(No Model.)

2 Sheets—Sheet 1.

G. S. WILSON.

DUST COLLECTOR.

No. 516,171. Patented Mar. 6, 1894.

Fig. 1.

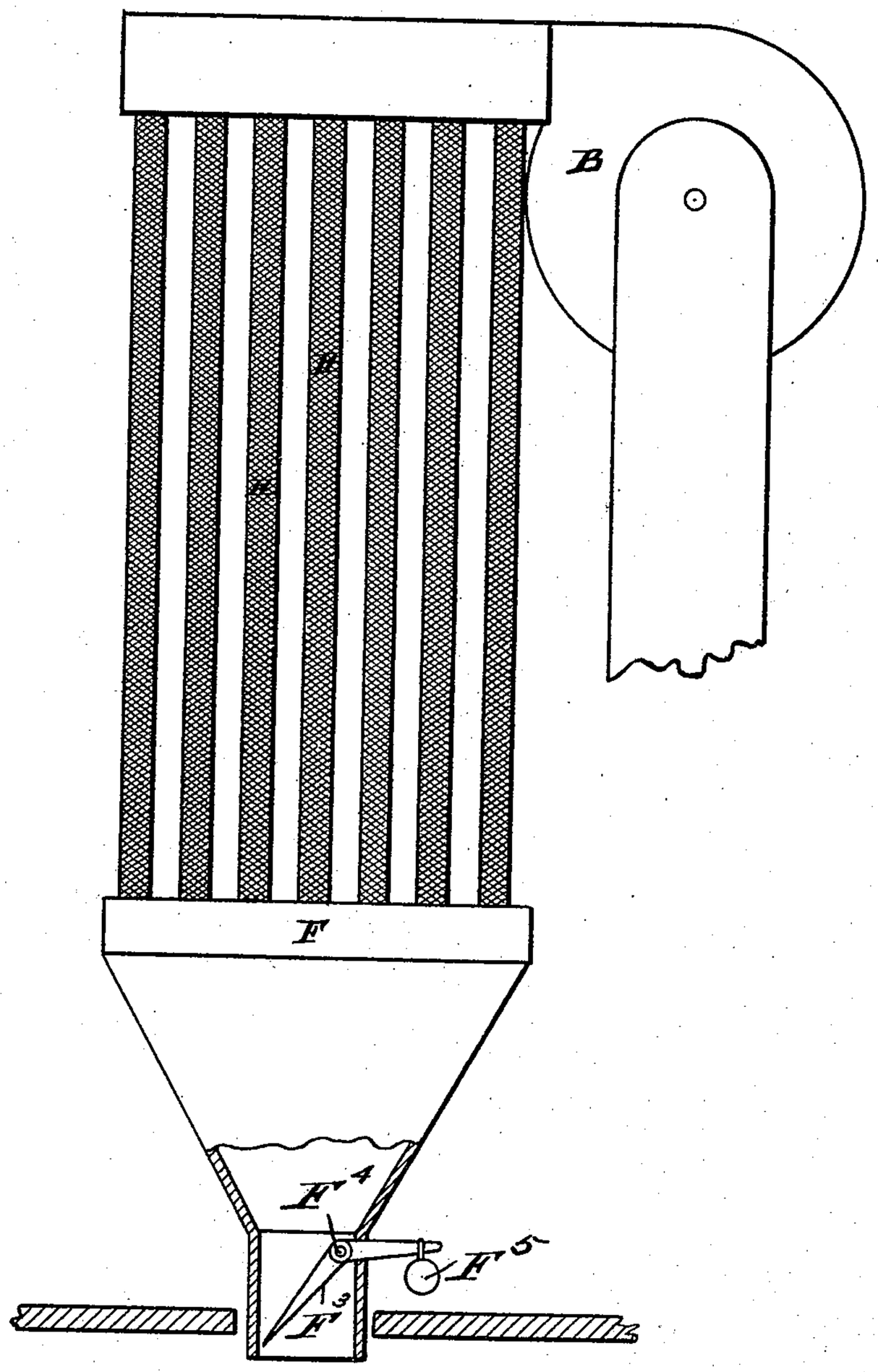
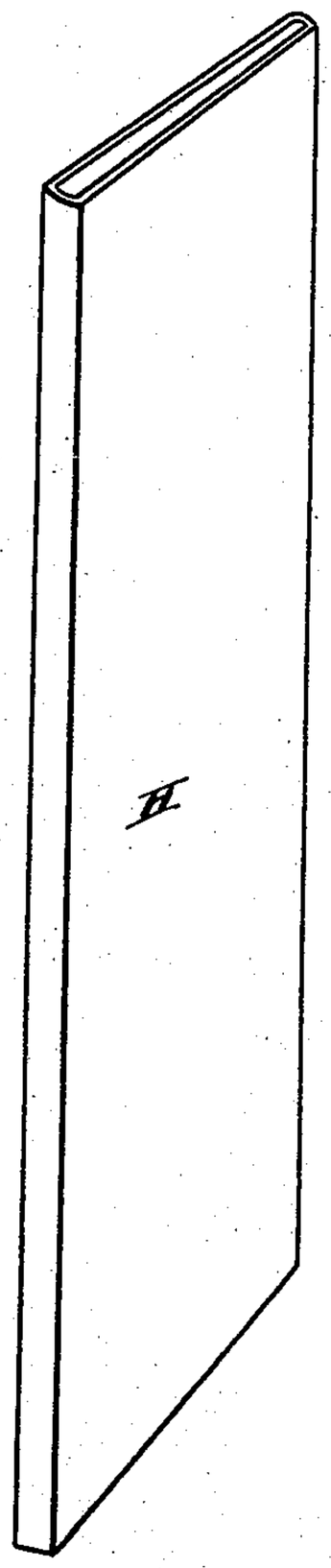


Fig. 5.



WITNESSES

H. Clough.

W. W. Bradford

INVENTOR

George S. Wilson

by Parker & Burton

his Attorneys.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

G. S. WILSON.

DUST COLLECTOR.

No. 516,171. Patented Mar. 6, 1894.

Fig. 3.

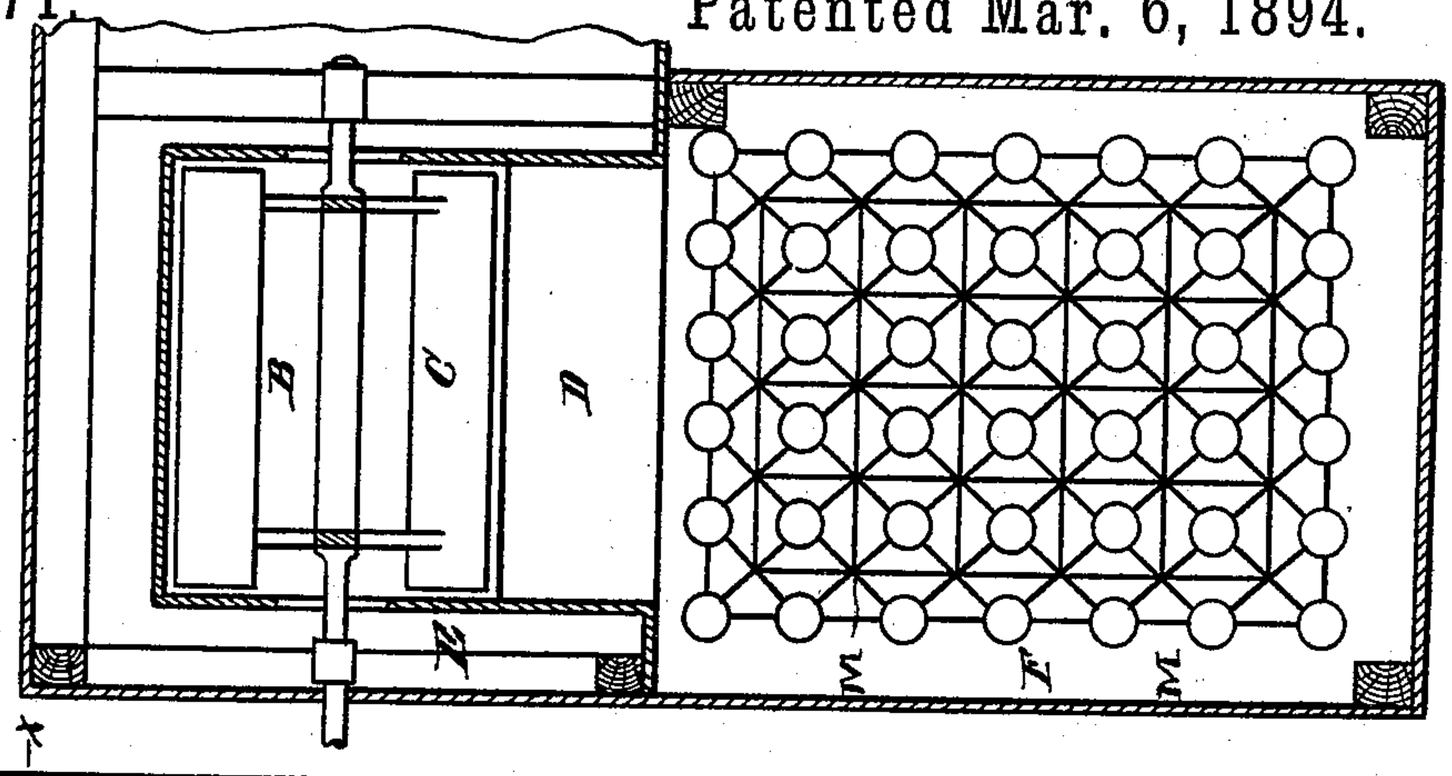


Fig. 2.

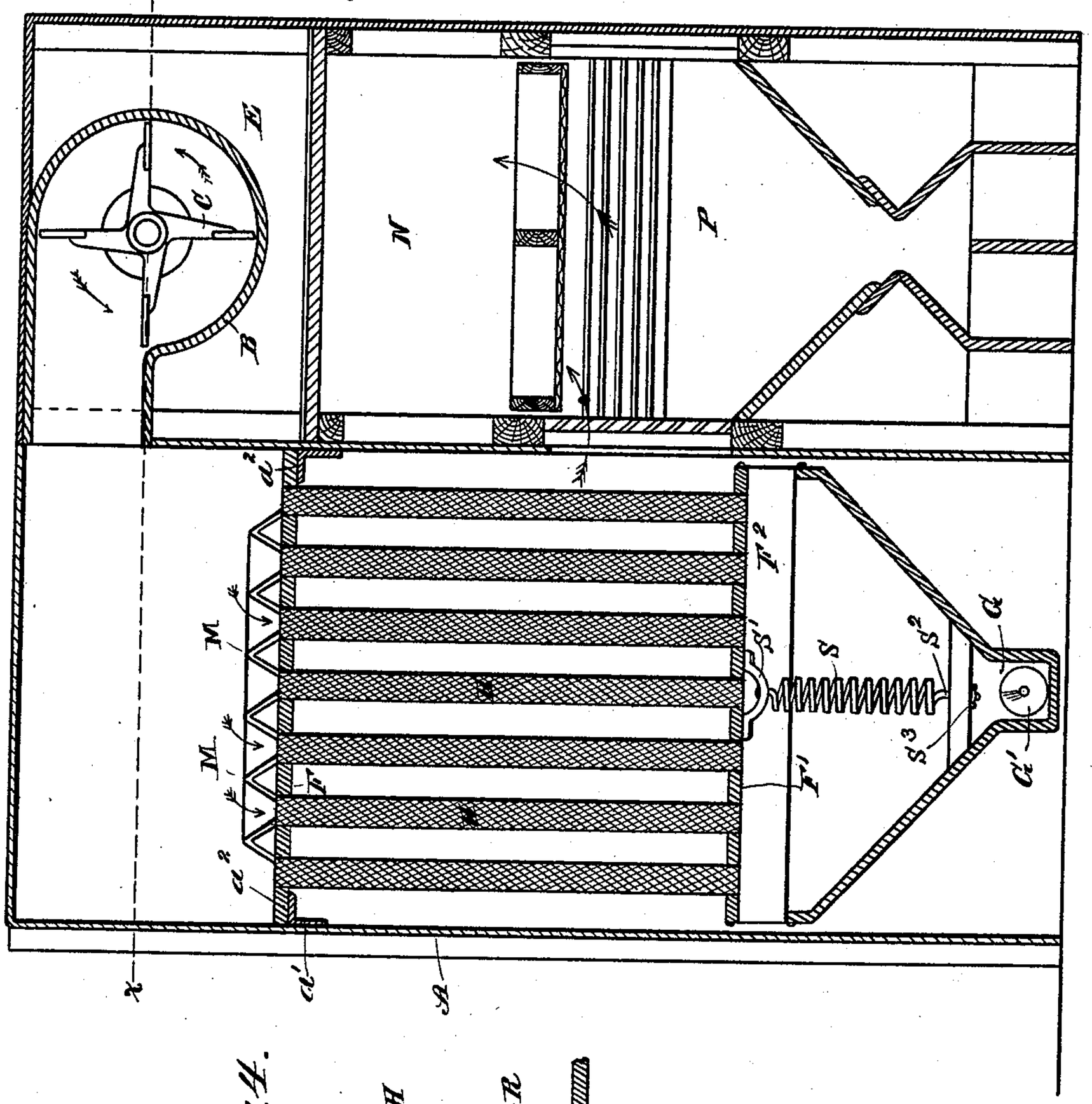
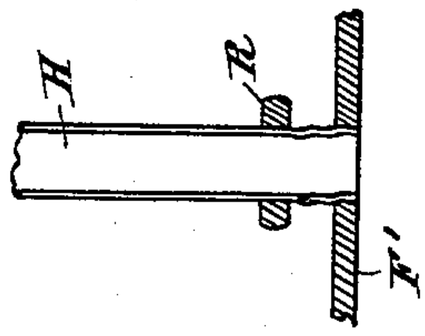


Fig. 4.



WITNESSES

H. Clough.

W. Bradford

INVENTOR

George S. Wilson

by Parker & Burton

his Attorneys.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE S. WILSON, OF TECUMSEH, MICHIGAN.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 516,171, dated March 6, 1894.

Application filed March 20, 1893. Serial No. 466,897. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. WILSON, a citizen of the United States, residing at Tecumseh, county of Lenawee, State of Michigan, have invented a certain new and useful Improvement in Dust-Collectors; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to dust collectors, and especially those employing canvas walls through which the air is forced and the dust strained therefrom; and consists in peculiar arrangements and combinations of the same with inclosing devices.

In the drawings, Figure 1 is a side elevation of one of my dust collectors, with fan attached. Fig. 2 represents a vertical section of the same connected to and operating with a middlings purifier of the ordinary construction,—the one known as the "George T. Smith middlings purifier" being selected for that purpose. Fig. 3 is a cross section upon line x—x of Fig. 2. Fig. 4 is a longitudinal section of a modification of the arrangement of the dust collector spouts or pipes, illustrating a variation merely. Fig. 5 is another modification of a dust collector.

In the drawings similar letters refer to similar parts.

A represents a case.

B represents the fan case, inclosing the fan C, both of which are of the ordinary construction, and will need no further description.

At D is an opening into the case A, communicating with the interior of the fan case, and through which the dust laden air is forced therefrom.

E is the wind trunk leading to the eye of the fan from the dust producing device of whatever character. In Fig. 2, this is shown to be a middlings purifier, and the wind trunk E leads to the space therein above the grading sieve.

F is a head, in shape and in size adapted to fit the interior of the case A. This head is perforated with holes, which may be either round, square, or rectangular, as shown in Fig. 3. Preferably, they are constructed of about two and a half inches in diameter, and circular in shape. At the lower end of the machine is a similar head F′.

G is a spout, trough, or receptacle, which is located underneath the machine, and which may contain, if desired, in its bottom, a conveyer, G′, as shown in Fig. 1.

Upon the inside of the casing A there is formed a ledge a', upon which depends the perforated head F, as shown at a^2 a^2 in Fig. 2.

Connecting the heads F and F′, are canvas tubes H, H; these tubes are fastened interiorly in the holes in the heads respectively, and are preferably from five to seven feet in length. As they are all of the same length, they connect the two heads by canvas flues in a manner very analogous to that of the two flue sheets of an ordinary tubular boiler. The upper ends of these canvas flues open into a space or air chamber in the casing A. The lower head F′ is so arranged that it falls slightly short of the upper edge of the hopper, and the two are connected by a canvas wall, although any elastic substance might be used, as rubber or leather.

In mounting the machine, the fan case and casing A are rigidly fastened in the mill, the head F is in place in the casing A, and depending therefrom are the canvas tubes H, H, connecting with and holding in suspension the head F′. The head F′ is then connected by the canvas wall with the hopper. It will be noted that the weight of the head F′ keeps the canvas tubes H, H, stretched, and prevents their wrinkling or being distended. This tension is an important feature of my invention. It is obvious that the head F′ can be made of any assignable weight, and, consequently, the tension upon the tubes can be adjusted, and thereafter will remain constant.

I have devised another means, which I have shown in Fig. 2, for adjusting the tension, and which, when adjusted, will still permit of the elasticity of the tubes as they may expand due to such tension, as it is well known that canvas under strain will stretch to quite a considerable extent. Some means must be provided to prevent such stretching from permitting the canvas to get loose and bag. Besides, I have discovered, in connection therewith, a very efficient means of cleaning, which could not otherwise be used, except the can-

vas were kept taut under all conditions. For this purpose, I place a strong spiral spring, S, under the center of the head F′, attached thereto by the hook S′. This spring is connected to an eye bolt, S^2, attached to a cross bar or other convenient means inside of the hopper, and where the same may be conveniently reached. At the lower end of the eye bolt, and upon the opposite side of the girt to which it is attached, is a nut S^3, the turning of which in the proper direction will increase the tension upon the spring S, and thereby increase the strain upon the tubes H H. The cloth wall F^2 connecting the lower head F′ and the upper edge of the hopper, prevents the air from expanding through underneath the head F′, after passing through tubes H, and, at the same time, affords a flexible connection between the two, so that any expansion of the tubes has no effect upon the connection itself.

It is obvious that the tubes H may be square, if desired, or they may be rectangular, as shown in Fig. 5. The other features would remain the same, and hence it is unnecessary to describe them with particularity. If desired to maintain a constant tension upon each tube separately, metal rings may be secured around the bottoms a short distance from the head F′, one of such rings being shown in Fig. 4, as R. By attaching it in that position to the tube, it would stretch the tube to which it is attached.

In order to prevent the lodging of dust upon the upper surface of the head F and between the perforations and mouths of the tubes, conical or prismatic caps are placed thereon, as shown at M, M. The bases of these caps preferably extend over the edges of the apertures in the head F, as shown in Fig. 2, for the purpose of preventing the too sudden action of the dust laden air upon that portion of the canvas adjacent to the head, and which would, if permitted, soon cut it out and destroy it. As shown in Fig. 1, the air is permitted to escape directly through the canvas pipes H, H, the pipes retaining the dust therein, which falls through to the hopper below, the air escaping into the surrounding atmosphere.

As shown in Fig. 1, an automatical discharge valve F^3 is provided, which consists of a flat valve pivoted at its upper edge at F^4, having an arm and a counterbalancing weight F^5. This valve is intended to keep the discharge passage from the dust collecting chamber substantially air tight up to any assignable pressure of the air; when the weight of the dust as it accumulates exceeds the weight of the counterbalance, the valve will open downward and permit the dust to be discharged, immediately returning to a closed position after such discharge. By this means, it will be observed, it is kept in a state of tension inside of the dust collector and the tubes corresponding with the resistance of the valve F^3.

As shown in Fig. 2, the devices are combined with a purifier, largely illustrating how it may be combined with any mechanism producing dust and operating by means of a closed air current. In this figure, N represents the body, as hereinbefore stated, of the George T. Smith purifier. As common with such devices, it possesses a grading sieve located therein, and through which the material to be bolted passes against a column of air which is drawn upward through the sieve, that being the essential operation of such machines. The wind trunk above the grading sieve communicates with the fan, as hereinbefore described, while a wind trunk P communicates with a continuation of the case A, inclosing the dust collector entirely from the atmosphere surrounding it. It is obvious that, on appropriately operating the fan, the air will be drawn through the grading sieve, carrying with it dust laden particles, forced into the dust collector, and forced through the walls of the tubes H H, leaving behind it the dust which falls into the hopper below. The air passing into the casing outside the tubes is drawn backward again into the purifier, through the wind trunk connecting therewith, to the space therein underneath the grading sieve. It will thus be observed that, as described, an essential feature in the operation of my dust collecting device is that the dust laden air is forced downward in the direction of the falling material into the dust collecting tubes, and, as it cannot pass out through the dust receptacle or hopper, it is compelled to pass through the walls of the tubes, which thus strain out the dust.

In all buildings containing machinery which create dust, there is sufficient tremor to continually keep the whole device, including the tubes H H, which are in a state of tension, in a constant tremor. I have found, in the use of such a machine, that this tremor efficiently keeps the cloth clean without the necessity of special cloth-cleaning devices; but it is necessary, in order to keep it constantly clean, that the cloth should be kept in a constant state of tension. I have also found that, by dividing the air space in a dust collecting chamber of such character, into a large number of small tubes, and thus preventing eddies in the air, the dust was far more efficiently collected than it could be where the cloth area was much smaller in proportion to the cubical contents of the chamber.

What I claim is—

1. In a dust collector, the combination of a chamber, a fan adapted to deliver dust laden air therein, a series of circular canvas tubes, open at each end, the upper open ends communicating with said chamber, and into which said dust laden air is delivered, the open lower ends communicating with a common dust receptacle, and means for conveying away the dust, substantially as described.

2. In a dust collector, the combination of a chamber, a fan adapted to deliver dust laden air therein, a series of circular canvas tubes open at each end, the upper ends communi-

cating with said chamber and adapted to receive the dust laden air therefrom, the open lower ends communicating with a common dust receptacle, means for conveying away the dust collected, and means for keeping the cloth tubes in a constant state of tension in the direction of their length, substantially as described.

3. In combination with a chamber having a suitable inlet opening, a fan case and fan connected therewith by suitable passages and adapted to deliver dust laden air into said casing, a series of cloth tubes leading therefrom downward and being open and unobstructed throughout their whole extent, a dust receptacle communicating with the lower open end of said tubes and having therein an automatic valve adapted to keep said dust chamber substantially air tight and adapted to automatically discharge therefrom collections of dust therein, substantially as described.

4. In combination with a casing having a suitable inlet opening, a fan case and fan connected therewith by suitable passages and adapted to deliver air into said casing, a series of unobstructed cloth tubes leading therefrom downward, adjustable means for keeping said tubes in a constant state of longitudinal tension, a dust receptacle communicating with the lower ends of said tubes and having therein an automatic valve adapted to keep said dust chamber substantially air tight and adapted to automatically discharge collections of dust therein, substantially as described.

5. In combination with a casing having a suitable inlet opening, a fan case and fan connected therewith by suitable passages and adapted to deliver therein dust laden air, a series of cloth tubes leading therefrom downward, a perforated head common to two or more of the flues, and sustained by the lower ends thereof, whereby the said tubes are kept in a constant state of tension, a dust receptacle communicating with the lower ends of said tubes, and means for discharging the dust from said dust receptacle, substantially as described.

6. In combination with a casing having a suitable inlet opening, a fan case and fan connected therewith by suitable passages to cause a downward current, a series of cloth tubes leading therefrom downward, the opening into the upper end of said tubes being choked or rendered smaller in diameter than the diameter of the tube proper, means for keeping said tubes in a constant state of tension, and a dust receptacle communicating with the lower ends of said tubes, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

GEORGE S. WILSON.

Witnesses:
CHARLES BURRIDGE,
WILLIAM H. LIKINS.