

(No Model.)

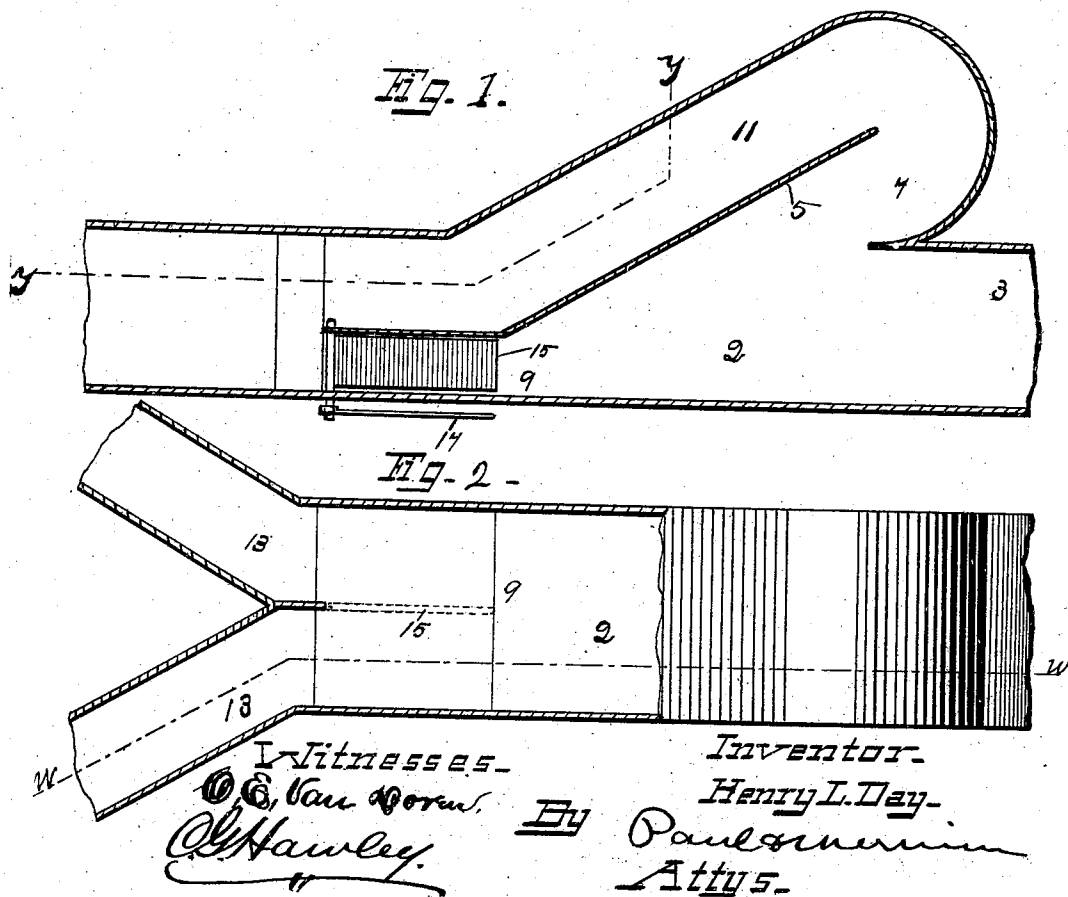
2 Sheets—Sheet 1.

H. L. DAY.

RELIEF VALVE FOR SUCTION OR BLAST PIPES.

No. 503,126.

Patented Aug. 15, 1893.



(No Model.)

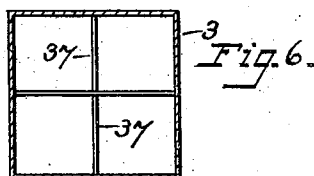
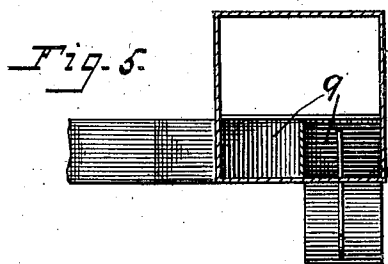
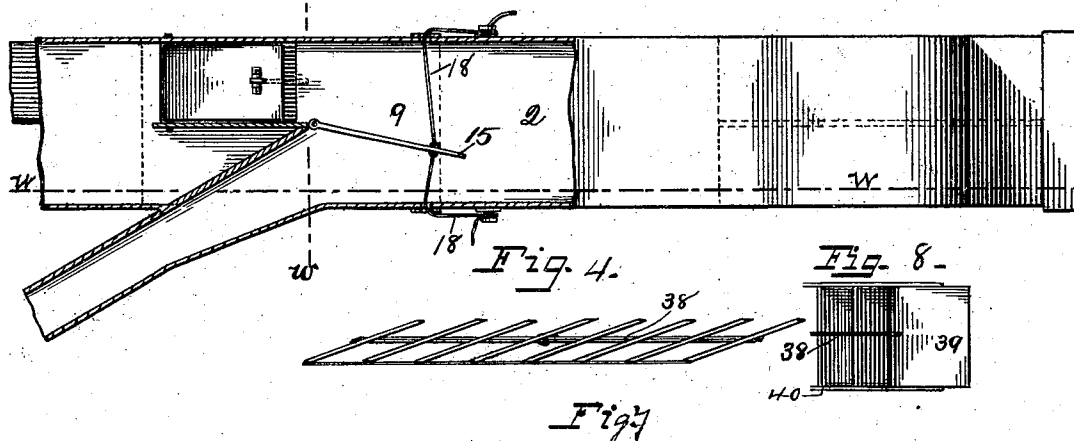
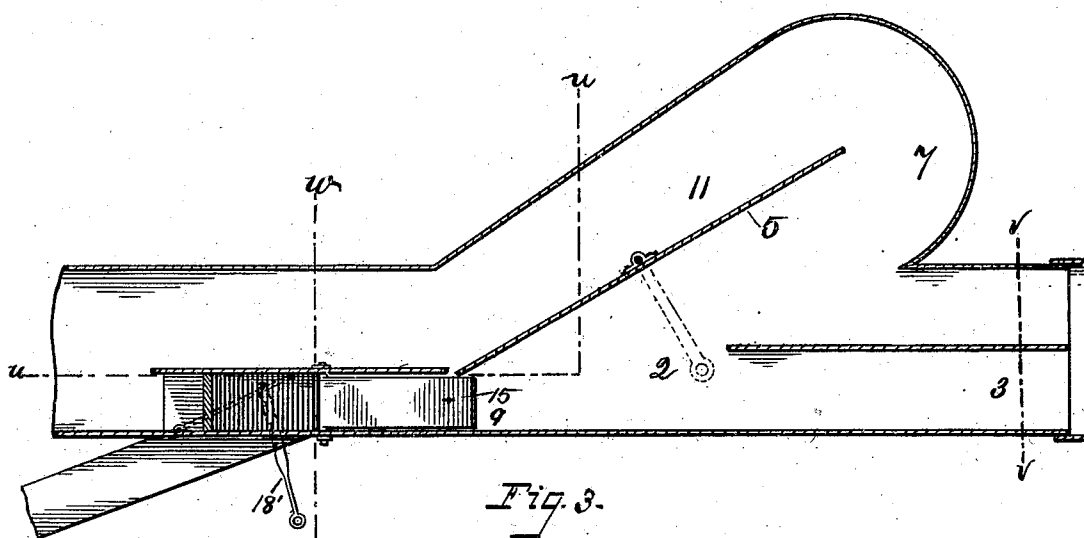
2 Sheets—Sheet 2.

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RELIEF VALVE FOR SUCTION OR BLAST PIPES.

No. 503,126.

Patented Aug. 15, 1893.



Witnesses.

C. Hawley.
C. C. Van Dorn.

Inventor

Henry I Day-

By Paul H. Merwin Atty.

UNITED STATES PATENT OFFICE.

HENRY L. DAY, OF MINNEAPOLIS, MINNESOTA.

RELIEF-VALVE FOR SUCTION OR BLAST PIPES.

SPECIFICATION forming part of Letters Patent No. 503,126, dated August 15, 1893.

Application filed February 24, 1891. Serial No. 382,406. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. DAY, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Relief-Valves for Suction or Blast Pipes, of which the following is a specification.

My invention relates to relief valves for use in connection with the suction or blast pipes for conveying material, such as saw-dust, shavings or dust from the machines in wood-working shops, elevators, or other places, to storage rooms or to boiler furnaces or to other suitable receptacles for such material.

In shops, mills and factories employing wood-working machinery, and in elevators and other places employing machinery where dust and light material are freed, it is customary to provide suction-pipes connected with suitable fans arranged to draw the shavings, saw-dust and light material from the machinery, and to pass them from the fans through suitable blast-pipes and to convey this material to suitable storage rooms, or other receptacles, and generally to convey all or part of the material to the furnaces that generate the power for driving the machinery of the plant.

Considerable difficulty has heretofore been experienced in properly separating the material from the air so as to direct the desired quantities to the furnaces and storage rooms without, at the same time, creating a back pressure on the fans or directing too great a quantity of air into the furnaces, or storage rooms, or permitting considerable fine dust to escape with the air.

In conveying the shavings and light material the pipes through which they pass must be of sufficient area to permit the blast of air carrying the shavings to pass freely along in the pipes with the shavings and light material practically held in suspension in the air current.

In dividing the material and determining the direction that it is to take, it is desirable to separate the material from the greater portion of the volume of air so as to bring it into a smaller compass and thereby make it more readily divisible and this must be done without permitting any impediment to the free passage of the air as otherwise a back pressure on the fans will be created.

The object of my invention is to provide a

relief valve adapted first to separate the shavings or other light material from the greater part of the volume of air with which it is carried along in the pipes from the fan; second, to direct and to regulate the quantity and flow of the material thus separated from the main body of air; third, to direct the air either into suitable escape pipes or to return it to the pipes in which the shavings or other material is conveyed; and fourth, to accomplish these results without creating any back pressure on the fan or fans.

My invention consists in providing a valve chamber having a main inlet opening, a double or divided outlet opening, and an expansion chamber of considerable size between the inlet and outlet openings, in combination with a suitable retarding and deflecting plate, slats, wall or partition adapted to deflect the shavings or other light material with a portion of the air and direct it to the outlet designed for it and compelling the remaining volume of air to find an escape through the outlet designed for it.

My invention will be more readily understood by reference to the accompanying drawings in which—

Figure 1 is a vertical sectional elevation of a valve or valve box embodying my invention. Fig. 2 is a sectional plan view thereof taken upon the line $y-y$ of Fig. 1. Fig. 3 is a vertical section showing a modified form of the valve, and means for directing the material. Fig. 4 is a plan view of the same partially in section as seen from line $u-u$ of Fig. 3. Fig. 5 is an end elevation as seen from the line $w-w$ of Figs. 2 and 4. Fig. 6 is an end view upon line $v-v$ of Fig. 3. Fig. 7 shows a plan view and Fig. 8 is a partial elevation of a modified form of deflecting and retarding partition.

In the drawings, 2 represents the main valve chamber and 3 the inlet leading thereto. This inlet is connected when the device is in use with the blast pipe by which the material is conveyed from the fan or fans. The valve chamber is provided with a suitable deflector 5 by means of which the shavings or light material is deflected and brought into small compass so that it may be divided and directed to any desired point. An expansion chamber 7 is arranged in connection with the

main-valve chamber and between the inlet and the deflector, so that the air which enters the valve chamber may expand into this expansion-chamber and escape therefrom without passing through the opening or openings 9 through which the shavings pass. The opening 9 is arranged at the end or foot of the deflector and is of considerably less area than the inlet opening of the valve chamber, so that the shavings and light material striking the deflector are directed through this opening while the surplus air current escapes into the expansion chamber, and through an opening 11 connected therewith. The opening 11, as shown in Figs. 1 and 2 connects with the outlet pipes on the other side of the opening 9 or it may, as shown in Figs. 3 and 4, connect with a portion of the outlet pipes but not with all. In every instance, however, the air that cannot pass out through the opening 9 finds ready egress through the opening 11. The air passes back into some one or more of the outlet pipes after the shavings have been separated and divided, and either passes along with the shavings or it passes along in a pipe from which the shavings have been cut off. I may provide two or more outlet pipes 13 with all of which the opening 9 is connected, as shown in Fig. 2. I provide a valve or valves 15 by means of which the shavings may be directed into any one of the outlet pipes or partly into one and partly into another. These valves are preferably arranged with handles or levers 17 or cords 18 by which they may be operated from the outside of the pipe. One or more outlet pipes 13 may branch off from the under side of the main outlet pipe, as shown in Fig. 3. In this instance the valve 15 will be arranged on a horizontal pivot and will form when in a horizontal position a portion of the bottom or floor of the main pipe. A notched lever 18' is provided for operating this valve and by this means the valve may be raised into the pipe in which position it will serve as a deflector to direct the material into the opening in the bottom of the main pipe and thus into the bottom pipe 13.

If preferred the deflector 5 may be pivotally mounted in the valve casing, as shown in Fig. 3, in which case the deflector may be turned so as to coincide with the wall of the inlet opening, and thus the air current will pass through the valve chamber without being acted upon by the deflector.

It is sometimes the case that the main delivery pipe enters the valve at an angle thereto, and that the velocity of the air is such as to tend to improperly distribute the shavings in the valve chamber. In order to avoid this difficulty I may provide partitions 37 within the inlet pipe 3, as shown in Fig. 6, by means of which the direction of the air currents is properly regulated.

The deflector may be made in a single piece or may be a slatted deflector, as shown in Figs. 9 and 10 in which the slats 39 lie in an angle nearly or quite corresponding to that

of the deflector 5, while the retaining ribs or frames 38 lie in a somewhat less angle. This whole device may be either pivotally or permanently secured within the valve box. As the shavings or dust strike against the inclined leaves or slats 39 it is deflected into the lower part of the box, while the accompanying air finds an easy escape between them into the expansion chamber.

The operation will be readily understood. In each form of relief valve the air current carrying the shavings or other light material is brought into the valve chamber. The deflector directs the material into the opening leading from the valve chamber, and this material being thus brought into a more compact form may be divided into any number of streams and directed into any number of passages or pipes. The surplus air-current freed from the shavings or dust passes through the expansion chamber and into the outlet connected therewith.

I claim as my invention—

1. The combination in a relief valve, of a valve chamber, a deflector and outlet opening to which the material is directed by said deflector, an outlet opening through which the surplus air escapes, a plate extending the full width of the valve chamber and separating said outlet openings, and an outlet pipe connected with both of said outlet openings.

2. The combination in a device of the class described, with the valve chamber, of an inlet pipe connected with said valve chamber, outlet openings for said valve chamber, two or more pipes each connected with both of said openings, a plate in said valve chamber separating said outlet openings, a deflector arranged to direct the material to one of said openings while the surplus air escapes through the other, and a valve or valves arranged to direct said material into said pipes in the desired proportions.

3. The combination in a relief valve, with a valve chamber provided with a suitable inlet and with suitable outlets, of a series of pipes connected with said outlets, one or more valves controlling the admission of material to said pipes, and a deflector for directing the material to one of said outlets while the surplus air is permitted to escape through the other outlet, substantially as described.

4. The combination in a relief valve, of the valve chamber provided with a suitable inlet, an outlet for material of less area than said inlet, a deflector arranged to direct the material into said outlet, said valve chamber being also provided with an outlet for the surplus air, a plate arranged in said valve chamber and separating said outlets, and a pipe having one or more branches connected with both of said outlets, and valves for directing the material into said pipe or branches in the desired proportions.

5. The combination with a valve chamber, of the inlet pipe 3 and the outlet pipes 13, the deflector arranged in said valve chamber, an

outlet opening to which material is directed by said deflector of less area than said inlet pipe said opening connecting with said pipes 13, and an outlet from said valve chamber 5 into said pipes 13 into which the surplus air can escape without passing under said deflector and a plate arranged in said valve chamber and separating said outlet openings.

6. The combination in a relief valve, of the 10 valve chamber provided with a suitable inlet, a transverse deflector arranged in and extending across said valve chamber, an outlet opening below said deflector to which the material is directed by the deflector, an outlet 15 opening above said deflector through which the surplus air escapes, a pipe or pipes connected to both of said outlet openings.

7. The combination in a relief valve cham-

ber provided with a suitable inlet, one or more outlets in the lower portion thereof, an inclined deflector arranged in and extending 20 across said valve chamber to direct the material to said outlets, a valve or valves to regulate the quantity of material passing to each of said outlets, an outlet opening arranged 25 above said deflector through which the surplus air escapes, and an outlet pipe connected to all of said openings to which the material is directed by the deflector.

In testimony whereof I have hereunto set 30 my hand this 20th day of October, 1890.

HENRY L. DAY.

In presence of—

A. M. GASKILL,
C. G. HAWLEY.