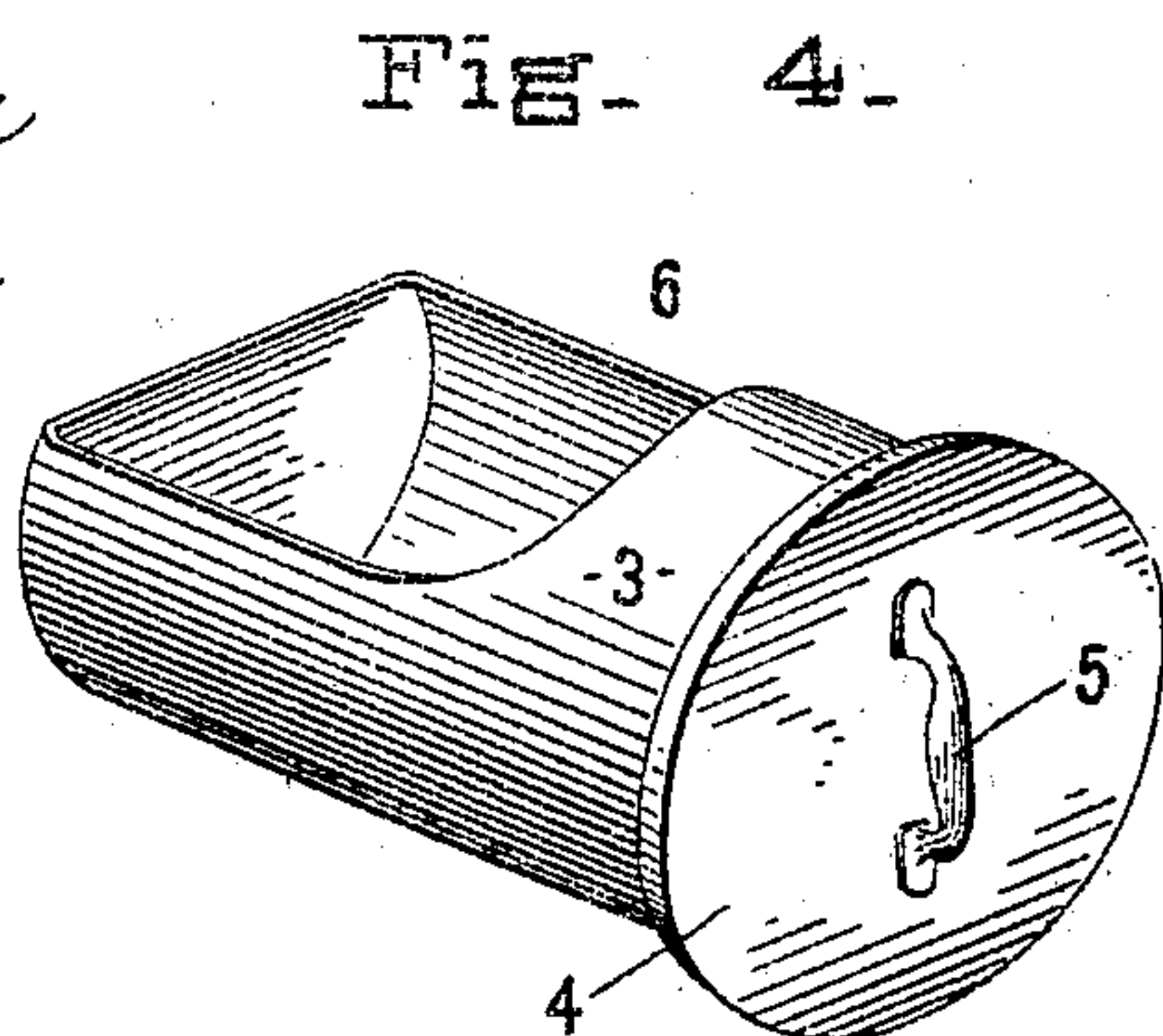
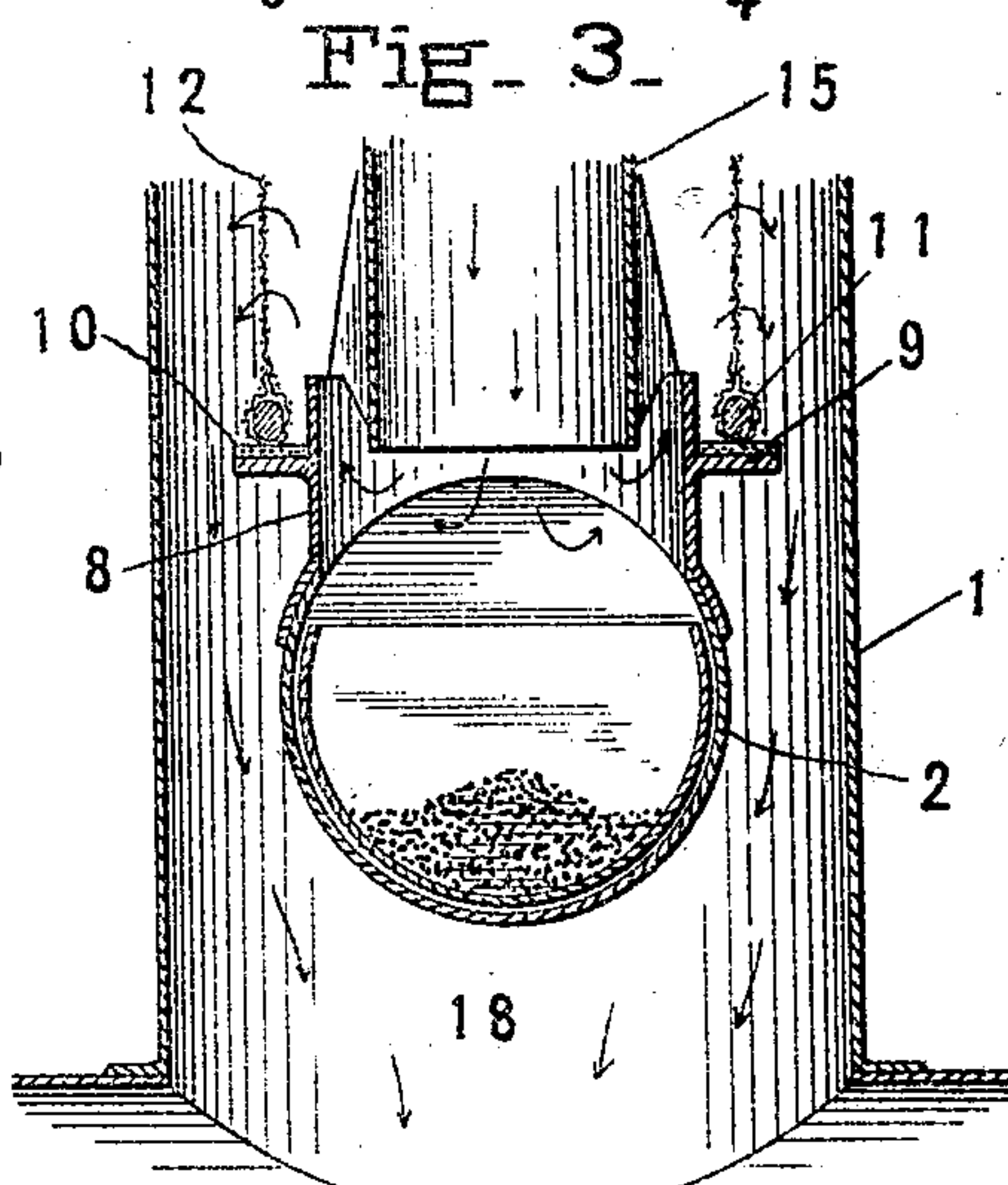
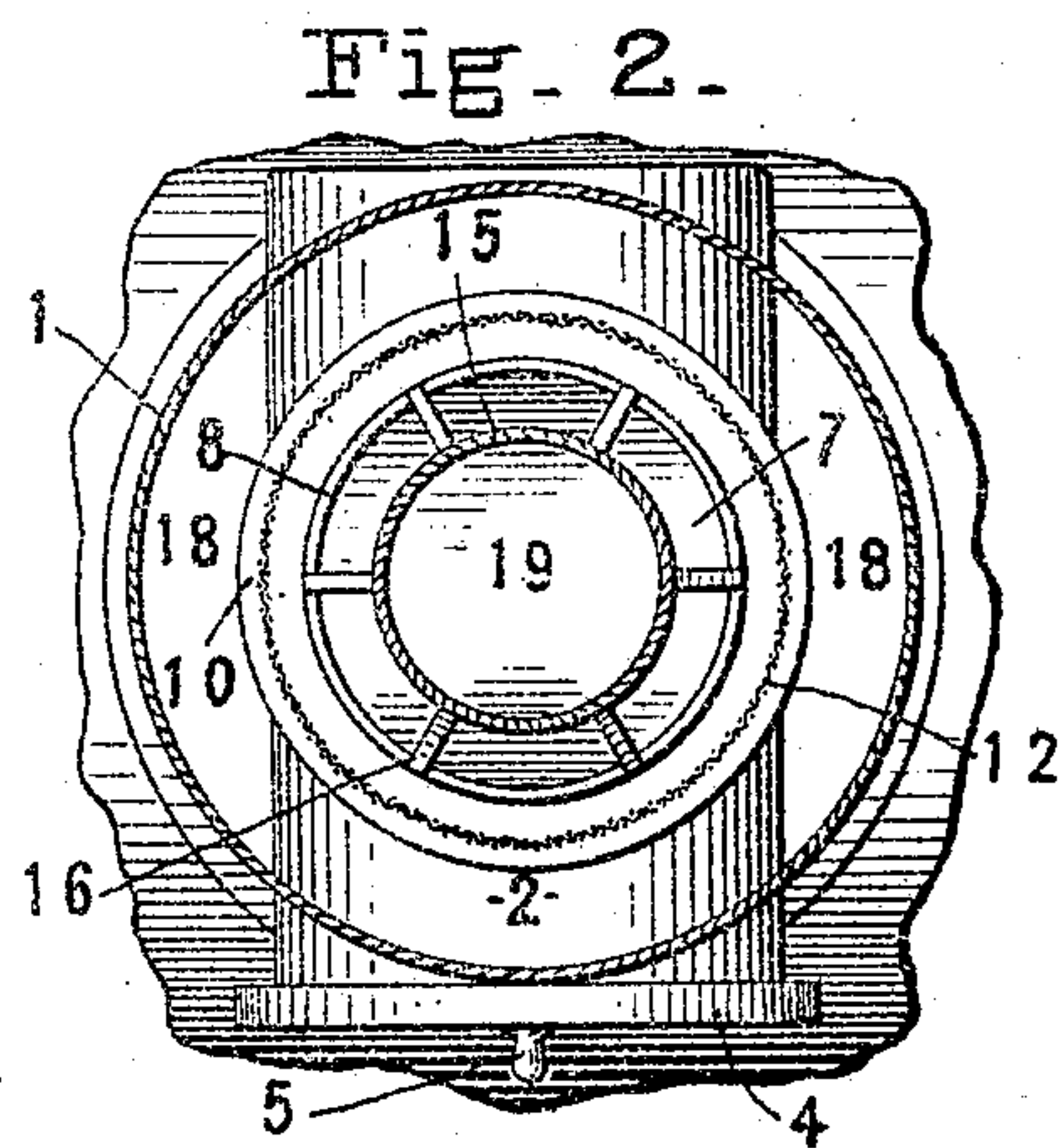
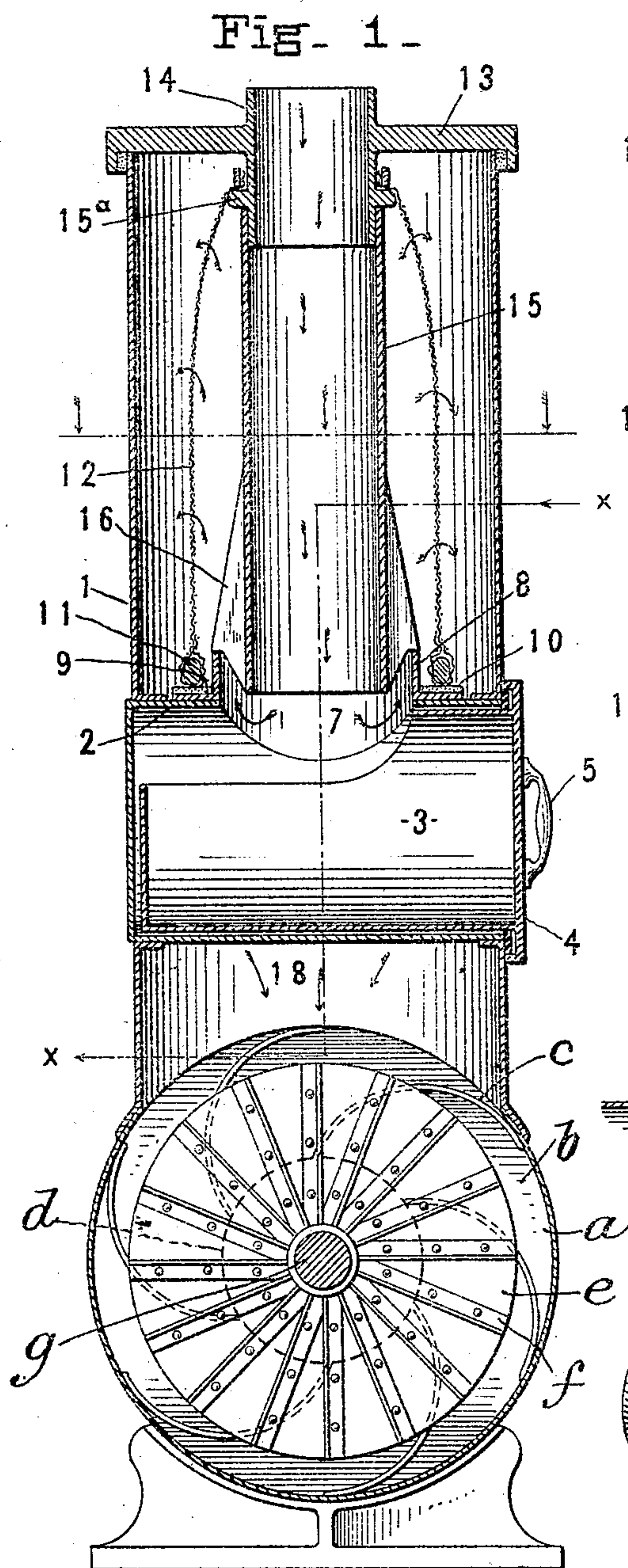


I. H. SPENCER.
PNEUMATIC DUST SEPARATOR.
APPLICATION FILED NOV. 22, 1907.

999,604.

Patented Aug. 1, 1911.



WITNESSES
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PNEUMATIC DUST-SEPARATOR.

999,604.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Original application filed January 29, 1907, Serial No. 354,602. Divided and this application filed November 22, 1907. Serial No. 403,320.

To all whom it may concern:

Be it known that I, IRA H. SPENCER, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, (whose post-office address is Hartford, Connecticut,) have invented certain new and useful Improvements in Pneumatic Dust-Separators, of which the following is a full, clear, and exact description, whereby any one skilled in the art may make and use the same.

The invention relates to separators or dust collectors, such as shown in a co-pending application, Serial No. 354,602, filed Jan. 29, 1907, and embodies certain details of construction and improvements. This application is filed as a divisional application of said co-pending case.

The objects of the invention are to provide a collector or separator which will disintegrate the fluid passed therethrough, and will not only collect the heavy particles of material carried in the fluid, but will also prevent the passage of the finest particles.

A further object is to provide a device, the various parts of which may be most accessible and durable and extremely cheap as to construction, and at the same time providing features of the greatest efficiency.

A still further object is to secure the easiest possible accessibility for cleaning and adjusting the various parts.

Another object is to provide an automatic safety device for preventing rupture of the separator screen upon excessive suction.

Referring to the drawings: Figure 1 is a longitudinal sectional view of the device. Fig. 2 is a cross-sectional view on a horizontal plane. Fig. 3 is a central vertical section through the drawer and the casing on the line $x x$ of Fig. 1. Fig. 4 is a perspective view of the transversely disposed receiving drawer.

Briefly, the device comprises a receiving chamber and an exhaust chamber, with means intermediate the two chambers for cleansing the fluid passed through the device from all impregnating matter including the finest dust and particles of dirt. It contemplates an arrangement of receiving and exhaust chambers, so divided by the intermediate screening mechanism that a substantially pure fluid is drawn through the exhaust chamber.

In the accompanying drawings the numeral 1 denotes a casing preferably of tubular form and adapted to be mounted upon or in connection with any suitable suction inducing apparatus, such as partially illustrated in Fig. 1, which, as herein shown, is illustrated in front elevation as a multiple stage turbine device in which there are a series of compartments, one of which is shown as at a , which bears deflector blades upon its rear wall b , as at c . Immediately in front of the wall b , which is centrally perforated as indicated in dotted outlines as at d , is an impeller comprising a disk e , having blades f , which, upon rotation of the main shaft g , centrifugally throw off the fluid against the deflectors c , and pass said fluid into the next succeeding compartment beyond the wall a , through the central orifice d . Such devices are not unknown and while ordinarily used for causing a pressure or blowing effect may, when utilized as herein defined, act as a suction apparatus for giving a constant suction or vacuum upon the inlet side with a constantly increasing pressure in the several impeller chambers which are not specifically indicated herein. The main purpose and advantage of such a multiple stage turbine arrangement is that a constant suction may be secured irrespective of the volume of air passed through the device.

The casing 1 is intersected by a transverse tubular casing 2, the latter being of a less diameter than the diameter of the casing 1, so that there is a considerable passage about the periphery of the transverse casing 2. Within this transverse casing 2 is arranged a receptacle 3 which preferably is of cylindrical form to fit within the tubular casing 2, and is provided with a flanged end 4 which closes the opening to said casing 2. The flanged end 4 has properly secured thereto a handle 5 by which the drawer or receptacle 3 may be readily removed. It is of course understood that the tubular receptacle 3 is opened at its upper side as at 6 to receive material deposited therein by the incoming impregnated fluid. By having the transverse casing 2, and correspondingly formed receptacle 3, arranged below the inlet, there is a distinct advantage in as much as the circular form of the removable casing or receptacle 3, gives sharp

edges in connection with the inlet opening at all points about the inlet and the casing whereby the material once deposited through the inlet opening, will be retained in the tubular cylindrical casing or receptacle 3. In other words, only the surface of the material directly underlying the tubular inlet, will be subjected to any disturbance whatever, and as the incoming fluid acts with some force, the deposited material will be driven back under the edges of the opening of the cylindrical receptacle 3, where it will not be subject to immediate air currents.

Through the upper wall of the transverse casing 2 is formed an opening 7 which is surrounded by an upwardly extending neck or throat 8. This neck or throat 8 is preferably of angular form providing a seat 9 suitably covered with a resilient bushing or felt 10, and forming a closed joint in connection with the retainer 11 holding the lower end of the bag-like screen 12.

The upper end of the casing 1 is closed by a cover 13 of a proper form to seal the upper end of the tubular casing. This cover has projecting through, or formed integrally therewith, a tubular inlet neck 14. As shown herein, this neck 14 is provided with a rib or extension 15^a, above which the upper end of the bag-like screen 12 may be secured by a strap or draw spring.

The lower end of the inlet neck 14 projects into a nominally stationary tube 15. The latter is of a less diameter than that of the upwardly extending neck or throat 8 and projects below the upper edge of said neck and into direct proximity with the receiver 3. It is held in place in a vertical position with reference to the neck 8 and the casing 1 by flanges or wings 16. These, of course, may be of any desired form, number or arrangement to insure the holding of the tube 15, though they must not restrict the opening between the neck 8 and said tube.

The inlet tube 14 is so formed that its lower end will project within the upper end of the tube 15, and thus there is a continuous passage from the exterior of the casing 1 to the receptacle 3.

The bag-like screen 12 is of such a form as to completely surround the inlet tube 14 and the tube 15, and is secured to the inlet tube 14, as heretofore indicated, while its lower end is wrapped about the retainer 11. This retainer 11 is of the ring form and of considerable weight. It fits nicely about the outer surface of the neck 8 and rests upon a resilient pad or felt 10. Its office is to normally hold the screen 12 in proper position. If, however, the suction is so great that the screen 12 might be disrupted the ring will rise and permit a free passage of fluid from the inlet tube 15 to the exhaust

chamber designated as 18. This prevents rupture of the screen 12.

It will be noted that the screen 12 actually divides the casing 1 into two compartments, the first including the passage through the inlet 15 and the interior of the screen forming the inlet compartment 19, while the space between the screen and the casing 1, which connects directly with the exhaust chamber 18, is an exhaust compartment.

The tubular inlet 15 extends centrally of the casing 1 and terminates adjacent to the inner periphery of the transverse casing 2. With this arrangement the fluid drawn in through the tube 15, owing to the suction in compartment 18, must make a direct and sharp turn from the inner surface of the tube 15 to its outer surface as it passes up through the neck 8, and thence through the screen 12. This sudden turning of the directional movement of the fluid causes all the heavier material and particles carried in said fluid to be deposited in the receptacle 3, while the more purified fluid is drawn through the bag-like screen 12 into the exhaust compartment 18. The receptacle 3 oftentimes, through inadvertence or inattention, may become so filled with material separated from the rapidly moving fluid that the opening from the bottom of the inlet tube 15 is partially or almost totally clogged. Thereupon the full suction effect of the exhaust chamber 18 is brought directly to bear upon the screen 12, and under ordinary conditions the screen being held at both ends said suction would disrupt it. Such an action, however, is prevented by the use of the weighted retainer 11 which, if the suction becomes too great upon the screen, will rise and prevent its rupture.

There is a special advantage in arranging the screen, as hereinabove described. First, it is insured against injury by the variable holding effect at its bottom, and being secured to the cover, or its projecting tube, it may be readily removed with the appurtenant parts for cleaning, inspection or renewal.

By providing the transverse intersecting receiving chamber with cylindrical walls the suction effect upon the screen is evenly distributed as the fluid space about the walls of the chamber 2 is substantially the same with reference to both sides thereof.

The wings or flanges 16 by which the tube 15 is secured in position within the neck 8 are tapered from the tube to the neck, thus as the screen is lowered the retainer 11 will assume a proper position about the neck 8 and with reference to its cushion seat 10. Thus the removal and insertion of the cover 13 with its tube 14 and screen 12 may be readily effected.

Obviously, the details of the various parts

might be varied to a considerable extent without departing from the spirit or intent of the invention, and, of course, it is not absolutely material that the various casing parts and inlets be made in the tubular form herein shown and described.

As shown in Fig. 1 the main casing 1 is mounted upon the casing of a suction-inducing apparatus, which, as herein shown, consists of a device of the non-positive type. Obviously, any form of suction inducing apparatus might be employed, although it is preferred to use apparatus of the multiple stage turbine type, as with such a device a practically unlimited volume of fluid may be moved with a substantially uniform vacuum or pressure.

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

1. In combination in a device of the character described, a main casing of tubular form, a tubular casing of lesser diameter than the main casing intersecting said main casing transversely, a tubular drawer fitting said transverse casing, an inlet pipe arranged appurtenant to said casings, a cover for the main casing and a removable screen attached to said cover.

2. In combination in a device of the character described, a main casing of cylindrical form, a cylindrical casing of lesser diameter than the main casing intersecting said main casing at substantially right angles, a receptacle arranged in said transverse casing, an inlet tube concentrically arranged with

reference to the main casing, a removable cover provided with an opening registering with the inlet tube, and a screen secured to said cover and surrounding the inlet tube.

3. In combination in a device of the character described, a main casing of cylindrical form, a transverse cylindrical casing of lesser diameter than the main casing intersecting the main casing, a removable receptacle fitting within said transverse cylinder, a tubular opening from the transverse cylinder to the main cylinder, an inlet tube secured within said opening, a removable cover provided with a projection registering with the inlet tube, and a screen secured about such projection, and with its lower end resting about the opening.

4. In a device of the character described, a tubular casing provided with a cover, a tubular receiving casing transversely arranged thereto and of lesser diameter than the main casing, said casing intersecting the tubular casing, a tubular neck or throat extending from said transverse casing into the main casing, a tube having its lower end extending within said neck or throat and with its upper end appurtenant to the cover, tubular connections intermediate said tube and the cover, and a tubular screen secured to said cover and extending about the upwardly projecting neck or throat.

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Witnesses:

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WILBUR V. PAINE.