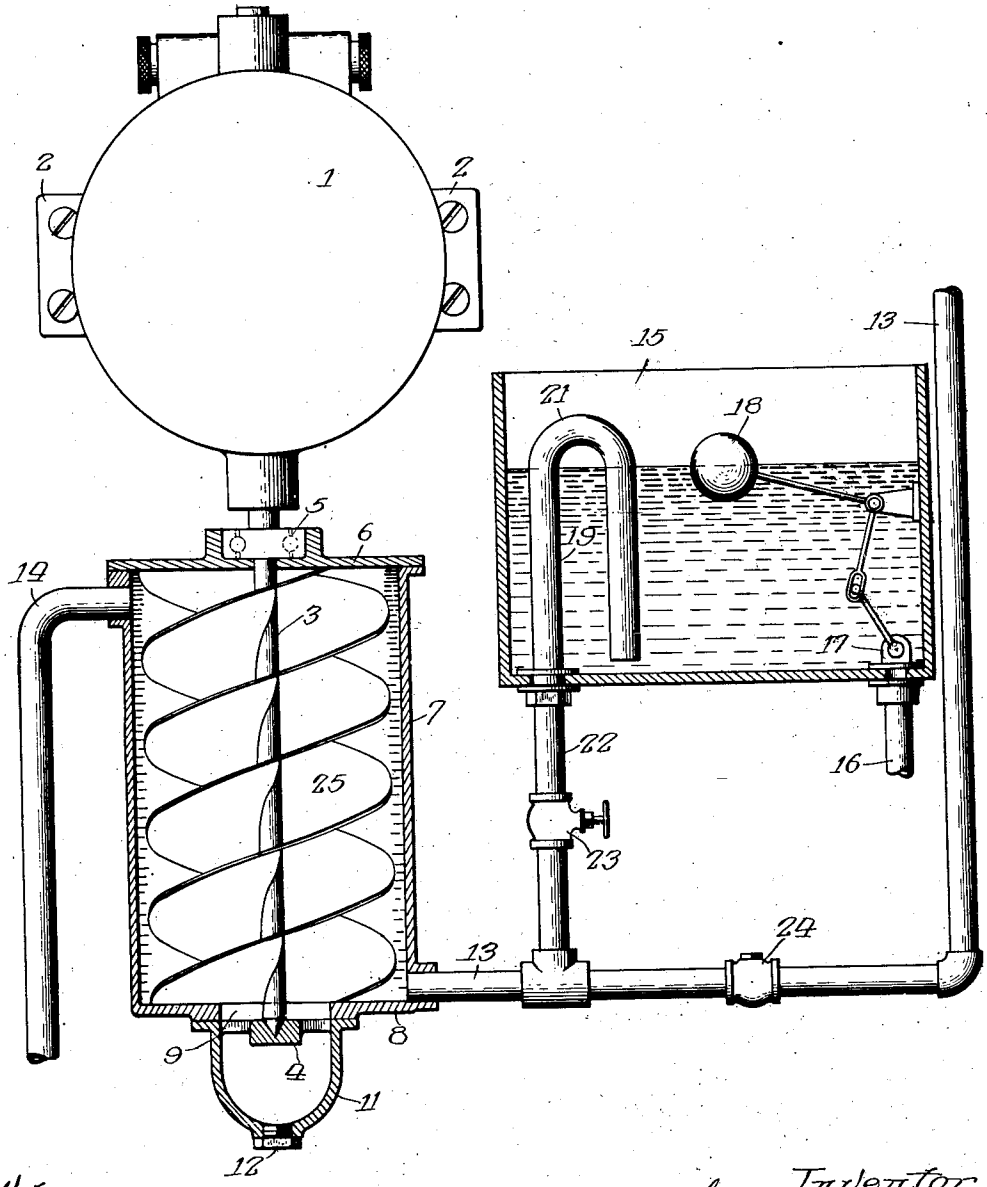
F. W. MILLER.

VACUUM SYSTEM.

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VACUUM SYSTEM.

1,273,900. Specification of Letters Patent. Patented July 30, 1918.

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To all whom it may concern:

Be it known that I, FRANK W. MILLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vacuum Systems, of which the following is a specification.

This invention relates in general to vacuum systems or means for creating a vacuum for any desired purpose, and while I have illustrated in the present application a system particularly adapted for vacuum cleaning purposes, it should be understood that my invention is capable of use in many places where the creation or maintenance of a vacuum is desirable. One of the primary objects of my present invention, is to provide a system which will be capable of creating and maintaining a high vacuum with a minimum expenditure of power.

Another object of my invention is to provide a vacuum creating device which shall employ a liquid seal around the rotating or vacuum creating member whereby a substantially hermetic seal is provided which enables the member to create and maintain a high vacuum without leakage.

Still another object of my invention is to provide a system particularly adaptable for vacuum cleaning purposes which will be entirely sanitary, since my invention contemplates mixing the dust laden air with water and discharging the dirty water and air directly to a sewer so that the air which may carry disease germs or bacteria will not be returned from the machine to the living room or dwelling.

A further object of my invention is to provide a vacuum system which will be simple in construction, cheap to manufacture and economical to operate, and which will be easy to install and will occupy only a small amount of space.

Other objects and many of the attendant advantages of my invention will be readily appreciated as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings.

On the drawings the single figure illustrates a side elevation partially in section of a vacuum system embodying my invention.

Referring to the drawings reference character 1, indicates an electric motor of any suitable construction adapted to be supported by bracket (2) which may be attached to a wall or to any convenient means of support. The lower end of the motor shaft is directly connected with a vertical shaft (3), the lower end of which is set in a bearing (4), the weight of the shaft being carried by anti-friction ball bearings (5), supported upon the top (6) of a suitable casing. The casing comprises side walls (7) and a bottom (8) provided with a central opening (9) below which a sediment collector (11) is mounted, the lower end of the sediment collector being provided with a removable plug (12) which when removed will permit the discharge of the contents of the receptacle (11).

An inlet pipe (13) connected at one end to the casing near its bottom, is adapted to be attached at its other end to a hose (not shown) which may be equipped with any preferred type of vacuum cleaning tool. If the system is to be used for purposes other than vacuum cleaning, it will be obvious that the pipe (13) will be connected with any receptacle, mechanism or device in which it is desired to create a vacuum or to which suction is to be applied. To the opposite end of the casing, a discharge pipe (14) is connected which preferably is connected to discharge into the sewer, so that whatever is drawn into the casing through the pipe (13) is delivered through the discharge pipe (14) to the sewer.

A water tank (15) is mounted in proximity to the casing in any suitable manner and water is supplied to the tank through a pipe (16) from the city supply or any suitable source, the level of water in the tank being controlled and maintained by a float valve (17) adapted to be actuated by a float (18). The details of construction of the float valve are of minor importance and these structural features may be of any well known or preferred construction. A siphon (19), the crown (21) of which is exposed above the water level in the tank, said level being indicated by the dotted line on the drawing, is connected by means of a pipe (22) with the pipe (13) so that when suction is applied to the pipe (13) water will be drawn from the tank (15) through the siphon and delivered to the pipe (13) from which it is drawn with the air passing through the pipe (13) into the casing. The pipe (22) is equipped with

a hand regulating valve (23) by means of which the quantity of water delivered from the tank (15) to the pipe (13) may be regulated. The pipe (13) is provided with a check valve (24) which prevents back flow of air and water through the pipes, thereby precluding water from the tank from going back through the pipe (13) and eventually through the suction tube. As a further precaution it will be noted that the pipe (13) extends above the water level in the tank (15) so that should the valve (24) fail to work it would be impossible for any water to flow back in the pipe (13) to the suction hose or to the tool to which the pipe (13) is connected.

The shaft (3) is provided within the suction chamber with a spiral conveyer which in the present instance is shown as comprising a double spiral blade. It will be observed from the drawing that considerable clearance is provided between the periphery of the spiral blade and the surrounding wall (7) of the casing. This clearance prevents any friction between the periphery of the blade and the surrounding casing, and also obviates any danger of dirt or solid particles collected and drawn in through the pipe (13) from lodging between the conveyer and the casing so as to interfere with the free running and successful operation of the rotary suction device. If air alone were drawn into the casing through the pipe (13) this clearance would preclude the creation of a high vacuum, but it is for the purpose of effectively sealing this clearance that the water tank and connections are provided. The water which is drawn into the casing from the tank (13) is forced by centrifugal action, when the conveyer is rapidly rotated, outwardly against the surrounding walls of the casing, and the quantity of water admitted is controlled by the valve (23) so that only a sufficient quantity is admitted to form an effective and a substantially hermetic seal between the periphery of the rotating blade and the surrounding casing walls. The water also being mixed with the dust and dirt laden air in the casing, takes up the dirt so that it is carried in suspension in the water and is delivered through the discharge pipe (14) together with the air directly to the sewer. The water therefore performs the dual function of taking up the dirt in the air drawn into the device and it also forms a liquid seal around the spiral suction device, which effectively prevents leakage and renders the suction device highly efficient. Furthermore by delivering the water and air directly to the sewer, all danger occasioned by returning the air which may be laden with germs and bacteria directly to the rooms or dwelling, is eliminated. Such solid matter as may accumulate within the casing collects into the sludge chamber or collection receptacle (11) from which it may be drained whenever desired by simply removing the plug (12).

It is believed that the construction, operation, and many of the attendant advantages of my invention will be readily understood from the foregoing without further description, and it should be obvious that I have provided a suction device which is capable of creating and maintaining a high vacuum so that it is capable of use for many purposes and it should also be obvious that my invention is particularly adaptable for use as a vacuum cleaner, since the dirt which is drawn into the device with the air is taken up and carried in suspension by the water with which it is discharged from the device directly into the sewer, thus making the device thoroughly sanitary in its operation. While I have illustrated and described one practical and preferred embodiment of my invention, it should be understood that the structural details shown and described are capable of considerable modification and variation without departing from the scope of the invention as defined in the following claims.

I claim:

1. A vacuum system comprising a casing, a rotatable spiral conveyer disposed vertically therein, a sediment collecting receptacle connected with the bottom of said casing, an air inlet pipe connected to one end of said casing, a discharge pipe connected to the opposite end of said casing, and means for delivering water or other liquid in regulated quantities to said air supply pipe.

2. A vacuum system comprising a stationary cylindrical casing provided with an air inlet adjacent to one end and a discharge outlet adjacent to the other end thereof, a spiral rotary conveyer mounted concentrically within said casing, and means for delivering liquid to said casing with the air through said inlet in sufficient quantities to maintain a liquid seal around said conveyer and provide a surplus for discharge through said discharge outlet.

3. A vacuum system comprising a stationary vertically disposed cylindrical casing, a spiral rotary conveyer mounted concentrically within said casing, a discharge pipe connected to the upper end of said casing, an air inlet pipe connected to the lower end of said casing, and means for delivering liquid to said casing with the air through said inlet pipe in sufficient quantities to maintain a liquid seal around said conveyer and provide a surplus adapted to be discharged with the air through said outlet pipe.

4. A vacuum system comprising a stationary cylindrical casing, a spiral rotary conveyer mounted concentrically within said casing and having its periphery spaced a

substantial distance from the casing, an outlet pipe connected to said casing adjacent one end thereof, and means for delivering air and a liquid to the other end of said casing, said liquid being delivered in sufficient quantities to maintain a liquid seal around the conveyer and to be discharged together with the air through said outlet pipe.

5. A vacuum system comprising a stationary casing, a spiral suction creating device mounted therein and spaced equally from the surrounding casing throughout its periphery, means for supplying air and a liquid to the intake end of said casing, and means for delivering air and liquid from the other end of said casing, a portion of the liquid being maintained by gravity and centrifugal force in the casing to form a liquid seal around said suction creating device.

FRANK W. MILLER.