W. S. NELSON.

DRAINING PUMP.

No. 51,854. Patented Jan. 2, 1866.

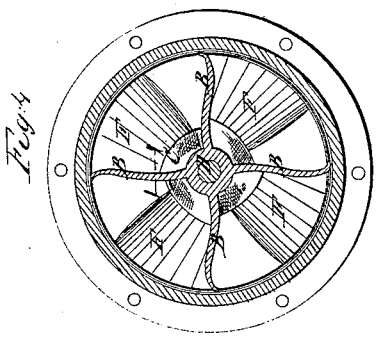

Fig. 4

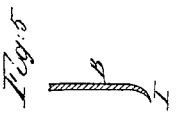

Fig. 5

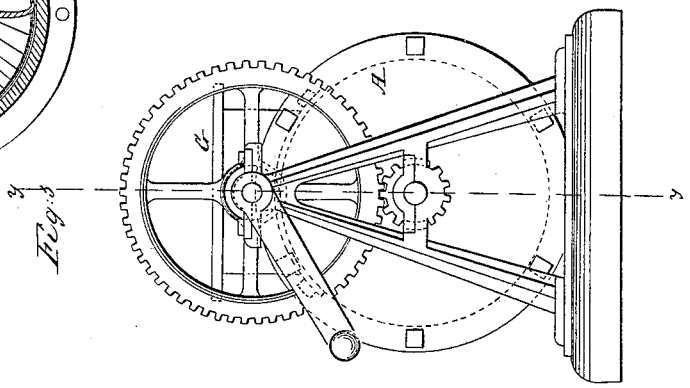

Fig. 3

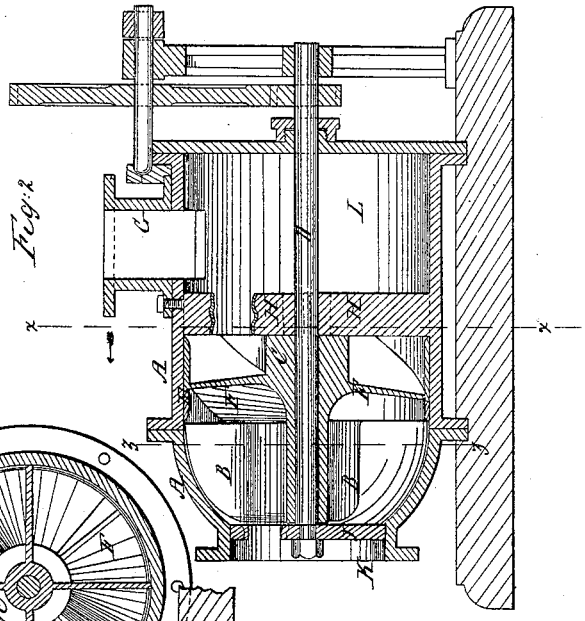

Fig. 2

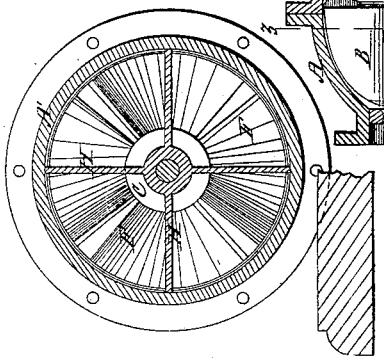

Fig. 1

Witnesses
Wm Truran
Theo Tusch

Inventor
Wm S. Nelson
By Munn & Co
Atty

UNITED STATES PATENT OFFICE.

WILLIAM S. NELSON, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN DRAINING-PUMPS.

Specification forming part of Letters Patent No. **51,854**, dated January 2, 1866.

To all whom it may concern:

Be it known that I, WILLIAM S. NELSON, of St. Louis, in the county of St. Louis and State of Missouri, have invented a new and useful Improvement in Draining-Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a cross-section of a pump made according to my invention, the section being taken on line *x* of Fig. 1. Fig. 2 is an elevation of an axial section taken on the line *y* of Fig. 3. Fig. 3 is an end view, looking toward the right-hand end of Fig. 2. Fig. 4 is a cross-section taken on the line *z* of Fig. 2. Fig. 5 is a section of one of the fans B, taken on the line 1 of Fig. 4.

The object of this invention is an improvement in pumps adapted more especially for draining purposes, because it is not liable to be put out of order or to be stopped up in pumping muddy and refuse water.

It consists of a hollow cylinder, within which are placed two series of vanes whose adjacent ends are connected, although each series, in other respects, is distinct from the other in form and position. Those vanes which are nearest the induction end of the cylinder are nearly straight, while those of the other series are spiral. The latter, moreover, are surrounded by a circular case which nearly fills the cylinder, and they are mounted upon a hub or axis whose diameter is about one-half the cylinder. Next to this series of vanes is a frame containing four radial blades fixed within the cylinder, each blade being in a plane parallel with the axis of the cylinder. Their purpose is to counteract the tendency of the water to rotate after it has left the vanes and direct it outward toward the place of discharge.

A is the cylinder of the pump. It is supported upon any suitable platform, and the standards of support will be varied according as the pump is worked with its axis in a horizontal or a vertical position. In this example it is shown in a horizontal position, its shaft D being driven by a crank through suitable gear-wheels. The shaft goes through the whole length of the cylinder, and is supported at its open or induction end K by a cross-bar, J, in which it turns. The end K of the cylinder is to be connected to a pipe or conduit, (not shown,) in which a valve may be placed to close it when the pump is not working. At about the middle of the cylinder, in its interior, are four radial blades, at equal distances apart, and extending from the shaft to the inner circumference of the cylinder to which they are fixed. They are in this example fixed centrally upon a collar which surrounds the shaft and is loose thereon. L is the water-chamber of the cylinder, into which the water is forced by the vanes, and from which it is discharged through an opening, G, in the side of the cylinder. The place of discharge may, however, be in the end of the cylinder, if desired.

The vanes B and F are mounted on a hollow cylinder, C, which extends from the place of the fixed blades H to the end of the shaft D, which it surrounds and to which it is keyed. The vanes F are four in number, and are arranged spirally on their cylinder C, each extending over about one-fourth of the same, and being surrounded by and connected with a ring, E, which is of such a diameter as to be capable of revolving freely within the outer cylinder, A. The thickness of the hollow cylinder C is greater at its inner than at its outer end. Its thickness is diminished rapidly from its right-hand end down to the end of the vanes F, whence it remains the same to its end. The ends of the vanes F are connected to the vanes B, which extend thence to the end of the inner cylinder or hub, C. They are not spirally arranged, but stretch from the cylinder C nearly in radial lines toward the outer cylinder, and are turned down on their outer corners so as to conform to the shape of said cylinder at the part designated A′, which is there beveled off in order to reduce its diameter and bring it down on a curved line to join the induction part K. The vanes F and B are therefore continuations of each other. The vanes B are not perfectly straight. Their ends are bent back slightly as they approach the sides of part A′ of the cylinder. The outward edges of the vanes B are also bent, as seen at I in Fig. 5, which gives a cross-section of one of them on the line 1 1 of Fig. 4. The object of this curve at I on their front edges

is to prevent the water from escaping beneath them, (or behind them when the pump is working horizontally,) and the object in view in bending said vanes B slightly backward is to give the water a tendency to move up along the sides of the part A′ of the cylinder and into the spaces between the wings F, which latter force it forward with energy into the receiving-chamber L, whence it is discharged through the pipe G. The ring E, which surrounds the vanes F, prevents water and foreign substances from getting between those vanes and cylinder C, and so it protects the vanes from the danger of fracture and preserves the pump from liability of getting out of order and from stoppage from such causes, since, if any foreign substance were allowed to be interrupted between the rapidly-moving vanes and the fixed outside cylinder, it would be ground between, and would cause the vanes to wear away, and also expose them frequently to be broken off.

Since my pump is designed especially for draining purposes, it will be always more or less liable to be used where the water is impure both from the presence of mud and sand and also of sticks, and therefore the protection of the vanes F is of great importance.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. Surrounding the vanes F with a ring, E, which connects their ends, and which ring is interposed between them and the side of the cylinder of the pump, substantially as and for the purpose above described.

2. The combination, upon the same hub or hollow cylinder C, of the spiral vanes F and the straight vanes B, in manner substantially as described.

3. Reducing the part A′ of the outer cylinder in which the straight vanes revolve, so that its sides become narrower as they approach the end of the cylinder, substantially as shown.

4. In combination, the fixed outer cylinder, A, with its reduced end A′, the vanes B and F, arranged so as to be continuations of each other, and the fixed radial blades H, substantially as shown.

WILLIAM S. NELSON.

Witnesses:
D. W. VAN HOUTEN,
WM. P. NELSON.