of the pump which is intended to remain in the well. By having the flange-plate constructed in this manner it saves the necessity of removing the entire pump, as pumps have been heretofore constructed. We thereby also avoid the necessity of descending into the well to repair the pump. The said platform-flange or base-plate may be secured to a platform well-curb by bolts or screws, which serve to hold the two parts of the flange together. It will be also observed that the two tubes or rods B B hold or suspend the lower part of the pump; also, that the two pipes I J serve to hold down the working part of the pump in proper position. The pipe J serves the purpose of an air-chamber and also as a support for the pump-handle, and the discharge-tube I also acts as a support for the pump-handle.

The annular flange *c* may or may not be dished toward the central opening.

As the check-valve *e* opens when the pump is in operation, it will be seen that the water in the cylinder C is drawn up into the pump-cylinder, leaving a partial vacuum in the pipes B B, and as soon as the pump is at rest and the check-valve closes the hole *d* serves as an inlet to allow the water to fill the partial vacuum referred to, therefore drawing the water from the discharge-pipe I to prevent freezing.

In pumps now in common use the discharge-pipe is provided with a leak-hole to allow the escape of surplus water. In such cases the water is returned back into the well, and when a hose is used and a great quantity of water is forced through the pump referred to much water is lost, which necessitates an extra amount of labor to raise the water which is not utilized; and another advantage of the cylinder C is that by its being always full of water the pump will always be primed, and in the event of the pump-cylinder losing its water the pump will always be primed. This cylinder C also acts as a sand or débris receiver, and is provided with a plug, *m*, by the removal of which any accumulation can be drawn out. This cylinder C is also provided with a tube, which forms a valve-seat for the valve *e* in connection with the flange *c*.

It is obvious that the suction-pipe below the bottom of the cylinder C may be connected thereto in any suitable manner.

By reason of having the flange *c* inclined and the upper end of the suction-pipe very small, there will be no lodgment for sand or débris. Hence the valve *e* will not be liable to be clogged.

In ordinary pumps the valve-seat is generally large and not provided with means for al-

lowing the débris to escape therefrom and fall below, as we have shown.

The suction-pipe D is not necessarily provided with the sand-box E or the tube F; but we prefer to use these parts, as above explained, when we use our pump for long suction or driven wells.

Instead of the gate E′ and its rod, a removable plug or cap may be used; but the advantage of the gate E′ and its handle is that we may be able to open the sand-box E from the platform or flange, and then by the agitation of the water in the cylinder and the motion given to the rod or handle E^2 the sand-box can be emptied of any accumulation of foreign matter, after which the gate can be shut.

The pipe J may not act as a support for the handle, but it may stop at the platform and an enlarged tubular support be connected to that part of the flange *b*, as fully explained in the schedule annexed to the patent granted to Roscoe Bean, dated April 4, 1876, and numbered 175,588.

If desired, we may apply to the cylinder C a gate and rod or handle similar to what we have shown applied to the sand-box E. The cylinder C not only serves as a charger and débris-receiver, but it also serves as a coupling for the lower part of the pump-cylinder G, to connect the same with its suction-pipe, and a valve-seat for the check-valve. The air-chamber or the discharge-pipe extends below the platform-flange, and serves, in combination with set-screws or other fastenings applied to the flange A, as the means for holding down the pump-cylinder and insuring close joints between the caps at both ends thereof.

It will be seen from the above description that I have a frame which is adapted to be suspended into a well and sustained by a flange, and which affords a support for the actual working parts of the pump and its cylinder, which parts are detachable at pleasure from said frame. When either one or both of the chambers or pipes B are used as an air or vacuum chamber to draw the water from the discharge-pipe, such chamber or chambers may open into the pump-cylinder proper below the piston and above the check-valve, this communication being obtained by means of the cylinder C and holes *d* in the flange *c*. This communication we have shown in the drawings as being through the leak-hole *d* from the tube or tubes to the working-cylinder.

Having thus fully described our invention, what we claim is—

1. In a pump, a platform-flange consisting of the part *a* and the part *b*, substantially as described.

2. The combination of a two-part vertically and horizontally divided platform, a pump-section which is adapted to be fixed in a well, and a pump-section which is adapted to be removed from the section left in the well, substantially as described.

3. The combination of a vertically and horizontally divided platform, a pump-stock arranged above the same, and a pump-cylinder and its attachments arranged below the platform, substantially as described.

4. The stationary section of the pump, consisting of the flange *a*, the rods depending therefrom, the cylinder C, attached to said rods and adapted to receive the pump-cylinder G, and the suction-pipe D, substantially as shown.

5. The stationary section of the pump, consisting of a flange which sustains the lower cylinder, C, and the suction-pipe, substantially as described.

6. The stationary section of the pump, consisting of a flange, the suspension rods or tubes, the cylinder C, the suction-pipe, a tube communicating with the suction-pipe, and means for allowing the escape of sand from the cylinder, substantially as described.

7. The stationary section of the pump, consisting of a flange, the suspension rods or tubes, the cylinder C, the suction-pipe, tubes communicating therewith, a sand-box, and a suitable outlet from said box, substantially as described.

8. The stationary section of the pump, consisting of a flange, the cylinder C, and the suspension rods or tubes, forming air or vacuum tubes and communicating with said cylinder below the bucket *h*, substantially as described.

9. The stationary section of the pump, consisting of a flange, the suspension rods or tubes, the cylinder C, the sand-box, a valve or gate at the lower end of the same, and a rod or handle extending to the top of the well, substantially as described.

10. The stationary section of the pump, consisting of the flange, the suspension rods or tubes closed at their upper ends and communicating with the cylinder C, and means for withdrawing the sand, &c., from said cap, substantially as described.

11. The combination of a flange, the suspension rods or tubes depending therefrom and communicating with the cylinder C, the suction-pipe extending upward in said cylinder and forming a valve-seat for the check-valve, and a pump-cylinder, G, detachable from said cylinder C, substantially as described.

12. The combination of the cylinder C, the suction-pipe therein, the flange *c*, leaving a space between it and the upper end of the suction-pipe, and the check-valve seated on flange *c*, substantially as described.

13. The combination of the cylinder C, the suction-pipe, and the flange *c*, perforated at *d*, having a space between them and affording seats for the check-valve, for the purpose described.

14. In a pump, the combination of the cap C, the flange *c*, provided with a perforation, *d*, and means for withdrawing the sand from the said cap, substantially as described.

15. The combination of the cylinder C, the suction-pipe therein, the diaphragm D′, water-passages D^2 D^3, and an air-chamber, F, communicating with the said suction-pipe, substantially as described.

16. The combination of the cylinder C, the

discharge-pipe therein, a sand-box communicating therewith, and an air-chamber above the sand-box, substantially as described.

17. For a pump, the combination of a sand-box, a strainer therein, and a tubular air-chamber extending above the same, substantially as described.

18. In a pump, a divided platform-flange constructed to allow the removal from the well of the working mechanism of the pump, substantially as described.

19. In a pump, a two-part vertically and horizontally divided platform-flange arranged to suspend a section of the lower part of the pump in the well after the working mechanism has been removed, substantially as described.

20. In a pump, the combination of a pump-cylinder, C, a discharge-pipe, I, a platform-flange, *a*, and a tubular air-chamber, J, independent of the discharge-pipe, adapted to allow of the withdrawal of the said parts G, I, and J from the well, substantially as described.

21. The combination, with a platform-flange, of a suspended cylinder, C, and the pump-cylinders G and H′, supported thereby, the said flange being constructed to allow of the withdrawal of the cylinders G and H′, substantially as shown.

22. In a pump, the combination of a divided or two-part flange-platform, a cylinder, C, its suspension rods or tubes, the pump-cylinder G, the suspending and holding-down discharge-pipe, and the air-chamber, substantially as described.

23. In a pump, the combination of a handle-standard and an air-chamber and discharge-pipe fixed to but removable from a non-chambered platform, said pipes communicating independently with the pump-cylinder between two pistons, for the purpose set forth.

24. In a pump, the combination of a stationary but removable discharge-pipe and a stationary and removable air-chamber when both communicate with the pump-cylinder through the head thereof and between two pistons, substantially as described.

25. In a pump, the combination of a two-part vertically and horizontally divided platform-flange and discharge-pipe, removable from part *a* of said flange, and connected to the handle-standard, and communicating with the pump-cylinder between two pistons, for the purpose set forth.

26. In a pump, the combination of a cylinder, G, its removable top, cap, or head H, and a discharge-pipe and air-chamber connected to said cap H and communicating with the pump-cylinder below the cap, substantially as described.

27. In a pump, the combination of the removable cap H, the piston-cylinder G, flange A, and the suspending tubes I J, substantially as described.

28. In a pump, the combination of the lower cylinder, C, the side supports therefor, and the divided platform to which these supports are secured, substantially as described.

29. The combination, in a pump, of the lower cylinder, C, and its tubular side supports communicating with the pump-cylinder G above the check-valve, substantially as described.

30. The combination of the lower cylinder, C, provided with a chamber, a tube, and a water-passage, substantially as and for the purposes set forth.

31. The combination, in a pump, of the lower cylinder, C, provided with a valve, *e*, a seat for this valve, and a leak-hole, *d*, the suction-pipe D, forming part of said valve-seat, and means for drawing off sand, &c., from said cylinder, substantially as described.

32. In a pump, the combination of the lower cylinder, C, and one or more vacuum-pipes connecting said cylinder to the platform, and a discharge-pipe whereby the water is drawn out of the latter pipe when the pump is at rest, to prevent freezing, substantially as described.

33. In a pump, an air or vacuum chamber communicating with the pump-cylinder below the piston and above the check-valve through holes *d*, for the purpose specified.

34. In a pump, a frame which is intended to be fixed in the well, having at its upper end a flange-bearing to be sustained on the curb, and pendants connected at their lower ends by a horizontal piece, and adapted to sustain the working parts of the pump, and to allow the same to be removed or replaced at pleasure, substantially as specified.

In testimony whereof we affix our signatures, in presence of two witnesses, this 3d day of December, 1881.

JOHN BEAN.
ROSCOE BEAN.

Witnesses:
WM. R. HOMER,
WM. H. WELLAND.