

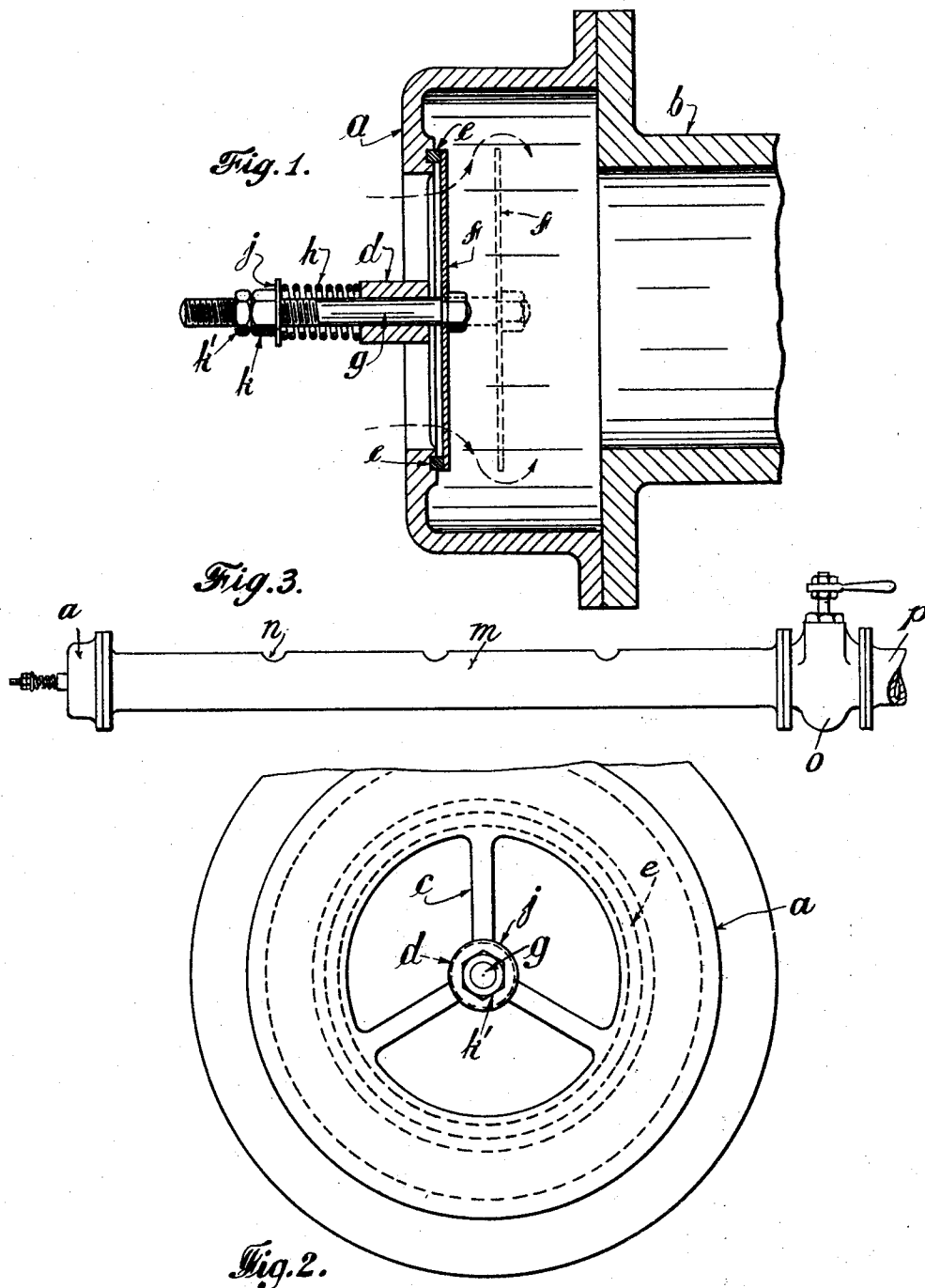
Feb. 7, 1933.

W. A. SMITH

1,896,597

AIR CONTROL VALVE FOR PNEUMATIC CONVEYERS

Filed Oct. 27, 1928



Inventor:
William Allen Smith.
By his Attorney: Walter Funn

UNITED STATES PATENT OFFICE

WILLIAM ALLEN SMITH, OF MANCHESTER, ENGLAND, ASSIGNOR TO PNEUMATIC CONVEYANCE & EXTRACTION (1929) LIMITED, OF LONDON, ENGLAND, A COMPANY OF GREAT BRITAIN

AIR-CONTROL VALVE FOR PNEUMATIC CONVEYERS

Application filed October 27, 1928, Serial No. 315,536, and in Great Britain November 5, 1927.

This invention relates to apparatus for the pneumatic conveyance of granular, powdered and like materials and in particular to control valves for the conveying medium.

In the pneumatic conveyance of materials, the quantity of air, which is the usual conveying medium, required for obtaining suspension and conveyance of the material, varies with the nature of the material and in particular with the size of the individual pieces of the material and the interstices between them. For instance, in vacuum conveying apparatus and under certain conditions, in which the weight of the material is a relevant factor, and when the material is of relatively large size, say $\frac{3}{8}$ inch or $\frac{1}{2}$ inch cube, only a very small quantity of auxiliary air is required i. e. air separately admitted in addition to that which enters through the interstices of the material.

The object of the present invention is to provide means whereby automatic control of the proportion of the conveying medium may be obtained so as to increase the efficiency of the plant by reducing power losses by maintaining efficient conditions of conveyance.

According to the invention an automatic control valve is provided operating with variations of pressures to regulate the admission of auxiliary air.

The invention is particularly applicable to apparatus for flue dust extraction as shown in British Patent No. 281,811 in which the pipes are usually arranged to be across the width of water tube boilers, with a valve at each end, the one at the far end being an air valve to admit auxiliary air for conveyance for the material. With such apparatus it is necessary for the operator to open both the valves before the extraction can be effected. As the completion of the extraction is reached, some of the inlet apertures become exposed and an excess of air is admitted to the conveying passage. With the improved automatic valve fitted at the end of the pas-

sage, the valve closes progressively with the exposure of the inlets as the degree of vacuum falls and so acts to maintain the efficiency of the conveyance.

The accompanying drawing shows a preferred example of the invention, in which:—

Fig. 1 is a sectional side elevation.

Fig. 2 is an end elevation, and

Fig. 3 shows an arrangement for the use of the valve shown in Figs. 1 and 2.

As illustrated the valve is arranged in a flanged cover *a* adapted to be secured to the end of the conveying pipe *b*. Centrally of the cover is a circular aperture with three radiating webs *c* to support a small central boss *d* for the stem of the valve. On the inner end of the cover and around the circular aperture is a flat annular seating or packing *e* held in a groove, and of any suitable material. The valve consists of a flat metal disc *f*, secured on the end of a spindle *g* which is a sliding fit in the central boss *d* of the cover, on the outer end of which spindle is arranged a spring *h*, washer *j*, adjusting nut *k* and locking nut *k'*, whereby the initial pressure on the valve may be adjusted, the spring *h* acting to hold the valve disc *f* on to the seating *e*.

Obviously the particular constructional details of the valve may be varied without departure from the nature of the invention as already set out above.

As shown in Fig. 3 the valve is particularly applicable to apparatus for flue dust extraction as covered by British Patent No. 281,811. The valve is shown attached by its casing *a* to one end of a length of piping *m* which is shaped and formed with inlets *n* as described in the aforesaid British patent. The pipe is connected through a manually operable control valve *o* with the suction pipe *p*. The piping *m* is usually arranged across the width of water tube boilers with a manually operable control valve such as *o* at each end but the use of the automatic air in-

let valve gives a better control of and a new result in effecting the pick-up of the material by the balancing of the volume of draft and the suction assisting the entrance of the material at the inlets *n*.

In operation, on opening the main valve *o*, the disc *f* of the automatic valve would be drawn off its seating *e* to an extent proportional to the existing degree of vacuum in the conveying pipe *m* and in proportion to the setting of the adjustable spring *h*.

The use of the valve is not limited to the particular application above described, for instance in some existing installations an auxiliary air supply is used at points other than at the inlet of the material, and the automatic valve may be used in such positions.

From the foregoing it will be obvious that the valve may be used in many instances with considerate advantage. In the example above described there would be an economy effected in the time of the operator, a reduction of the possibility of air leaks into the steam-raising unit and a saving in power in the extracting apparatus.

What I claim is:—

1. In apparatus for effecting the pick-up of powdered, granular, and like materials, for pneumatic conveyance, wherein the material entering a pipe at one point is exposed to a draft of air entering the said pipe from an inlet valve at another point beyond the said entrance for the material, means for effecting the automatic balancing of the volume of the draft and of the suction assisting the entrance of the material, comprising a self-opening spring-loaded inlet valve as set forth.

2. In apparatus for effecting the pick-up of powdered, granular, and like materials for pneumatic conveyance, according to claim 1, adjustable means for regulating the tension of the loading spring for the valve, as set forth.

In testimony whereof I have signed my name to this specification.

WILLIAM A. SMITH.