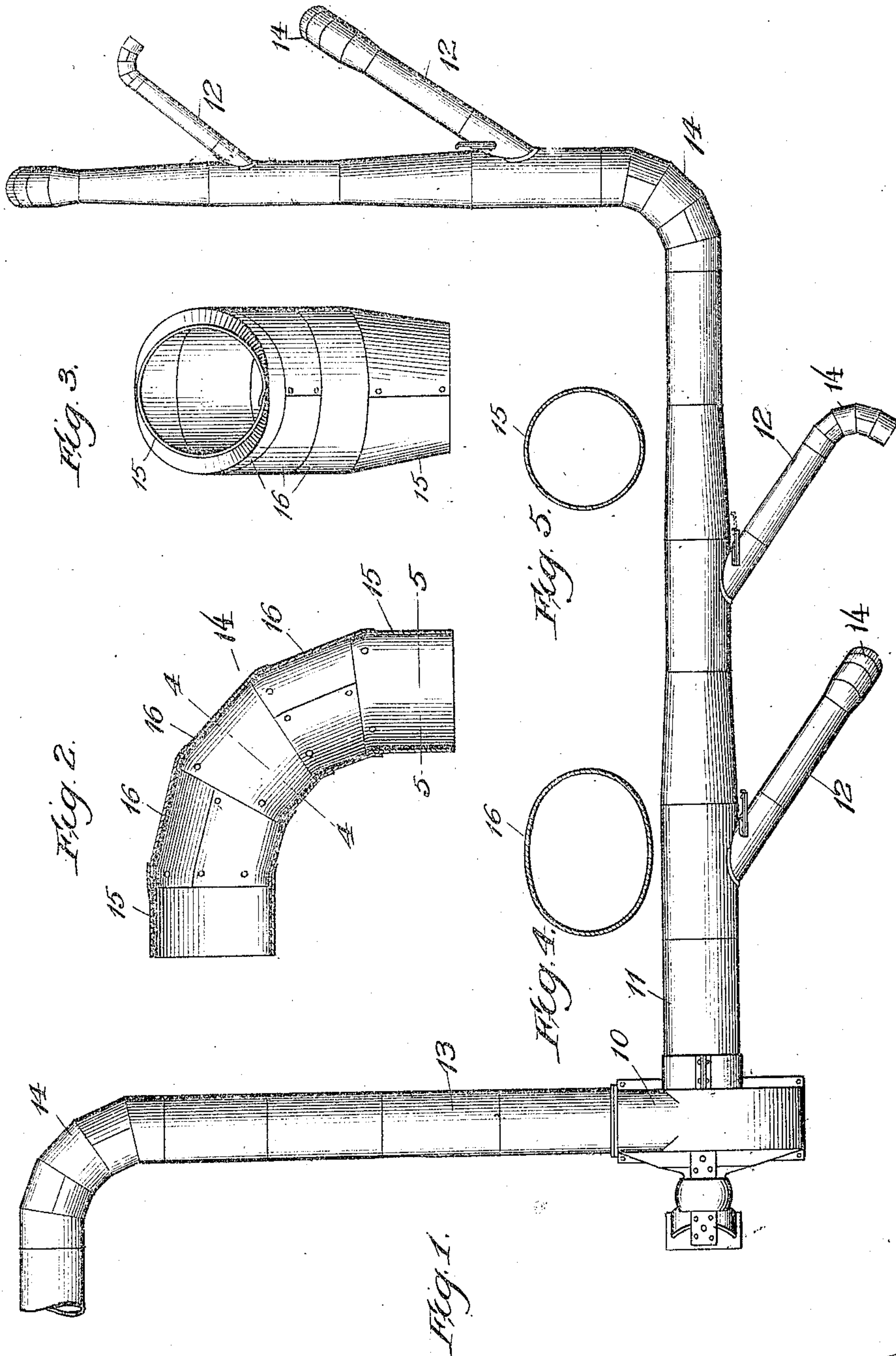


No. 846,973.

PATENTED MAR. 12, 1907.

W. E. ALLINGTON.  
DUST COLLECTING SYSTEM.  
APPLICATION FILED JULY 26, 1906.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM E. ALLINGTON, OF SAGINAW, MICHIGAN.

## DUST-COLLECTING SYSTEM.

No. 846,973.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed July 28, 1906. Serial No. 327,804.

*To all whom it may concern:*

Be it known that I, WILLIAM E. ALLINGTON, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Dust-Collecting Systems, of which the following is a specification.

My invention relates to improvements in material-conveying pneumatic systems, and has for its primary object to provide a system wherein air and material are conveyed through curved paths with high economy or a minimum expenditure of energy.

To this end my system contemplates the provision, in association with a fan and straight piping, of piping curves, bends, or elbows of configuration and proportion productive of minimum loss of energy in changing the direction of flow of the air and material in passage therethrough.

In the drawings, wherein I have illustrated an embodiment of my invention, Figure 1 is a plan view of a part of a material-conveying system. Fig. 2 is a section in plane of the curve of an elbow forming a part of said system. Fig. 3 is an end view of said elbow, and Figs. 4 and 5 are transverse sections through the elbow on lines 4 4 and 5 5 of Fig. 2.

Throughout the drawing like numerals of reference refer always to like parts.

10 indicates an air and material propelling fan with the eye whereof is connected a main suction-pipe 11 at every point throughout its length of a diameter properly proportioned as to the combined areas of the pipe and branches therebeyond, said main suction-pipe having in combination therewith branch pipes 12, which lead to different areas of air and material supply.

13 indicates an air-delivery pipe leading from the mouth of the fan, for example, to a dust-collector. (Not shown.)

In any one of the pipes of the system wherever change of direction is necessary I provide an elbow of special construction, as generally indicated at 14. In general each such special elbow or bend provides beyond the terminal radii of the bend inlet and outlet extremities which aline with and are of area equal to the straight pipes to be joined and intermediate the terminal radii of the curve an area in excess of the inlet and outlet areas of the elbow. Further, such elbow is preferably formed to present in section a

continuous curve without sharp angles, preferably in ovate shape, having its major axis transversely disposed relative to the plane of the elbow.

In practice I prefer to construct the elbow of several pieces, usually five in number, comprising end members 15 15, each arranged to aline with the straight piping to be connected and at its extremity round in section, each said section being bent or swaged to oval form between its extremity and its juncture with the intermediate pipe-sections 16 16, and said intermediate sections being arranged in overlapping relation to present in the aggregate a curve, as best illustrated in Fig. 2. The curve-sections 16 are preferably secured together by riveting at suitable points and are arranged to overlap in such direction that the air in transit therethrough meets with no obstruction at the transverse joints, the circumferential joints of each curve-section being preferably arranged at a point which leaves clear and unbroken the exterior sweep of the curve.

While for the handling of material I deem the oval configuration of the curve described to be advantageous, it will be apparent that some of the advantages incident to my invention will be preserved should the sections of the curve be made round in cross-section.

I have found that the loss of power and energy due to deflecting material and air through an elbow in a material-handling pneumatic system is greatly reduced or, conversely, that the efficiency of the system is greatly increased by the use of elbows of the character and construction described.

It is well known that an increase in the area of a pipe between its ends produces a reduction of the velocity of the air in flow through the enlarged section below the velocity in the section of standard area. Thus in the elbows of enlarged area the velocity of the air is decreased, its momentum lessened, and inevitably the energy required to change the direction of flow of the air is diminished. I find in practice that I can make a ninety (90°) degree bend without appreciable loss, whereas in effecting a like turn of the air the old uniform area elbows a loss of ten per cent. (10%) of the energy results, and I also find that, contrary to the old practice, I can use a short radius elbow, as shown, without detriment. Furthermore, it will be observed that by using an elbow of ovate section with its major axis transverse to the plane of the



curve I provide at the outside of the curve a transverse surface of increased width or longer radius which affords room for the material in passage to mass in a thinner layer under the influence of the centrifugal action attendant upon rounding the curve. For this reason I prefer to employ in material-handling installations elbows of the section illustrated in the drawing, although for handling air alone curved sections round in cross-section might be employed.

For purposes of full disclosure I state that I have in practice found that by increasing the sectional area in the curve twenty-five (25%) per cent. over the area of the straight piping I am enabled to produce a large saving; but it will be understood that I do not desire to limit myself to the exact proportions of the curve enlargements relative to the straight piping area.

While I have herein described in some detail a specific embodiment of my invention, which experience has proven advantageous, it will be understood that changes might be made in the physical structure without departure from the spirit and scope of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a system of the character described, the combination with a fan, of a pipe communicating therewith, said pipe comprising straight sections and an interposed elbow or

bend, said elbow or bend being in transverse cross-section, curved throughout, and of area greater than the sectional area of the straight sections wherewith it communicates, the dimension of such section on an axis in the plane of the bend being not greater than its dimension on an axis at right angles to such plane.

2. In a material and air handling system of the character described, the combination with a fan, of a pipe communicating therewith, and comprising straight sections, and an interposed elbow, said elbow being of transverse sectional area in excess of the area of the straight sections wherewith it communicates, and of cross-section ovate in configuration with its major axis transverse to the plane of the elbow.

3. In a system of the character described, the combination with a fan, of a pipe communicating therewith, said pipe comprising an elbow or bend structure having straight circular ends, and an intermediate longitudinal bend of sectional area greater than the end areas and of diameter at right angles to the plane of the bend greater than the diameter of the ends.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

WILLIAM E. ALLINGTON.

In presence of—

GEO. T. MAY, Jr.,  
MARY F. ALLEN.