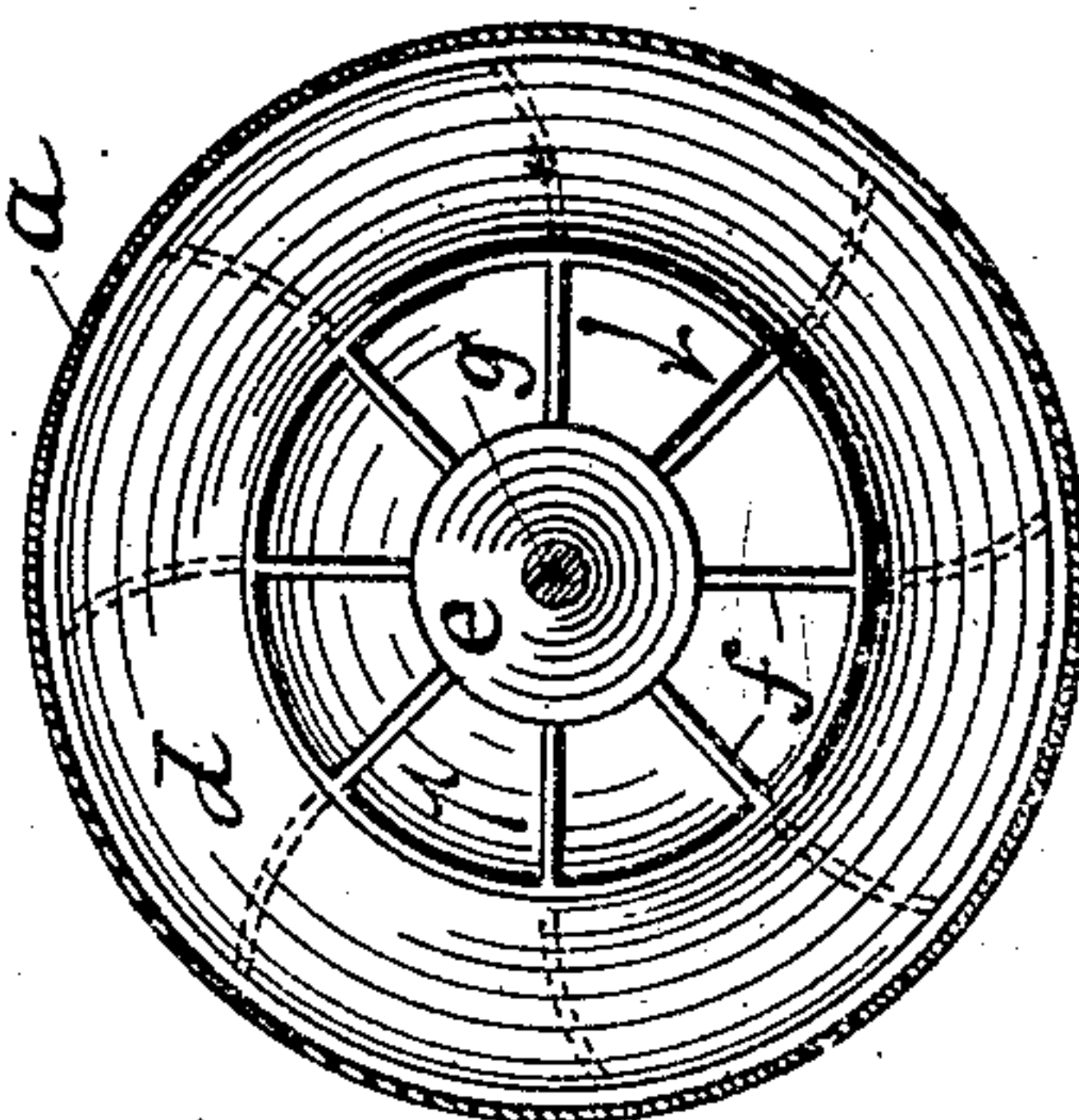


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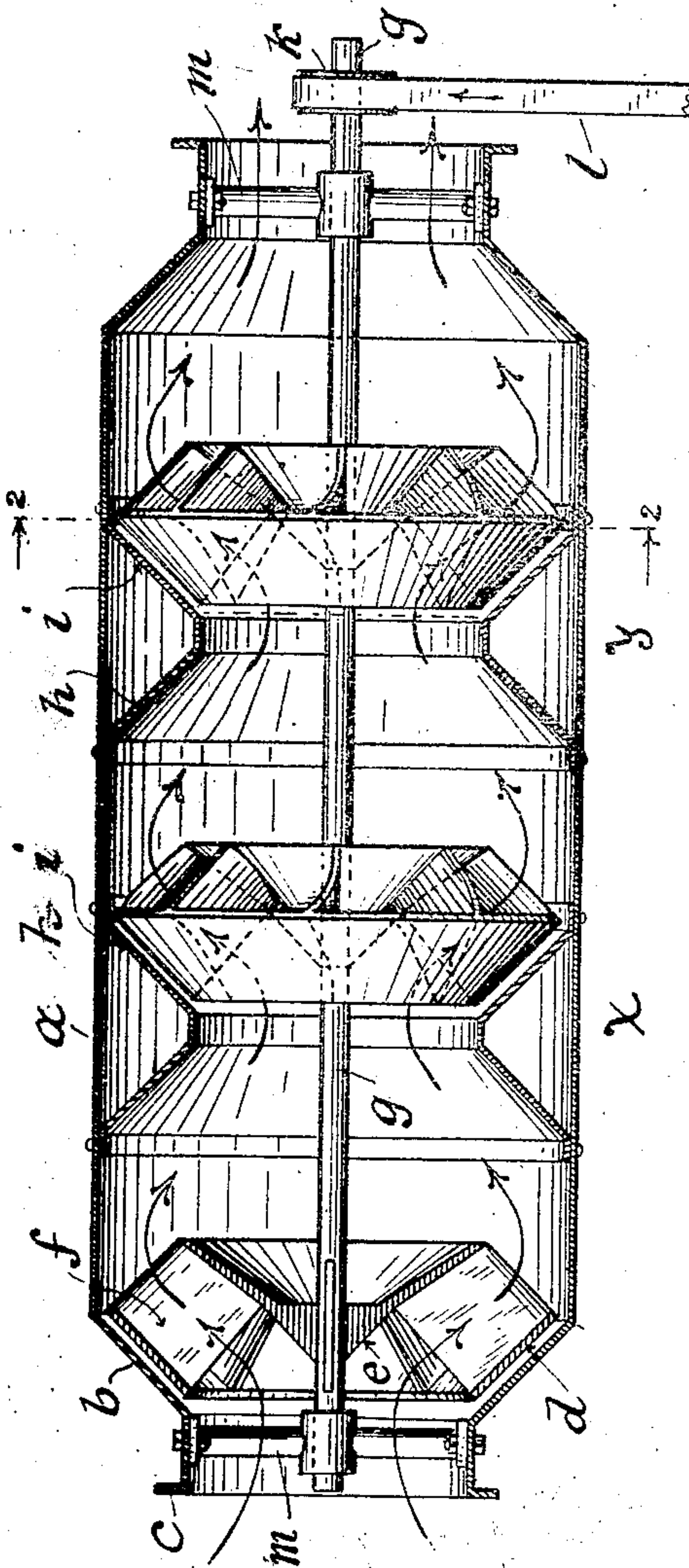
W. J. BALDWIN.
CENTRIFUGAL FAN.
APPLICATION FILED JULY 7, 1906.

Patented Sept. 15, 1908.

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WILLIAM J. BALDWIN, OF BROOKLYN, NEW YORK.

CENTRIFUGAL FAN.

No. 898,624.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed July 7, 1906. Serial No. 325,064.

To all whom it may concern:

Be it known that I, WILLIAM J. BALDWIN, a citizen of the United States of America, and a resident of the borough of Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Centrifugal Fans, of which the following is a specification.

This invention relates to improvements in centrifugal fans or blowers, and it particularly pertains, but is not restricted to, improvements in installations of centrifugal fans of the particular type known as "forward direction fans".

The invention essentially relates to the combination of a plurality of such fans, arranged tandem within a casing, and the purpose and effect of the invention is to materially increase the pressure of the air delivered by such an installation over that which could be attained by a single fan. I have determined that when a plurality of such fans are set tandem in a casing, so that the air delivered by the first fan goes practically directly to the inlet of the next fan, from that fan to the inlet of the third fan, if a third is used, and so on, the pressure of the delivered air rises in some function of the number of the fans employed, and with forward-direction fans this is nearly in proportion to the number of the fans. Therefore, by this invention it becomes possible to produce comparatively small compact blowing apparatus capable of delivering air at great pressures and consequently capable of forcing it against considerable resistances, thereby filling a want in various modern arts, as in certain branches of electrical engineering.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is a longitudinal section, partly in elevation, of an installation containing three forward direction fans, Fig. 2 is a cross section on the line 2. 2. of Fig. 1.

In a casing of a cylindrical section and somewhat larger diameter than the fans, are arranged tandem a plurality of centrifugal fans, preferably of the forward direction type. The said casing *a* may be constructed as a single shell or may be made in sections fastened together, and in the latter case the joints would naturally be at about the joints *x y* at the apexes of the plates *h, i*. The drawings show the said fans as substantially similar to that set forth in my United States Patent No. 556,453, dated March 17,

1896; *d* being a shell, *e* a cone fixed on a shaft *g* driven in any manner, as by pulley *k* and belt *l*, and blades *f* extending between and secured to said shell *d* and cone *e*. The air coming in through the open rear end of casing *a* enters at the small and open rear end of shell *d*, and by the centrifugal effect of the blades *f*, together with shell *d* and cone *e*, is given an outward and forward direction against said casing *a*, then being deflected by the contracted throat plate *h* inwardly to the inlet of the next similar fan. Said contracted throat plate *h* is preferably of conical shape and is fastened to said casing *a*; and in order to force the air into the inlet of said next fan and to prevent its impinging on the periphery of the shell thereof, I prefer to employ a backing *i* immediately behind and conforming to the shape of the shell of said fan, and of course said throat plates *h* and backing *i* may be either of sheet metal as indicated, or solid castings or forgings.

The other fans are preferably of the same size, shape and type as said first fan, and are, as hereinbefore stated, arranged tandem, that is in front of one another and concentric to said casing *a*, and between each pair of fans is a contracted throat plate to direct the air coming from one fan into the inlet of the next forward fan. I also prefer to fix all the fans on the same shaft *g*, supported in bearing on arms *m* in casing *a*, and which is driven in any suitable manner, as by pulley *k* and belt *l*, but it is evident that the several fans might be placed each on its separate shaft, and I might also arrange the fans with alternately opposite pitch and drive them in opposite directions, instead of giving all the fans the same blade pitch and driving them all in the same direction. Nor is there any limit to the number of fans employed, it being practicable to employ two or any greater number.

The air enters at the inlet end of casing *a*, acquires a certain forward velocity and pressure while passing through the first fan, enters the second fan with this velocity and pressure, gains a greater forward pressure while passing through the second fan, and so on, finally escaping from the open front end of casing *a* with a materially greater forward pressure than it received at the first fan.

Now having described my improvements, I claim as my invention.

1. The combination of a casing, a plurality of forward direction fans arranged tandem therein, and throats *h* between each pair of fans inclined inwardly and forwardly to direct the air from the rearward fan into the center of the forward fan, substantially as described.

2. The combination of a casing open at both ends, a plurality of forward direction fans arranged tandem therein, and inclined throat plates *h* and backing plates *i* between each pair of fans adapted to direct the air from a rearward fan into the center of a forward fan and to prevent back currents, substantially as described.

3. The combination of a casing open at both ends, a plurality of forward direction fans therein each having a conical closed center *e* and a conical shell *d* with open center, and inclined throat plates *h* and backing plates *i* between each pair of fans adapted to direct the air from a rearward fan into the open center of a forward fan and prevent back currents, substantially as described.

Signed at New York city this 5th day of July 1906.

WILLIAM J. BALDWIN.

Witnesses:

HENRY H. DE VOS,
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