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2 Sheets-Sheet 1

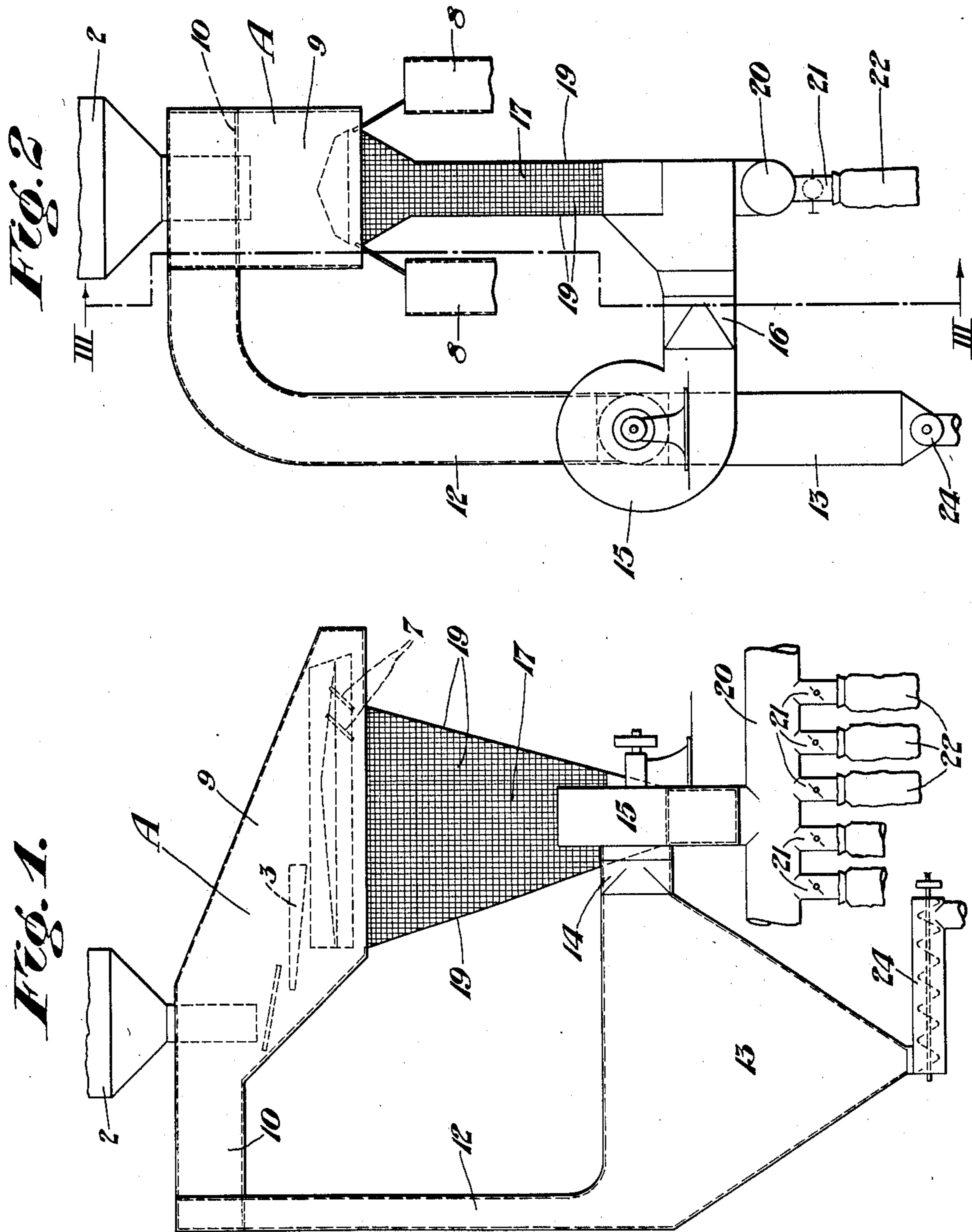


Fig. 1.

Fig. 2.

Witnesses:  
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Inventor:  
EDWARD O'TOOLE,  
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his Attorney.

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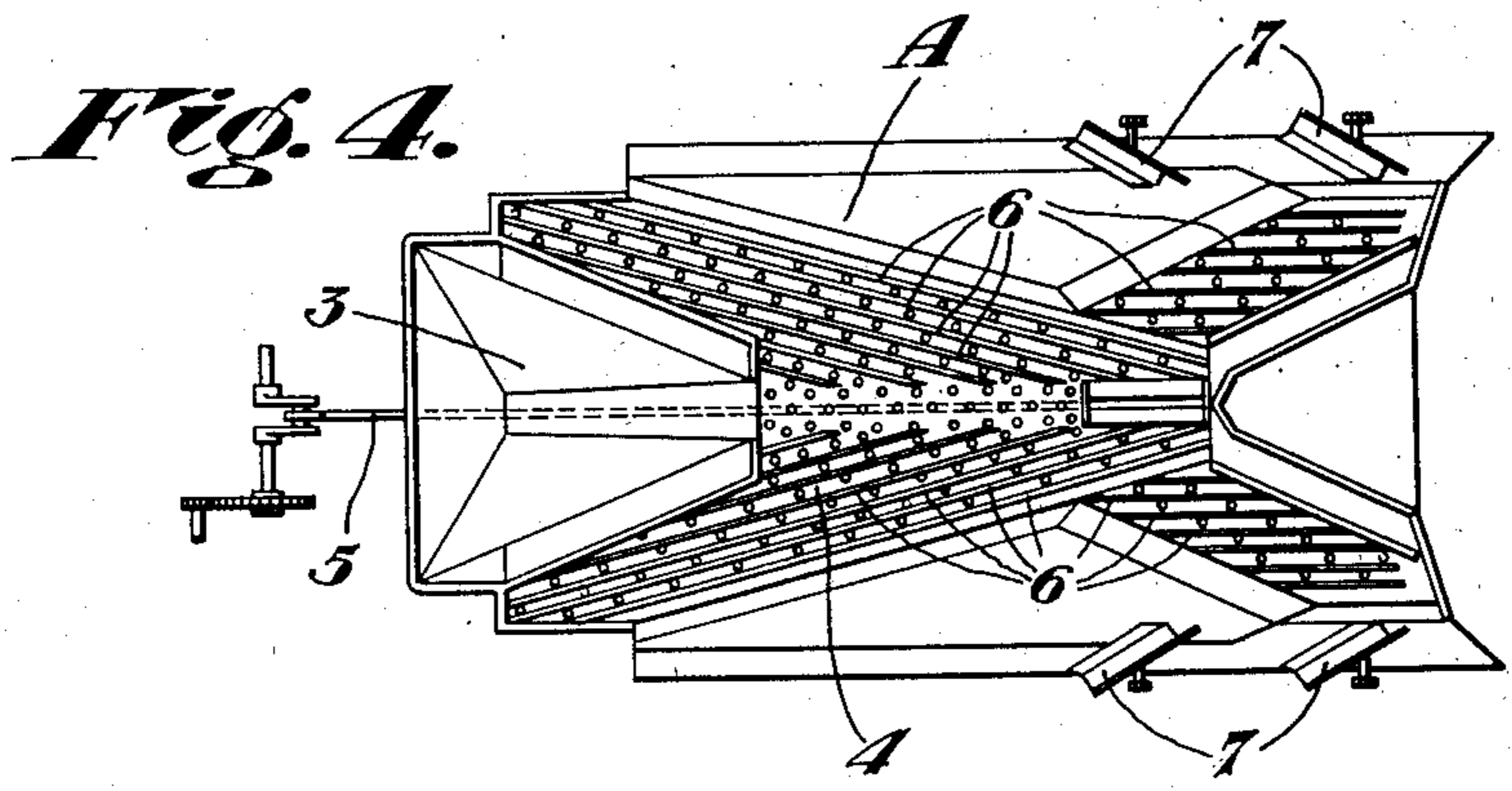
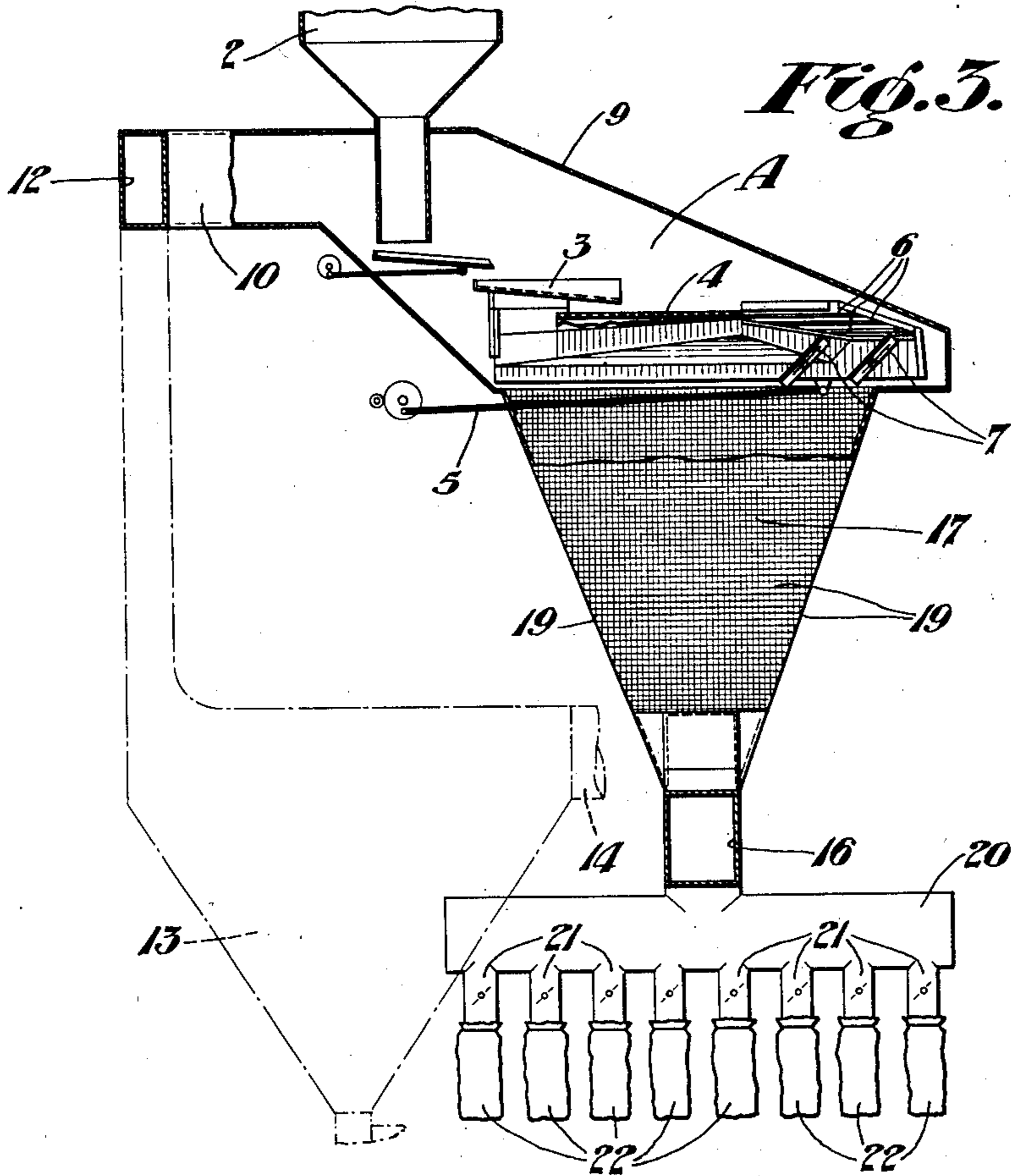
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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR CLEANING COAL.

Application filed September 27, 1927. Serial No. 222,308.

This invention relates to improvements in apparatus for cleaning and sizing coal and other materials, in which a blast of air is used as one of the cleaning and sizing forces, and has for its object the provision of a semi-closed circuit for the air forced through the material being cleaned and sized, whereby said air used over and over in the operation of the apparatus and all excess air discharged from the system is filtered to remove all dust.

Another object is to prevent the escape of dust through the discharge ports for the sized and cleaned material, and to otherwise generally improve apparatus of this class.

The present invention may be applied to pneumatic cleaning and sizing apparatus of the prior art, such as shown in the patent to Henry M. Sutton, Walter F. Steel, and Edwin Goodwin, No. 1,603,997, dated October 19, 1926, and, therefore, since the present improvement lies primarily in the air circulating system composed of standard elements, the parts will be shown more or less diagrammatically in the drawings.

In the drawings—

Figure 1 is a side elevation of the coal cleaning apparatus embodying this invention.

Figure 2 is an end elevation thereof.

Figure 3 is a sectional elevation on the line III—III of Figure 2.

Figure 4 is a plan of the cleaning table.

Referring more particularly to the drawings, the letter A designates the cleaning and sizing apparatus as a whole, which comprises a feed hopper 2 which delivers the coal or other material to be cleaned and sized onto a feeding table 3. The table 3 is adapted to deliver or discharge the material to be cleaned and sized onto a perforated bed 4 which is inclined forwardly and from the center toward each side and is adapted to be jugged in a longitudinal direction by an eccentrically operated rod 5.

The bed 4 is provided with riffle strips 6 adapted to retard the movement of the material to be sized.

The coal or other material to be sized is fed onto the rear end of the bed 4 and due to the effect of the combined forces caused by jugging of the bed and the up-flow of air, the large pieces of coal, fines and slate or bone are separated. The large pieces of coal will roll by gravity to the sides of the bed first, and the fines will follow the riffle strips to a point adjacent the forward end of the bed, while the slate and bone, due to their weight,

will ride to the extreme forward end of the bed. The dust or extreme fines will be taken up by the up-flowing air and removed from the coal mass.

Separating bars 7 are adjustably mounted at each side of the bed for defining the line of separation between the separated materials.

Hoppers 8 are arranged along each side of the bed to receive the separated material.

A hood 9 is arranged over the bed and feeding table, and extends beyond the side edges of the table to provide clearance for the discharge of the sized and cleaned material.

The hood 9 terminates at its rear end in a reduced conduit section 10, which is connected to a conduit 12 connected to a hopper-shaped expansion chamber 13. The chamber 13 is connected to a conduit 14 which is in turn connected to the inlet or suction port of a fan 15. The fan 15 has its discharge or blast port connected to a conduit 16 which is connected to the lower end of an air chest 17, which air chest extends upwardly and is connected to the lower side of cleaning and sizing apparatus A so as to deliver air under pressure to the apparatus, which air is adapted to pass upwardly through the perforated bed plate 4, through the material to be separated, and into the hood 9.

The air chest 17 is provided with fabric or fine mesh side walls 19 so that excess air may escape therethrough.

Any dust entrained in the air escaping through the walls 19 of the air chest 17 will be trapped, and will fall down to the lower end thereof.

The lower end of the chest 17 is connected to a manifold conduit 20, which has a plurality of valved outlet spouts 21 to which bags 22 are adapted to be secured to receive any dust or extreme fines.

The expansion chamber 13 may be provided with any suitable outlet opening at its lower end to permit the discharge of the dust and fines. However, for the purpose of illustration, I have shown a screw conveyor 24 for removing the dust and fines from the expansion chamber 13.

In operation, power will be applied to the fan 15 which will create a suction in the hood 9 and will force air under pressure through the conduit 16 and chest 17, up through the perforated bed 4 of the apparatus. The air being forced up through the bed 4 of the apparatus will pass through the material



being sized and cleaned, and will carry the extreme fines and dust from said material up into the hood 9, from which the air and entrained dust will be drawn by the suction created by the fan 15, through the conduits 10 and 12 into the expansion chamber 13. When the dust laden air enters the chamber 13 it will expand and the major portion of the dust and fines entrained therein will settle out in the chamber 13. The substantially dust free air will be drawn from the chamber 13 through the conduit 14, back into the fan 15, and again forced through the conduit 16 and chest 17, and up through the cleaning and sizing apparatus.

Due to the openings along each side of the bed 4 through which the sized and cleaned material passes to the hoppers 8, the suction in the hood 9 will continually draw fresh air into the system through these openings and, therefore, unless there is some escape of air from the system, the pressure would soon build up to a prohibitive point. In order to prevent the building up of excessive pressure in the system I have provided the valved outlets 21 in the manifold 20, one or more of which may be opened to permit excess air to escape, and any dust carried by the escaping air is filtered through the bags 22 and thereby saved since it has a considerable commercial value.

A further means is provided to insure the escape of all excess air in the perforated or fabric side walls 19 of the chest 17. If the pressure of the air in the chest 17 is excessive it will escape through the side walls 19 and any dust entrained in such escaping air will be trapped or filtered out by the side walls 19 and will fall down into the manifold 20 so as to be carried through the open outlets 21 into the bags 22.

The semi-closed system above described will clean and salvage all the dust from the material being cleaned and sized, and will further, due to draft of air taken in through the material discharge openings and the suction in the hood 9, prevent the escape of any dust from the apparatus.

While I have shown and described one specific form of apparatus it will be understood that I do not wish to be limited thereto since various modifications may be made without departing from the scope of my invention as defined in the appended claims.

I claim—

1. The combination with a coal cleaning and sizing apparatus comprising, a sizing and cleaning table having a pervious deck through which air is adapted to be forced under pressure upwardly through the coal, a plurality of outlets for the sized and cleaned coal, of a hood arranged over said table, a suction conduit leading from said hood to an expansion chamber, a fan having its inlet port connected to said expansion chamber,

an air chest connected to the lower side of said sizing and cleaning table and to the discharge port of said fan, and a manifold member connected to the lower end of said air chest and provided with a plurality of valved outlets for regulating the pressure of the air delivered to said table.

2. The combination with a coal cleaning and sizing apparatus comprising, a sizing and cleaning table having a pervious deck through which air is adapted to be forced under pressure upwardly through the coal, a plurality of outlets for the sized and cleaned coal, of a hood arranged over said table, a suction conduit leading from said hood to an expansion chamber, a fan having its inlet port connected to said expansion chamber, a pervious air chest connected to the lower side of said sizing and cleaning table and to the discharge port of said fan, adapted to deliver air under pressure to said table and to filter and permit some excess air to escape, and at least one valved outlet connected to said air chest for regulating the pressure of air delivered to said table.

3. The combination with a coal cleaning and sizing apparatus comprising, a sizing and cleaning table having a pervious deck through which air is adapted to be forced under pressure upwardly through the coal, a plurality of outlets for the sized and cleaned coal, of a hood arranged over said table, a suction conduit leading from said hood to an expansion chamber, a fan having its inlet port connected to said expansion chamber, an air chest connected to the lower side of said sizing and cleaning table and to the discharge port of said fan, and at least one valved outlet connected to said air chest for regulating the pressure of air delivered to said table.

4. The combination with a coal cleaning and sizing apparatus comprising, a sizing and cleaning table having a pervious deck through which air is adapted to be forced under pressure upwardly through the coal, a plurality of outlets for the sized and cleaned coal, of a hood arranged over said table, a suction conduit leading from said hood to an expansion chamber, a fan having its inlet port connected to said expansion chamber, a pervious air chest connected to the lower side of said sizing and cleaning table and to the discharge port of said fan, adapted to deliver air under pressure to said table and to filter and permit some excess air to escape, a manifold member connected to the lower end of said air chest and provided with a plurality of valved outlets for regulating the pressure of air delivered to said table, and dust catching air filter bags connected to each of said last named outlets.

In testimony whereof, I have hereunto set my hand.

EDWARD O'TOOLE.