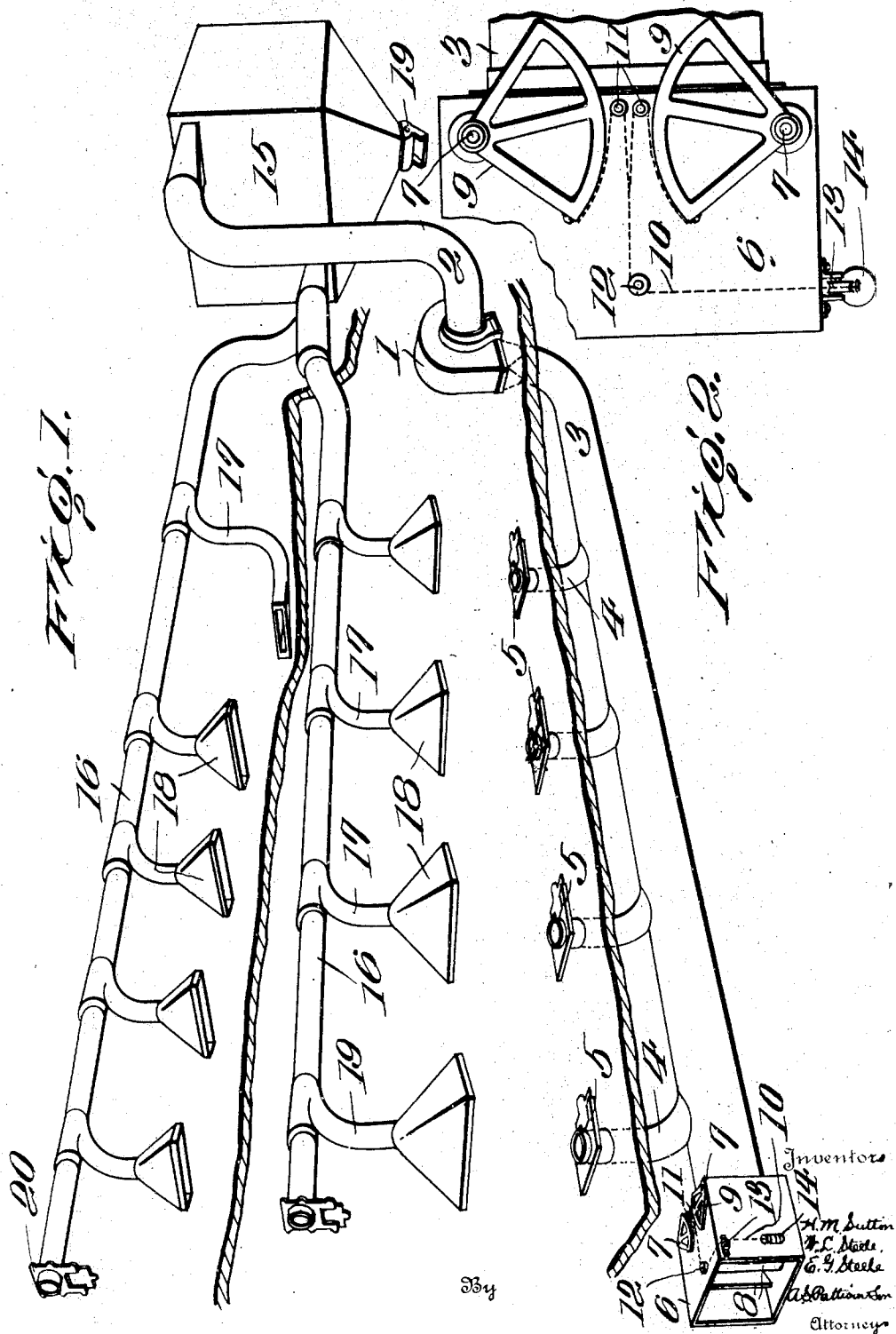


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ONE-FAN COMBINED DUST COLLECTING AND AIR SUPPLY
SYSTEM FOR PNEUMATIC SEPARATORS AND CLEANERS
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ONE-FAN COMBINED DUST-COLLECTING AND AIR-SUPPLY SYSTEM FOR PNEUMATIC SEPARATORS AND CLEANERS.

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This invention relates to improvements in a one-fan combined dust collecting and air supply system for pneumatic separators and cleaners and relates more particularly to a one-fan system for providing air to a plurality of pneumatic separators or cleaners and at the same time maintaining a suction in the dust collecting system for collecting the dust laden air as it rises from the cleaning or separating mills or tables.

The object of our invention is to provide a combined dust collecting and air supply system for pneumatic separators or cleaners in which there is utilized a single fan.

Another object of our invention is to provide a one-fan system of the character described in which the fan provides an air volume in excess of the total air requirements of the system.

Another object of our invention is to provide a one-fan system of the character described in which there is means to control the air in respect to the dust collecting system and also in respect to the air supply system.

A further object of our invention is to provide a one-fan system of the character described in which adjustments can be made in respect to the amount of air delivery to one of the separators or cleaners without affecting a previous adjustment of air delivery to any of the other separators or cleaners.

A further object of our invention is to provide a system of the character described in which there is one fan which operates on its suction side a dust collecting system and on its discharge side an air supply system, both systems being preferably utilized in respect to pneumatic separators or cleaners.

Another object of our invention is to provide a combined system of the character described which is cheap and simple of manufacture and installation and highly efficient in operation.

Other further objects, improved results, and novel features of construction will appear in the following description and accompanying drawings.

So far as we are aware the common custom has been to provide a separate fan for each pneumatic separator or cleaner in a mill. This is done for the reason that it is necessary that the air supply to each par-

ticular separator or cleaner be closely regulated to suit the work being done. A separator or cleaner may be used for separating or cleaning material of different characters both as to size and weight and also as to amount of tonnage handled, and due to these facts the close regulation of air before mentioned is necessary.

This necessity for the close regulation of air supply has caused a separate fan to be employed for each apparatus for the reason that if all of the cleaning or separating apparatus of a mill were receiving their air from one fan of a sufficient capacity to supply the needs of all of them it would be seen that any change in regulation of the air supplied to one apparatus would immediately disturb and change the air regulation of all of the other apparatus. A one-fan system of this character would consequently prove inoperative and frequent regulation of the air supplied to the several apparatus is necessary.

Our present application has on the discharge side of the fan a system which provides air for a plurality of separators or cleaners and the system is so designed that repeated air adjustments can be had on any of the several separating or cleaning units without affecting the regulation of any of the other units.

The present application deals with the combination of the one-fan air supply system for a plurality of pneumatic separators or cleaners with a dust collecting system for the separators or cleaners.

It however will be necessary to go into somewhat of a description of the air supply system as well as the dust collecting system.

In the drawings:

Figure 1 is a perspective view, part in section, showing our present improvement.

Figure 2 is an enlarged top plan view of the automatic air controlling device placed at the inlet end of the tube 3.

Referring now to the drawings:

1 indicates an ordinary centrifugal fan having its suction side provided with a suitable pipe 2 and its discharge side provided with a suitable pipe or conduit 3. The fan 1 may be of any type desired and driven in any suitable manner such as through the medium of a belt, motor or the like.

Leading off from the discharge conduit 3

are a plurality of supplemental air conduits 4 which provide air to the several separators or cleaners (not shown) located preferably above the main conduit. It will be understood however that the position of the separators or cleaners can be made as desired.

Positioned in each of the supplemental conduits 4 there is a regulating gate or valve 5 for controlling the air supply to each of the separating or cleaning units. The position of this valve is not material so long as it is at some point between the main air conduit and the unit, the air supply of which it controls.

Located at the end of the main air conduit 3 is an automatic relief valve composed of an open ended housing 6 in which are mounted upon vertical shafts 7 two gate valves 8. The upper ends of the shafts 7 are provided with segments 9 to which are fastened a chain or belt 10 which passes around suitable pulleys 11, 12 and 13 and carries upon its end the weight 14.

To make our air supply side of the system operative the main conduit 3 must be of a sufficient size to provide an air volume sufficient for the desired number of outlets through the several separator or cleaner conduits. The fan must be of a capacity to provide an amount of air in excess to the maximum air capacity of the several units of separators or cleaners.

Turning now to the dust collecting system we find that the suction side of the fan communicates with a dust collector 15 through the intake pipe 2 of the fan and that the dust collector is provided with an intake pipe 16 and having a plurality of supplemental conduits 17 which are provided at their ends with dust suction hoods or boots 18, which are positioned above the several cleaners or separators to receive the dust laden air as it rises from these apparatus.

The dust collector 15 may be of any desired construction common to the art and can be provided as desired with a dust outlet 19 which can be put in communication with a conveyer or bin for carrying off the dust product.

The end of the dust collecting conduit 16 is provided with a regulating gate or valve 20. Ordinarily more volume of air is required for the operation of a battery or series of pneumatic separators or cleaners than is required for the efficient operation of a dust collecting system. For this reason when an excess amount of air is provided over what is used in the operation of the several separators or cleaners a sufficient volume of air is available on the suction side of the fan to efficiently operate the dust collecting system. We have found in certain cases additional air must be admitted to the suction side of the system in excess to the volume of air admitted through the dust collecting

hoods or boots in order to provide a sufficient volume for the efficient operation of the separating equipment. In order to secure this needed volume the dust collecting conduit 16 is provided with a regulating gate or valve 20 in its end so that air can be admitted as desired to the suction pipe. This is advantageous for the reason that it is advisable to use a large volume of air at a high velocity for moving the dust through the horizontal pipes. It will be readily seen that the volume of air in the dust collecting system can be added to, as desired, through the medium of the control valve 20.

From the foregoing it will be seen that the fan 1 must have a capacity in excess to the total air requirements of both the dust collecting system and the air supply system.

The operation of the combined system is as follows: the fan 1 which has an excess capacity as described is operated at a speed suitable to provide the necessary air velocity on its suction side to efficiently operate the dust collecting system. The air inlet control or gate 20 of the suction conduit 16 is regulated to admit whatever additional air is needed in excess to the air entering the suction hoods or boots 18.

The hoods or boots collect the dust arising from the several separator or cleaner units of the mill or at any other points where it may be desired to place a suction hood. The dust laden air entering the suction boots is conveyed to the dust collector or separator 15 where the dust is removed from the air and is conveyed through the outlet 19 of the separator to a suitable bin or the like.

The purified air now passes from the separator 15 to the suction side of the fan through the suction inlet pipe 2 and is discharged from the fan into the discharge conduit 3. The fan is delivering air into this discharge conduit in excess to the amount needed for the several separator or cleaning units. The amount of air needed by each of the units is adjusted through the medium of the regulating valves or gates 5 and as the total volume of air consumption of all of the units is less than the volume of air supplied by the fan this excess air forces the gates 8 of the relief valve open, overcoming the force of the weight 14, and thus escapes into the atmosphere or to waste.

Upon any adjustment of the valves 5 to regulate the air delivery to any separator or cleaner the air escape past the gates 8 will be increased or diminished in relation to whether or not the air delivered to the separator or cleaner is increased or diminished.

It will be seen that the system as a whole can be maintained in perfect balance. The adjustment of the valves 20 on the suction side of the system regulates the intensity of the suction at each suction hood or boot in addition to supplying more or less volume

for the efficient operation of the dust collecting system. The air supply system on the discharge side of the fan is automatic regardless of the amount of air handled by the suction side of the fan as only the desired amount of air needed for the operation of the several separators or cleaners passes to these units and the excess volume of air passes the gates 8 to the atmosphere or to waste.

The many advantages of our system and its value will be readily realized by those skilled in the art. One fan can be made to take care of a battery of pneumatic separators or cleaners both as to air delivery for their operation and as to air suction for taking care of the dust laden air which rises from them. The advantage of this is obvious when heretofore a separate fan has been used for each separator or cleaner and a separate fan for each dust collecting system.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. An air supply for a plurality of pneumatic separators and a dust collector, comprising a fan having a greater capacity than that required by the system, an air supply conduit connected with the outlet end of the fan having a plurality of connections with the separators, a dust collector conduit having a plurality of dust collectors, a dust separator connected with the dust collecting conduit, the suction side of the fan connected with said dust separator, and automatic means for controlling the amount of air pressure within the said air conduit, whereby a single fan operates a plurality of suction devices and supplies air to a plurality of separators.

2. An air supply and a dust collector comprising an air supply pipe having a plurality of outlets connected with a plurality of separators, a dust collecting tube having a plurality of dust collectors, a dust separator connected with the dust collecting tube, a fan having greater capacity than that required by the said system, having its outlet connected with the air supply and its suction side connected with the separator, said dust collector tube having means for controlling the air admitted thereto and to the said fan, whereby the suction in turn can be controlled for the purpose specified.

3. An air supply and dust collecting system for a plurality of dust collectors for pneumatic separators, comprising an air supply tube having a plurality of connections for a plurality of separators, a suction tube having a plurality of dust collectors, the outlet end of the dust collecting tube connected with an air separator, and a fan having a larger capacity than the system requires having its outlet side connected with

the air tube and its suction side connected with the said separator, the said air tube having automatic means for controlling the pressure therein, and the suction tube having means for controlling the air thereto, whereby the amount of air admitted to the suction tube can be controlled according to the amount of air supplied to the separators.

4. An air supply and a suction system for a plurality of separators comprising an air tube having a plurality of connections for a plurality of separators, a dust collecting tube having a plurality of dust collecting devices, and a dust separator connected with the outlet end of the dust collecting tube, a fan having greater capacity than that required by the said system having its outlet side connected with the air supply tube and its suction side connected with the said separator, the air supply tube provided with means for controlling its pressure and its connections provided with means for controlling the supply of air to the individual separators and the inlet of the dust collecting tube having means for controlling air thereto, whereby an increased or decreased amount of air can be fed to the dust collecting tube according to the amount of air passing from the said air supply tube.

5. An air supply and a dust collector for a plurality of pneumatic separators comprising an air tube with connections for a plurality of separators, a dust tube having a plurality of hoods, the dust tube connected with the separators, a fan having its outlet side connected with the air supply tube and its suction side connected with the separators, and means for controlling the air supply whereby a single fan is made to serve for a plurality of separators and dust collectors.

6. An air system for a plurality of pneumatic separators comprising a conduit pipe having a plurality of outlets to be connected respectively to the separators, a fan having its outlet connected with the said conduit, the fan being of a capacity in excess of the capacity required by the combined separators, each separator outlet having a manually adjustable valve, and the said conduit provided with a valve controlled by the pressure of air therein, whereby the pressure in the conduit is maintained at the desired degree irrespective of the adjustment of the manual valves in the outlets.

7. A dust collector and air supply system for pneumatic separators comprising a conduit having a plurality of connections with the respective separators, a dust collecting pipe having a plurality of connections of dust collecting parts located above the said separators, a dust collector connected with the dust conduit, a fan having its outlet connected with the conduit and its inlet connected with the dust collector to take the purified air therefrom, the fan having a

- capacity in excess of the capacity necessary for the air supply and dust collecting units, the dust collecting unit having a valve controlling the amount of air drawn through it, the conduit air supply having a pressure escape valve for regulating automatically the pressure therein, whereby the air for the dust collecting and air supply system is regulated.
- 10 8. A dust collecting and air supply system for pneumatic separators comprising an air supply pipe having a plurality of outlets to be connected with the separators, a dust collecting pipe having a plurality of dust collectors for the separators, a dust collector connected with the dust conduit, a fan having its outlet connected with the said air supply and its inlet connected with the dust collector at a point to take the purified air therefrom and feed it through the air pressure supply pipe for the separators, the air pressure conduit and the dust conduit each having valves, one of the said valves being controlled by the air passing through it and thus balancing the system.
- 25 In testimony whereof we hereunto affix our signatures.
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