

No. 627,514.

Patented June 27, 1899.

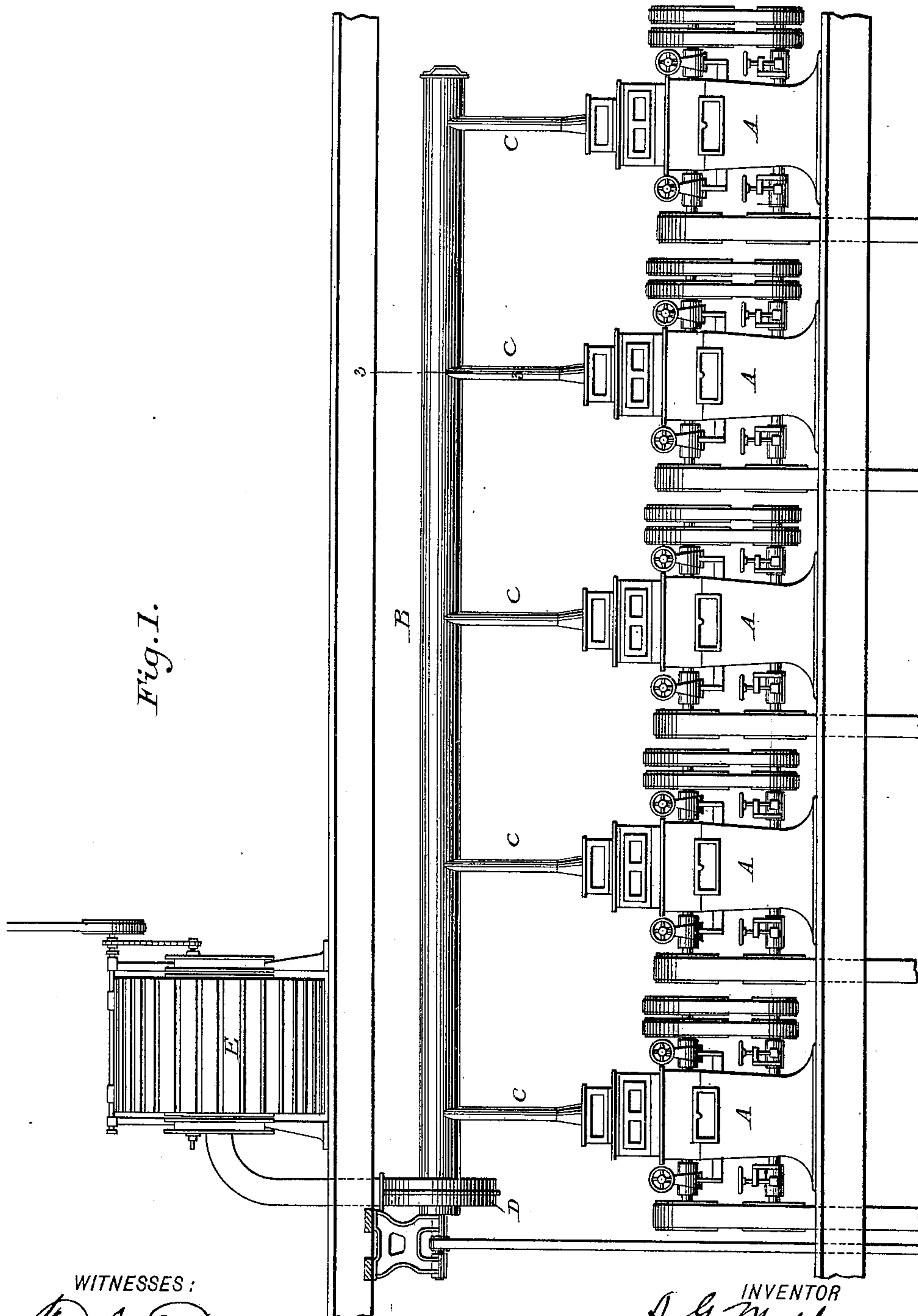
A. G. MATHER.

EXHAUST APPARATUS FOR ROLLER MILLS, &c.

(Application filed Jan. 31, 1899.)

(No. Model.)

2 Sheets—Sheet 1.



WITNESSES:

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Fig. 3.  
on line 3-3-fig. 1.

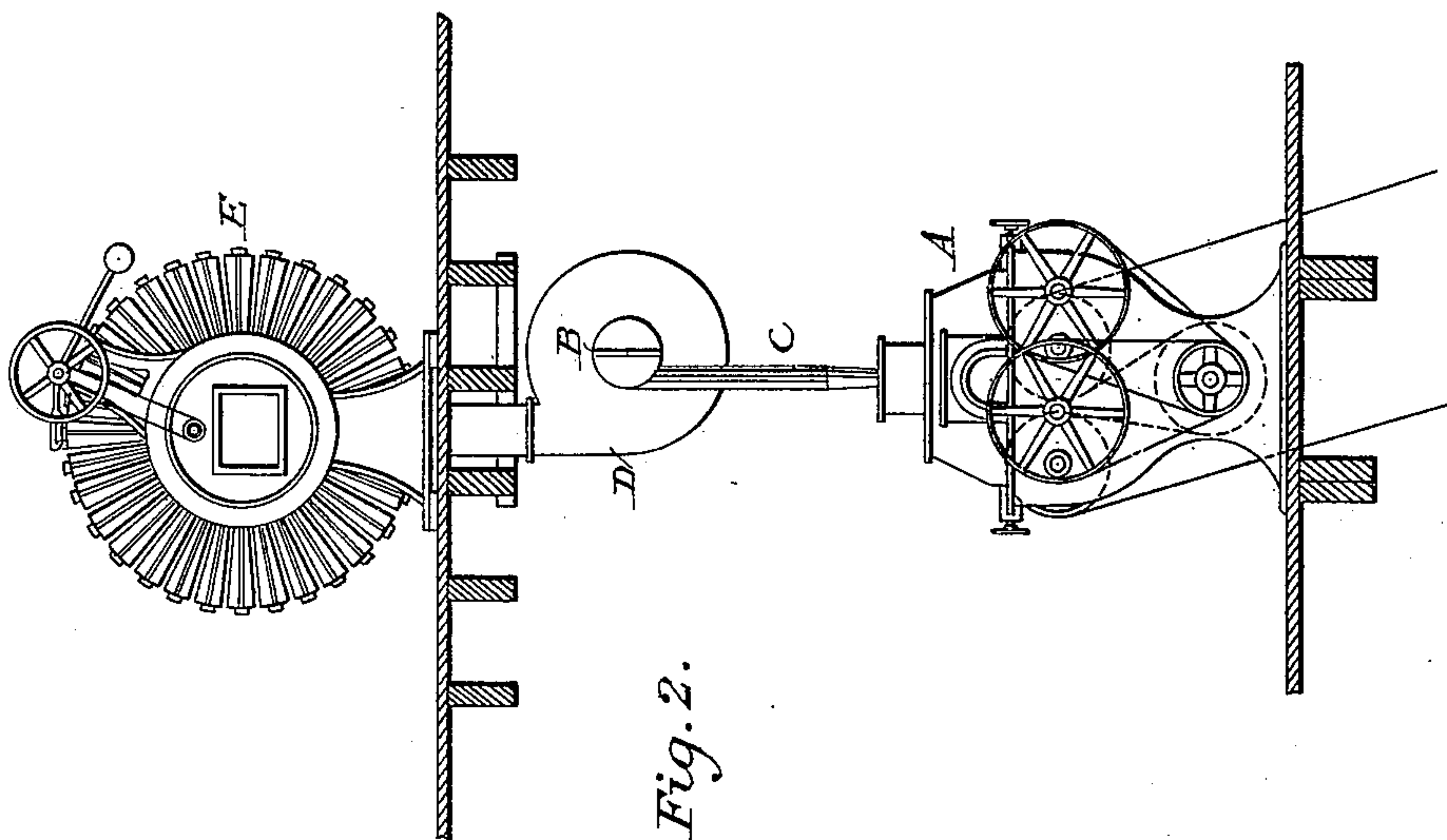
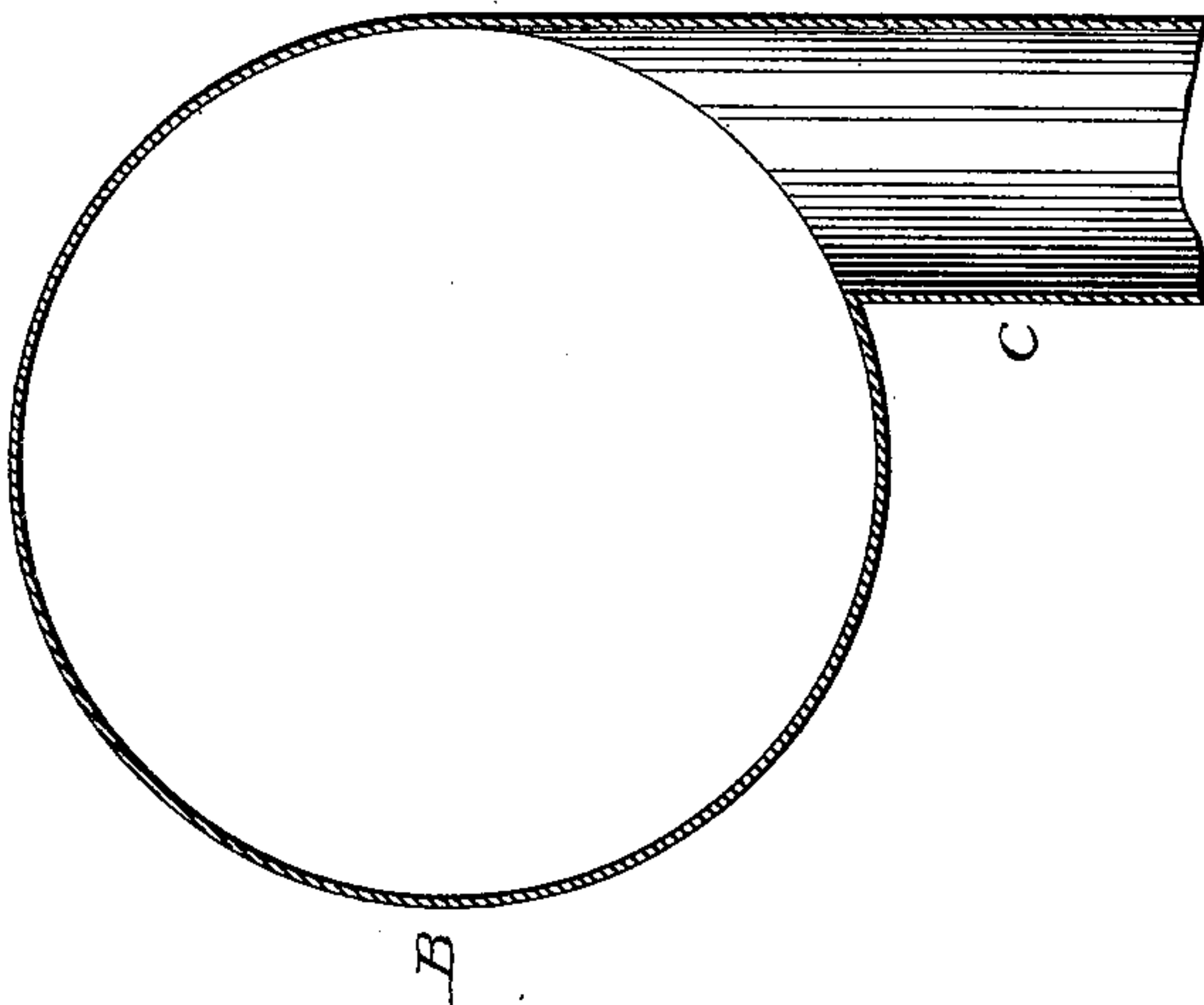


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## EXHAUST APPARATUS FOR ROLLER-MILLS, &c.

SPECIFICATION forming part of Letters Patent No. 627,514, dated June 27, 1899.

Application filed January 31, 1899. Serial No. 703,979. (No model.)

*To all whom it may concern:*

Be it known that I, ALLAN G. MATHER, of Milwaukee, county of Milwaukee, and State of Wisconsin, have invented a new and useful Improvement in Exhaust Apparatus for Roller-Mills, &c., of which the following is a specification.

My invention relates to improved means for taking away from roller-mills the dust and moisture-laden air and vapors developed by the reduction of stock by the rolls and to prevent the condensation of moisture on the inside of the roll-frames and spouts and the resultant injury to the bolting and separating machines.

Heretofore it has been customary to employ in connection with the roller-machines, either above or below the rolls, a wooden exhaust-trunk of large area and angular cross-section in order to secure the precipitation of the dust carried by the air-current, a conveyer or drag being commonly arranged in the bottom to remove the deposit, which would otherwise obstruct the passage of the air. This system is open to many disadvantages, among which are the extreme difficulty of building trunks sufficiently tight to prevent leakage, the difficulty of keeping them tight in the presence of moisture deposited therein, which tends to warp them out of shape, the fact that they have to be of very large area, and consequently high cost, to permit the precipitation of the dust. They are also dangerous on account of the liability to fire. The conveyer in the bottom is frequently inaccessible and difficult to lubricate. Moreover, the large conveyer contains at all times an inflammable and explosive mixture of dust and air.

It is the object of the present invention to overcome these objections and to produce a conveyer system which shall be inexpensive in construction and tight under all ordinary conditions and in which the precipitation of the dust is prevented without the employment of conveyers or other internal mechanism.

To this end the invention consists, essentially, in a horizontal conveyer-trunk of circular cross-section communicating at one end with an exhaust-fan and also communicating at different points in its length with the sev-

eral mills or roller-machines by conductors which enter tangentially. The suction-fan tends to draw the entire volume of air and vapor lengthwise through the conductor, while the inflowing currents entering tangentially and at successive points in the length of the conductor have the effect of setting up and maintaining throughout the length of the conductor a helical or gyratory movement of the current sufficient to prevent precipitation of the dust or moisture therein. As a result of this action I am able to maintain a dry and sweet condition of the conductor on its interior, to prevent obstruction of the flow there-through, and, in short, to overcome the very serious difficulties which have heretofore been encountered in connection with this class of apparatus.

Referring to the accompanying drawings, Figure 1 is a side elevation representing a row or series of roller-mills with my exhaust mechanism connected thereto. Fig. 2 is an end elevation. Fig. 3 is a cross-section through the conductor on the line 3 3 of Fig. 1.

A A represent a series of roller-mills, which may be of any ordinary construction.

B represents the exhaust trunk or pipe, made of circular form, preferably of sheet metal, and arranged in a horizontal or substantially horizontal position above the series of mills.

C C are suction-pipes extending upward from the respective mills to the trunk B and opening into the same at different points in its length, the connection being at one side of the trunk, so that the current from the vertical pipes C enters the trunk tangentially, as plainly shown in Fig. 3.

D represents a suction-fan or other suction apparatus located at one end of the trunk, and E represents a discharge-pipe, through which the air and vapors are delivered by the fan into a dust-collector F or elsewhere, as preferred.

While the trunk and the suction-pipes are preferably made of about the proportions represented in the drawings, it is to be understood that their size and proportion may be varied within reasonable limits, the only essential requirement being that the inlet-pipes C shall be substantially less in diameter than



the trunk and that they shall be joined tangentially thereto. The lower ends of the pipes C are preferably flattened and widened, as shown in Figs. 1 and 2; but this is not essential.

When the fan D is set in motion, it induces a current upward through the several mills and through the pipes C into the trunk B at different points in its length. As the current is drawn forward lengthwise of the trunk by the fan the inflowing currents discharged from the pipes C and entering tangentially have a tendency to rotate or whirl around within the interior of the trunk at right angles to its axis, and this motion is modified by the horizontal movement induced by the fan, so that as a resultant of the two forces the current pursues a helical course through the trunk toward the fan. If the trunk were of great length between the inlet and the fan, this spiral movement would obviously cease in advance of the fan; but the successive impulses of the inflowing currents from the different mills maintain this motion throughout the length of the trunk, so that all moisture and all of the solid matters which are deposited in the ordinary angular trunk are carried forward in my apparatus to the fan.

While I have shown the trunk of circular form in cross-section and while this form gives the best results and is the most cheaply constructed, it is to be understood that my invention will not be evaded or the desirable results wholly lost in the event of the trunk being slightly modified in its sectional form.

It is manifest that my invention is applicable in connection with a single mill and a short trunk, as well as with a long conductor and a series of mills, and also that it is applicable not only in connection with roller-mills, but with reducing apparatus of other forms or in connection with other machinery from which the air and moisture are to be withdrawn.

While I have represented the trunk of cy-

lindrical form—that is, of uniform diameter throughout its length—it may of course be made of diminishing size as it recedes from the exhaust apparatus.

Having thus described my invention, what I claim is—

1. In an apparatus for removing dust and moisture from mills, &c., the combination of an exhaust apparatus, a horizontal trunk of substantially cylindrical form, and a series of inlet-pipes connected tangentially to the trunk at different points in its length.

2. A combination of a series of mills, the circular horizontal trunk, the suction-pipes extending from the respective mills and joined tangentially to the trunk at different points in its length, and a suction apparatus connected with one end of the latter.

3. The combination of a roller-mill or a like apparatus, a suction-pipe leading therefrom, a horizontal circular trunk to which said pipe is tangentially connected, and an exhaust mechanism connecting with one end of said trunk.

4. In combination with a horizontal trunk or conductor of cylindrical form, means for producing a current longitudinally there-through, and tangentially-arranged pipes connected to the trunk at different points in its length and leading to a series of mills or similar dust-producing apparatus, whereby the dust-laden currents of air entering the trunk are caused to act successively to produce and maintain a spiral movement of the air longitudinally through the trunk; whereby precipitation of the solid matters therein is prevented.

In testimony whereof I hereunto set my hand, this 21st day of January, 1899, in the presence of two attesting witnesses.

ALLAN G. MATHER.

Witnesses:

W. D. GRAY,  
WM. BANNEN.