

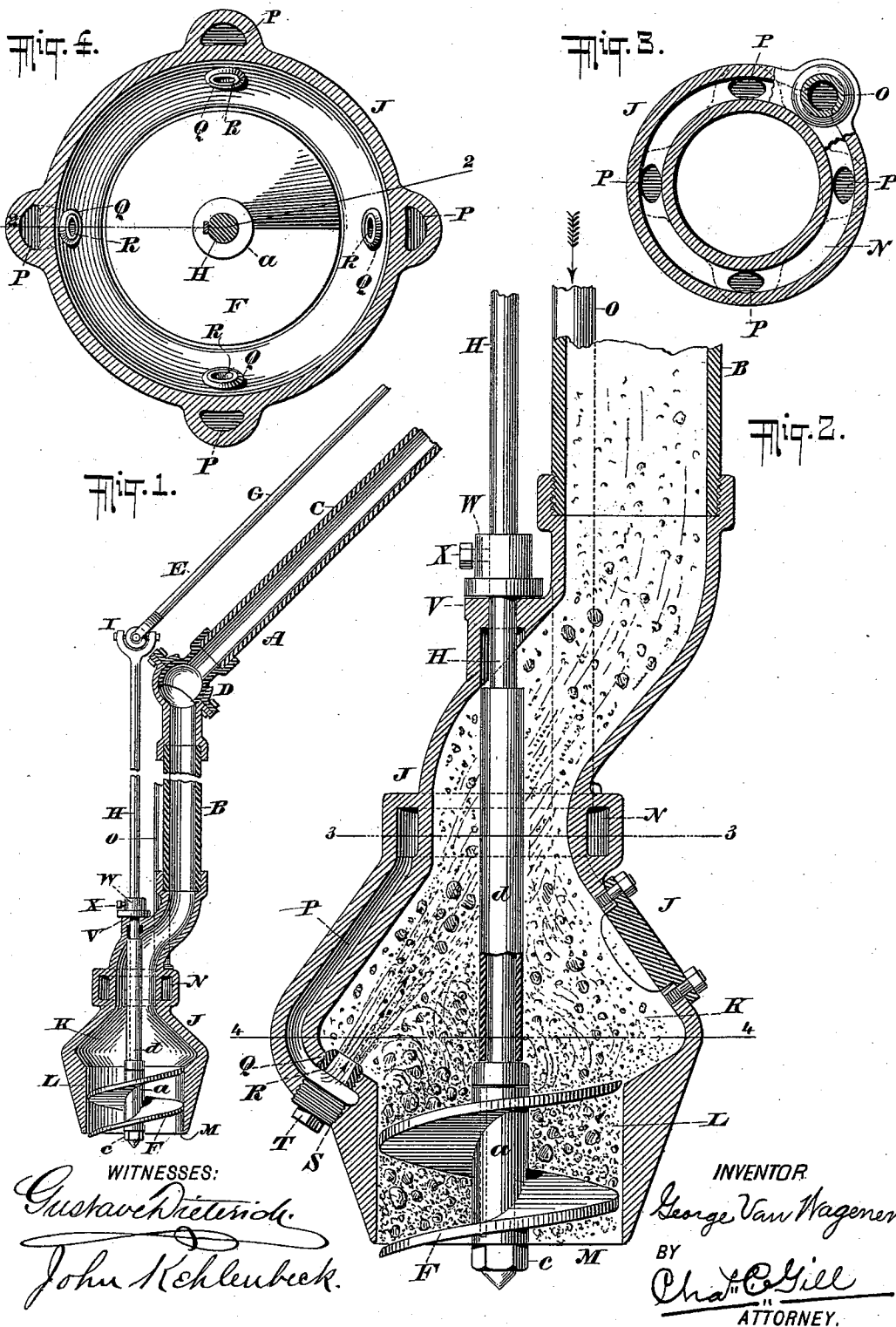
(No Model.)

G. VAN WAGENEN.

PNEUMATIC DREDGING, EXCAVATING, AND ELEVATING APPARATUS.

No. 541,513.

Patented June 25, 1895.



UNITED STATES PATENT OFFICE.

GEORGE VAN WAGENEN, OF NEW YORK, N. Y.

PNEUMATIC DREDGING, EXCAVATING, AND ELEVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 541,513, dated June 25, 1895.

Application filed December 6, 1894. Serial No. 530,976. (No model.)

To all whom it may concern:

Be it known that I, GEORGE VAN WAGENEN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Pneumatic Dredging, Excavating, and Elevating Apparatus, of which the following is a specification.

The invention relates to improvements in pneumatic apparatus for dredging, excavating and elevating, and consists in the novel features of construction and combinations of parts hereinafter described and particularly pointed out in the claims.

In accordance with my invention I provide a main pipe up through which the material is elevated and moved to its point of delivery, an air tube down through which compressed air is forced, and finally utilized to cause the ascent of the material through said main pipe, and a head secured to the lower end of said main pipe and containing suitable air ports and a revoluble spiral blade, which latter will elevate the material to a point at which it will come into the influence of the air escaping from said ports and be thereby elevated and moved to its point of delivery, all as hereinafter more fully explained. The main pipe will be of any desired length, and may be formed of sections united or connected by cup-and-socket joints when necessary or convenient; and the air tube down through which the air is conducted to the head at the lower end of the main pipe may be a flexible hose piping or of any suitable form or construction. The shafting leading to said revoluble spiral blade and by which it is given motion will also be of any suitable form or construction and when made in sections suitable connecting joints will be provided to insure the proper revolution of the sections and permit the yielding upward of the spiral blade or the lateral movement of the lower end of the main elevating pipe.

The invention is not confined to any special form of joints between the sections of the main pipe or the shafting for the spiral blade, but in the drawings forming a part of this application I illustrate suitable joints for this purpose and they being of well known form and construction do not require special mention.

The nature and scope of the invention will be more readily understood from the detailed

description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section through pneumatic dredging, excavating, and elevating apparatus constructed in accordance with and embodying the invention. Fig. 2 is a vertical section on an enlarged scale of same. Fig. 3 is a transverse section of same on the dotted line 3 3 of Fig. 2, and Fig. 4 is a transverse section of same on the dotted line 4 4 of Fig. 2 and indicating by the dotted line 2 2 the section on which Fig. 2 is taken.

In the drawings A designates the main elevating pipe, whose lower section B is connected with the upper portion C by a cup-and-socket joint D; and E denotes the shafting for the revoluble blade F and which is in sections G, H, connected by the usual gimbal joint I.

The lower section B of the main elevating pipe A has secured upon it the head J whose interior forms the bell-shaped chamber K and, below said chamber, the vertical cylinder L, while the lower edges of said head are tapered to what may for convenience be termed a knife edge M. At the upper portion of said chamber K is formed the belt N which is connected with the supply tube O for air and also by means of the passages P with the outlets Q for the air from said belt and said passages.

The apertures Q constitute the inlets for the air to the chamber K, and, as illustrated in Figs. 2 and 4, the said apertures Q are at the base of the expanded or bell shaped chamber K, in which position they can effectually direct the air against the material to be elevated and without loss of force move said material upward through the head J and into and through the elevating pipe A. The apertures Q will preferably be threaded and receive the threaded nozzles R, which will be inserted into said apertures through the larger apertures S formed in the exterior part of the head J and containing the removable plugs T, as more clearly shown in Fig. 2. By removing the plugs T the nozzles R may be withdrawn through the apertures S and additional nozzles, larger or smaller in bore, substituted for those removed. The exit aperture through the nozzles R may thus be varied at will in accordance with the particular results sought, and the character of the material it is intended to elevate through the head J and

main pipe A. The plugs T being removable also permit, should the same become necessary, the cleaning out of the lower ends of the passages T.

5 Above the belt N the head J turns laterally to form the bearing V and unites with the lower end of the section B of the main elevating pipe A. The bearing V is in the form of a shoulder provided with a central aperture in line
10 with the longitudinal center of the chamber K and cylinder L, and through this aperture passes the lower section H of the revoluble shafting E, which section H of the shafting is provided above said shoulder or bearing with
15 the supporting and adjusting collar or sleeve W having the set screw X and capable of permitting the raising or lowering of the spiral blade at will, depending upon the material being elevated.

20 The section H of the shafting E extends centrally through the chamber K and cylinder L and at its lower portion within said cylinder has keyed upon it the hub *a* carrying the spiral blade F, the latter being held in place by
25 the nut *c*; while above the said hub *a* and spiral blade F there is provided upon the shaft H the sleeve *d* extending upward to that part of the head J at which the latter turns to one side to meet the lower end of the elevating pipe A.

30 The purpose of the sleeve *d* is to prevent the material being elevated from striking directly against the shaft H. In many instances the material being elevated would not injuriously affect the shaft H, but in other cases,
35 such as when sand, gravel or coal is being elevated, it would be desirable to protect the shaft H from the frictional contact of such material therewith.

The spiral blade F in diameter is slightly
40 less than the diameter of the cylinder L and in height is about equal to the depth of said cylinder, whereby the walls of the said cylinder form a snug housing for the blade F and serve as a free bearing therefor. The lower
45 end of the cylinder L is entirely open, as shown, and the lower edge of the blade F projects slightly below the cylinder in order that it may take hold of the material to be elevated.

50 The lower end of the shaft H is pointed and extends slightly below the nut *c* and forms a central bearing point, which when the head J is lowered into proper material to be elevated, will not interfere with the operation of
55 the blade F but rather tend to facilitate the action of the same; while should said head be lowered against a ledge of rock or like rigid substance the pointed end of the shaft H by coming into contact with the same would
60 prevent the lower edge of the blade F from striking said obstruction.

It will be observed that the shaft H and blade F may have a definite vertical movement through the head J there being nothing
65 provided to rigidly hold the blade F downward in the position in which it is illustrated in Fig. 2, and hence should the lower pointed

end of the shaft H strike a ledge of rock when the head J is lowered into operative position, the said shaft H would yield upward within
70 the cylinder L and chamber K and thus the blade F would be elevated above the lower edge of the head J and be amply protected against any possible accident.

These sections of the shafting being connected
75 by a gimbal or other equivalent joint I, the elevation of the section H of the shafting will not interfere with the motion of the latter or of the revolution of the blade F.

In the operation of the apparatus constituting the subject of the present application, the head J connected with the main elevating pipe will be lowered into position to receive the material to be elevated, the shafting E and blade F set in motion, and the air supply
80 turned into the tube O, belt N and passages P; and thereupon the spiral blade F will elevate the material to the upper portion of the cylinder L and cause the same to fall laterally into the enlarged or expanded base
85 of the chamber K, where the said material will meet the air issuing into said chamber from the nozzles R and be thereby elevated through the head J and pipe A to the point of delivery, this process of elevating the material being continuous with the revolution
90 of the blade F and the escape of the air through the apertures Q. The expanded chamber K above the cylinder L is of special importance in that it permits the material
95 being elevated to fall laterally from the blade F and into the direct influence of the upwardly issuing currents of air from the nozzles R. It is also of special importance that the belt N for air be at the upper part of the
100 expanded chamber K for the reason that when so located there is absolutely no danger of the belt becoming clogged with mud or other sediment from the material elevated. If for any reason the lower end of the head
105 J should be allowed to remain partly embedded in a mud or sand bank without any air being forced into the pipe O, the nozzles R would simply fill with the material which would be blown out as soon as the air is turned
110 on the pipe O; while if the belt N were located in direct connection with the apertures Q the mud or sand or other material would settle within and fill said belt and leave the latter in such condition that the air could not
115 clear the same.

The side of the chamber K may be provided, if desired, with a suitable hand hole and cover for the purpose of facilitating the removal of any specially heavy article or piece of material that might enter said chamber and resist the elevating action of the air.

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

1. In pneumatic apparatus of the character
130 described, the head J having the cylinder at its lower end, the expanded or bell-shaped chamber above said cylinder, and the inlets for air at the enlarged base of said chamber,

combined with the spiral blade revoluble within said cylinder; substantially as and for the purposes set forth.

2. In pneumatic apparatus of the character described the head J having the cylinder at its lower portion, the expanded or bell shaped chamber above said cylinder, the inlets for air at the enlarged base of said chamber, and the annular belt for air at the upper portion of said chamber, the said belt being connected by passages to said inlets and also to the air supply, combined with the spiral blade revoluble within said cylinder; substantially as and for the purposes set forth.

3. In pneumatic apparatus of the character described, the head J having the cylinder at its lower portion, the expanded chamber above said cylinder and air inlets at the enlarged base of said chamber, combined with the shaft passing centrally through said chamber, the spiral blade mounted upon said shaft and inclosed by said cylinder, and the sleeve encompassing said shaft within said head above said spiral blade; substantially as set forth.

4. In pneumatic apparatus of the character described, the head J open at its lower end to receive the material to be elevated and provided with the annular belt connected with the air supply, the inlets for air to said head below said belt and the passages connecting said belt with said inlets, combined with the revoluble spiral blade at the lower end of said head; substantially as and for the purposes set forth.

5. In pneumatic apparatus of the character described, the head J having the cylinder at its lower open end, the expanded chamber above said cylinder, and the inlets for air to and at the base of said chamber, the upper portion of said head above said chamber turning laterally and connected with the elevating tube and forming the bearing in line with the vertical center of said chamber and cylinder, combined with the shaft extending through said chamber and having a supporting sleeve at the upper side of said bearing, and the spiral blade upon the lower end of said shaft and within said cylinder; substantially as and for the purposes set forth.

6. In pneumatic apparatus of the character described, the head J receiving the material to be elevated and provided with the annular belt connected with the air supply, the removable inlet nozzles for air to said head below said belt, the passages connecting said belt with said nozzle, and the removable plugs in said passages in line with said nozzles, combined with the revoluble spiral blade at the lower end of said head; substantially as and for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 3d day of December, A. D. 1894.

GEORGE VAN WAGENEN.

Witnesses:

CHAS. C. GILL,
EDWARD D. MILLER.