(No Model.)

A. C. LYNCH & G. W. CHRISTOPH.

AIR RELIEF FOR FAN DISCHARGE PIPES.

No. 547,793. Patented Oct. 15, 1895.

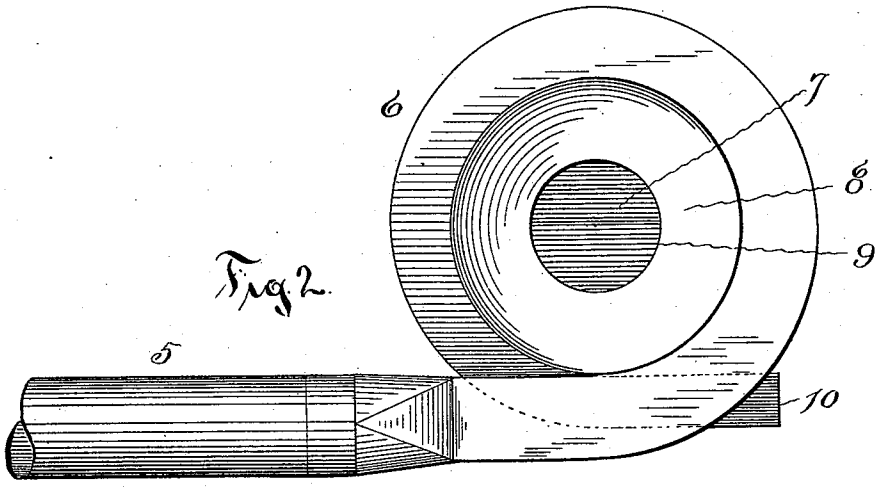


Fig. 2.

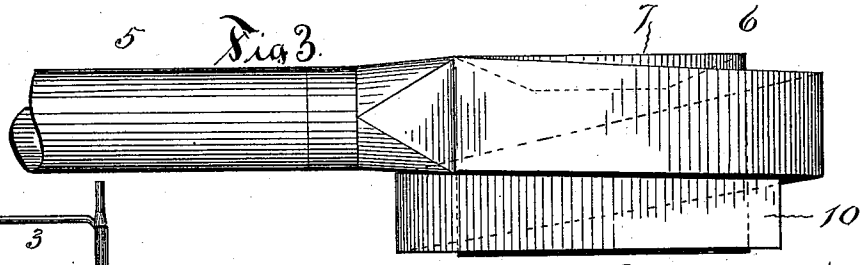


Fig. 3.

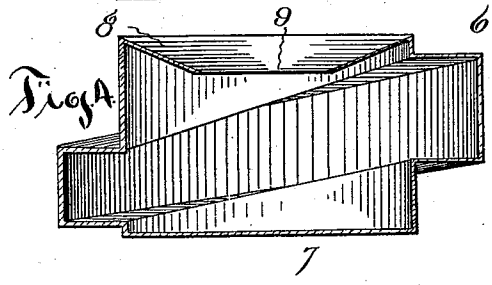


Fig. 4.

Fig. 1.

Witnesses.
Fred H. Smith.
E. J. Hyde.

Inventors
Arthur C. Lynch &
George W. Christoph, by
Harry P. Williams, atty.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

UNITED STATES PATENT OFFICE.

ARTHUR C. LYNCH, OF NEW YORK, N. Y., AND GEORGE W. CHRISTOPH, OF HARTFORD, CONNECTICUT.

AIR-RELIEF FOR FAN DISCHARGE-PIPES.

SPECIFICATION forming part of Letters Patent No. 547,793, dated October 15, 1895.

Application filed February 5, 1895. Serial No. 537,331. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR C. LYNCH, residing at New York, in the county of New York and State of New York, and GEORGE W. CHRISTOPH, residing at Hartford, in the county of Hartford and State of Connecticut, citizens of the United States, have invented certain new and useful Improvements in an Air-Relief for Fan Discharge-Pipes, of which the following is a specification.

The invention relates to the discharge-pipes of fans, blowers, exhausters, or other air-current producers that are placed in wood-working factories, saw and planing mills, polishing and buffing rooms, foundries, sugar-houses, pulp and paper mills, dye-houses, fertilizer-works, shoe-factories, and such places for removing odors, dust, chips, shavings, and other particles which are cut, disintegrated, abraded, or otherwise result from the operation of the tools or machines.

The object of the invention is to provide a relief or air-escape for the discharge-pipes of such fans, so as to reduce the amount of air required to be blown completely through the discharge-pipes, thereby economizing power and also enabling the better and easier handling and disposition of the dust, shavings, chips, lint, wool, or other cut, disintegrated, or abraded particles which are collected by the fans.

Referring to the accompanying drawings, Figure 1 is a diagram view of an exhaust and blower pipe system provided with the air-relief. Fig. 2 is an enlarged plan of the air-relief. Fig. 3 is an edge view of the relief, and Fig. 4 is a section of the same.

In the views, 1 indicates a fan, blower, exhauster, or other air-current producer, of common form and construction, which may be run by any ordinary means. Into this fan opens a suction-pipe 2, that has branch pipes 3, leading from the collectors 4, placed in the proper position adjacent to the several tools or machines the resulting chips or dust of which it is desired to collect and deliver at a distance. From the fan leads the discharge-pipe 5. The suction-pipe is, of course, of sufficient size to enable the fan to economically move the necessary amount of air for collecting the particles of material to be removed, and the discharge-pipe is proportionately large. After a suitable column of air for collecting and conveying the material has been set in motion and the particles of material being removed are under sufficient headway in the discharge-pipe, if the pressure of air is relieved, so that there will be no undue friction on the pipes, the particles can be compacted, reduced in volume, or made to occupy less space by decreasing the size of the pipe, and this effects a saving in piping and enables the material to be better handled with a smaller expenditure of power than with the use of a continuously-large discharge and delivery pipe. To enable such a reduction in the size of the discharge-pipe, so that the delivery-pipe may be smaller and so that less power will be required for blowing the material a distance to the outlet at the desired locality, the relief or air-escape 6 is located in the discharge-pipe, preferably no great distance from the fan.

The relief or air-escape may be formed by bending a portion of the discharge-pipe or an independent section of pipe attached to the discharge-pipe into a circular coil and opening a part of the coiled portion of the pipe in any desired manner, preferably by cutting away either a part or all of the walls around the inside of the circle, so that it communicates with a central cylindrical drum or chamber 7, that usually has an inward-projecting cover 8 with a central opening 9. This section of pipe, which may be of any desired number of coils, preferably is made rectangular in cross-section and tapering from the size of the discharge-pipe to the desired size of the delivery-pipe 10, that leads from this air-relief to any locality where it is desired that the particles of material conveyed by the air-currents shall be delivered.

With the fan in operation all dust, chips, shavings, lint, wool, or other particles that result from the operation or use of the tools or machines to which the collectors are applied is collected through the branch pipes and the suction-pipe and then blown into the discharge-pipe. As the air-currents, laden with the particles which are being conveyed away, reach the coil of the relief and move around it, the particles travel close to the out-

side wall and pass into the reduced delivery-pipe. The inertia or centrifugal motion first imparted to the particles causes them to hug the outside wall of the circular part of the discharge-pipe or relief in such manner that none escape into the cylindrical drum or chamber; but as the size of the discharge-pipe is decreased and the space occupied or volume of solid-matter particles is reduced all of the air that is blown from the fan into the discharge-pipe cannot pass into the reduced delivery-pipe without causing great friction and back-pressure. This excess of air escapes from the coil into the cylindrical drum, from which it passes out through the opening in the top wall or cover.

The cylindrical drum shown in the drawings has parallel side walls and is entirely closed at the bottom and nearly closed at the top by a re-entrant portion which has a central opening. If the material, such as chips or shavings, which is being rapidly driven by the air-currents through the discharge-tube does not happen the first time to pass out through the reduced end of the coiled portion, or if the particles collide or bound against the side walls in such manner as to be thrown out of the tube into the central drum, they are kept in there until the suction of the whirling air that passes around through the tube again draws the particles into the tube and sends them on into the discharge-pipe. Of course, when drawing chips or shavings the volume is not always equal, as sometimes there will be more and sometimes less chips, and if there is such a large volume of shavings or chips at any one time that all cannot or do not pass out of the reduced outlet-tube the portion that thus cannot pass out will be crowded into the drum and it will revolve around until the tube has cleared itself, and then will in turn pass on when the congestion is reduced, for the material that accidentally or otherwise escapes from the coiled portion of the tube into the drum cannot drop out of the drum onto the floor of the department in which the device is located. By means of this arrangement the delivery-pipe can be very much reduced in size, causing a saving of material and a reduction of space occupied, and this also enables a better control of the material, for when condensed in volume it can be more easily handled, while the power necessary to operate the fan and blow the particles is also reduced, for less air will be required to blow the material the distance required. The excess air which could not enter the reduced delivery-pipe without much increasing the power required to force it through freely escapes without the heavy particles through the air-relief, as described, and the solid particles continue their movement to the end of the delivery-pipe whether it be at the door of a furnace or at a refuse heap.

We claim as our invention—

1. In combination with a fan, a discharge pipe for such fan having an inlet end and a discharge end that is smaller in cross sectional area than the inlet end, said pipe being formed into a coil between the inlet end and the discharge end with a cylindrical drum located within the coiled portion, and a part of the inner wall of the coiled portion of the discharge pipe being open into the drum, substantially as specified.

2. In combination with a fan, a discharge pipe for such fan having an inlet end and a discharge end, said pipe being formed into a coil between the inlet end and the discharge end and said coil being gradually reduced in cross sectional area as it extends toward the discharge end, with a cylindrical drum located within the coiled portion, and a part of the inner wall of the coiled portion of the discharge pipe being open into the drum, substantially as specified.

3. In combination with a fan, a discharge pipe for such fan having an inlet end and a discharge end that is smaller in cross sectional area than the inlet end, said pipe being formed into a single coil between the inlet end and the discharge end, with a cylindrical drum having an opening through one end only located within the coiled portion, and a part of the inner wall of the coiled portion of the discharge pipe being open into the drum, substantially as specified.

4. In combination with a fan, a discharge pipe for such fan having an inlet end and a discharge end that is smaller in cross sectional area than the inlet end, said pipe being formed into a coil between the inlet end and the discharge end, with a cylindrical drum having a re-entrant perforated top and a closed bottom located within the coiled portion, and a part of the inner wall of the coiled portion of the discharge pipe being open into the drum, substantially as specified.

ARTHUR C. LYNCH.
GEO. W. CHRISTOPH.

Witnesses for Arthur C. Lynch:
E. E. CUNKLER,
S. D. MAXWELL.

Witnesses for Geo. W. Christoph:
H. R. WILLIAMS,
SCOTT H. SMITH.