

No. 850,609.

PATENTED APR. 16, 1907.

I. WAKEFIELD.
FAN.

APPLICATION FILED DEC. 9, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

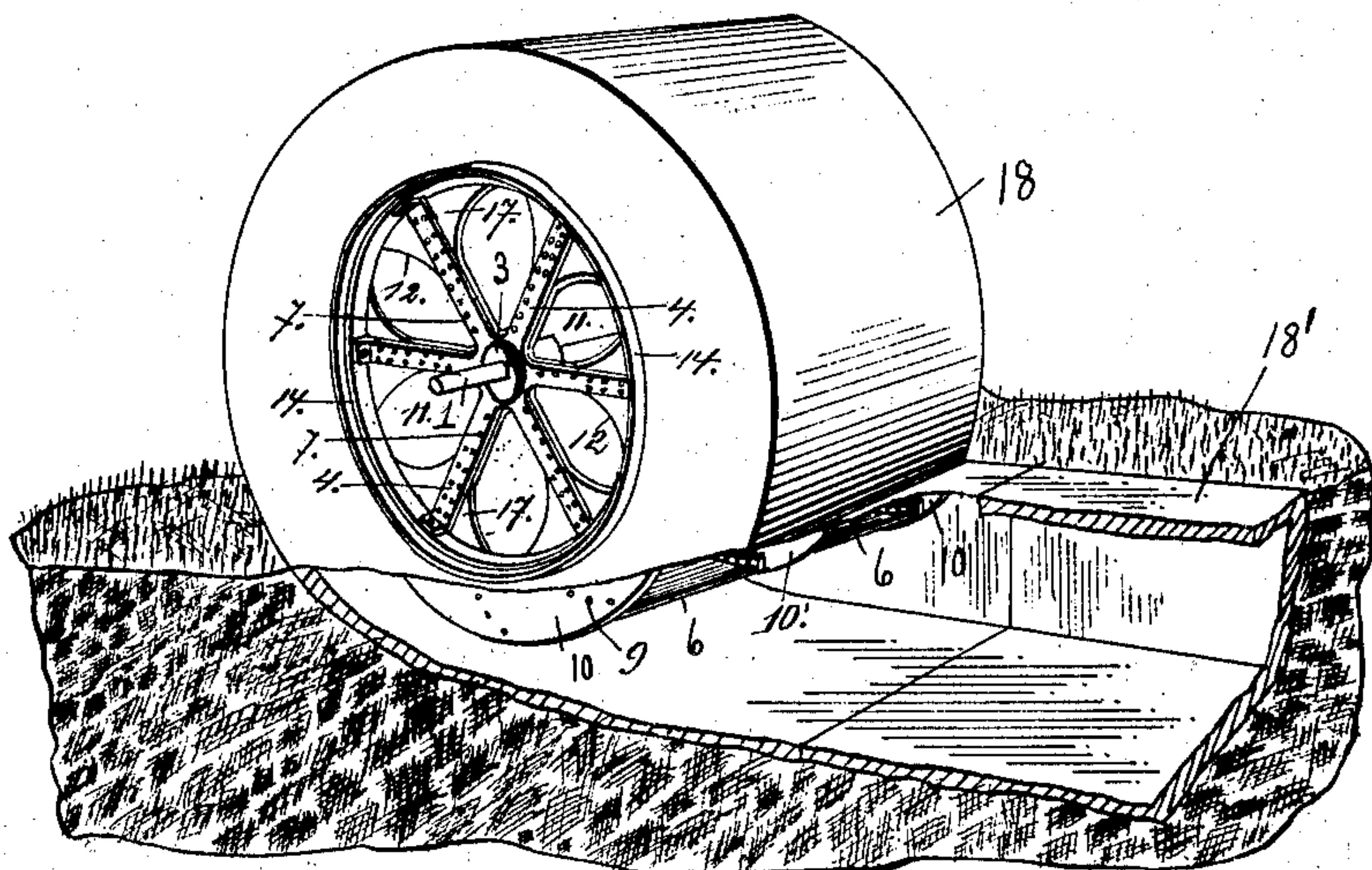


Fig. 2.

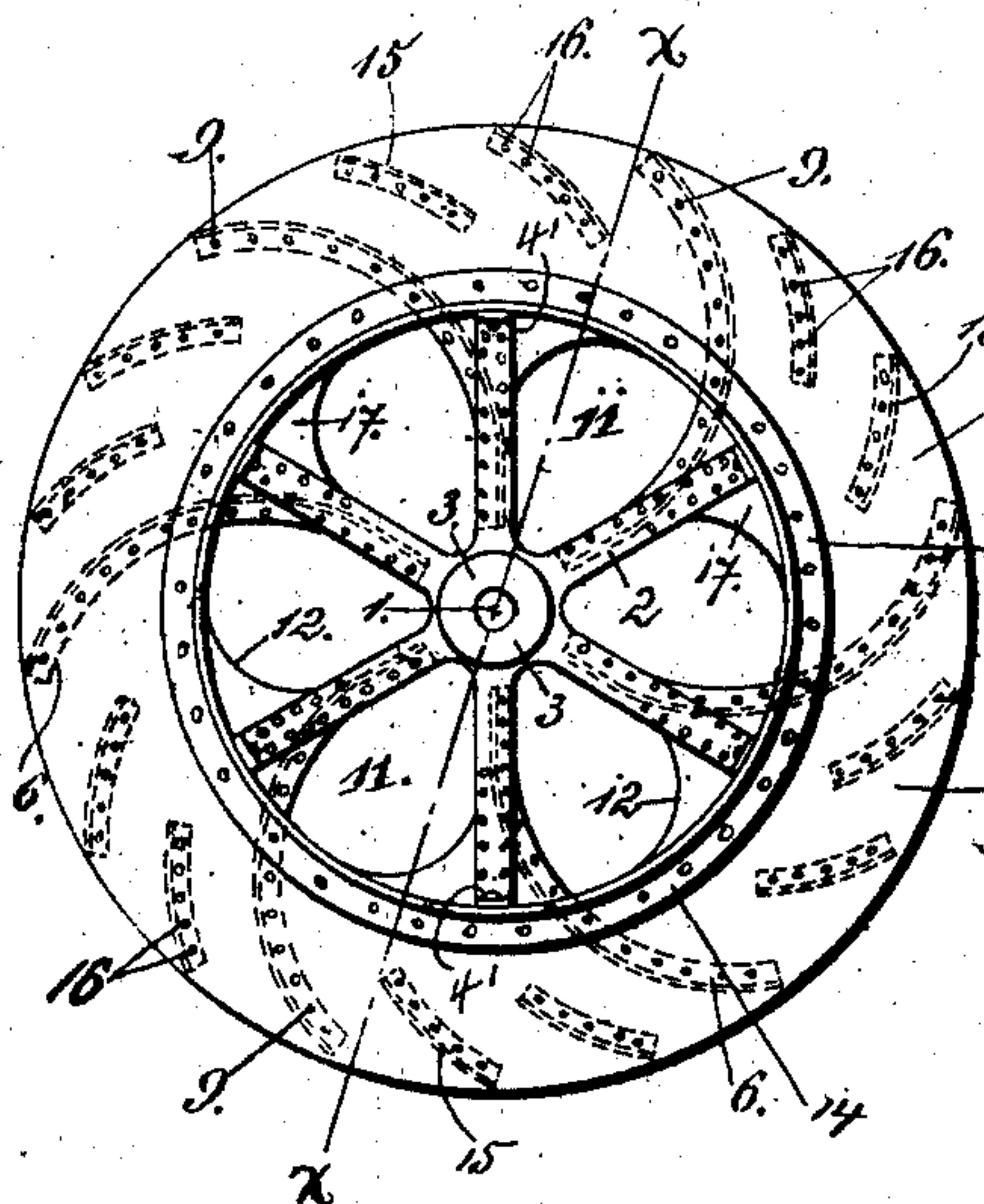
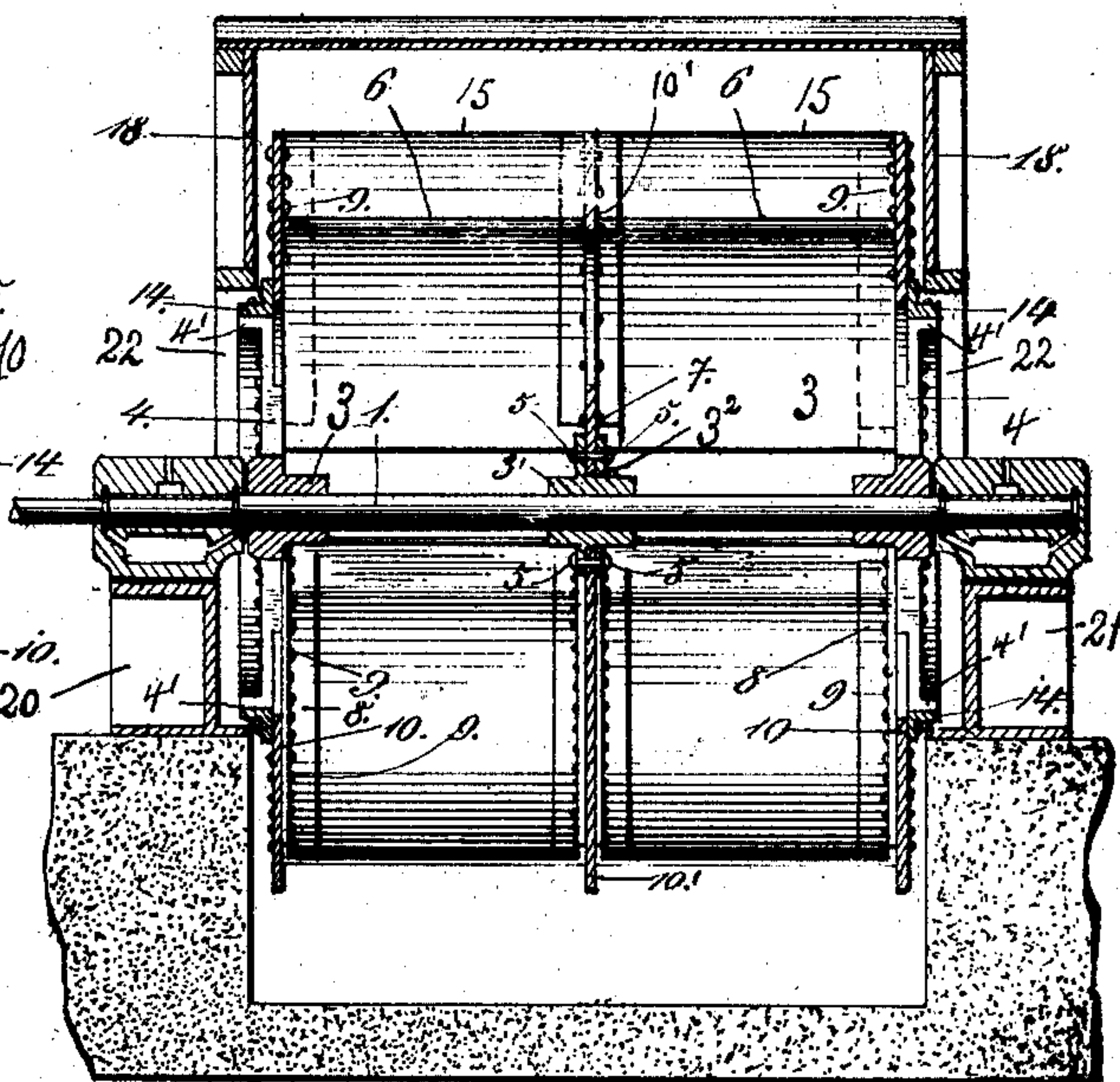


Fig. 3.



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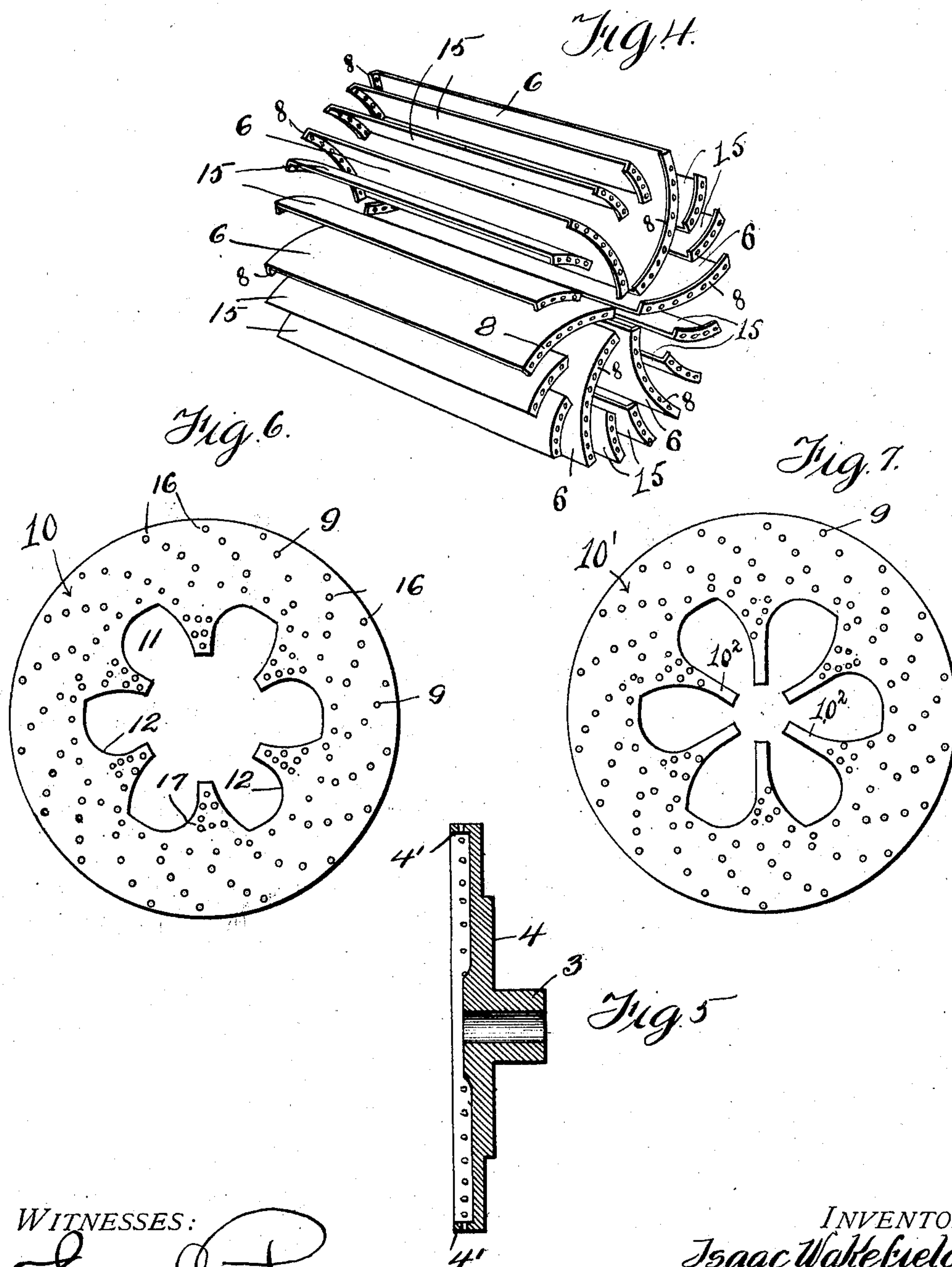
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2 SHEETS—SHEET 2.



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ISAAC WAKEFIELD, OF NEW EAGLE, PENNSYLVANIA.

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No. 850,609.

Specification of Letters Patent.

Patented April 16, 1907.

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To all whom it may concern:

Be it known that I, ISAAC WAKEFIELD, a citizen of the United States of America, residing at New Eagle, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Fans, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in fans, more particularly to the class of centrifugal fans, especially to devices of this character employed in mining and like operations, and has for one of its objects to improve the construction and increase the efficiency and utility of devices of this character.

15 Another object of this invention is to produce a device of this character wherein the air which is being driven or exhausted thereby is retained in close proximity to the blades of the fan.

20 With these and other objects in view, which will appear as the nature of the invention is better understood, the invention consists in certain novel features of construction, as hereafter shown, described, and specified in the claims.

25 In the drawings employed for illustrating the invention is shown the approved construction capable of carrying the same into operation, and in the drawings thus employed Figure 1 is a perspective view, partly in section, of the improved device applied. Fig. 2 is an end elevation, enlarged, of the fan portion of the improved device. Fig. 3 is a sectional elevation of the improved device applied, the fan portion in section on the line $x x$ of Fig. 2. Fig. 4 is a perspective view of the fan-blades detached from the casing and arranged in their proper relative order. Fig. 5 is a sectional detail of one of the end "spiders" of the fan portion of the device. Fig. 6 is a side elevation of one of the end plates of the fan portion of the device. Fig. 7 is a side view of one of the intermediate plates of the fan portion of the device.

30 The improved device may be applied in connection with any desired form of shell or casing and provided with a tangentially-extending conductor or spout, and for the purpose of illustration an approved form of casing of this character is represented at 18, preferably of sheet metal and with a tangentially-extending conductor 18'.

35 The conductor 18' is generally embedded in

the ground, (represented at 19,) and mounted upon the supporting portion 19 are bearings 20 21, supporting a shaft 1, the shell 18 having circular openings 22 surrounding the shaft 1 and concentric thereto. The shaft 1 is adapted to be rotated in any suitable manner, the rotating power not being shown, as it forms no part of the present invention.

Secured upon the shaft 1 and within the shell 18 are spider members, each comprising a plurality of spaced hubs 3, having radial arms 4, the arms terminating in lateral offsets 4', around which annular L-shaped rings 14 are disposed and secured to the offsets as by riveting. The rings project partly through the side openings of the shell 18, as shown in Fig. 3.

Connected to the end spiders are the end plates 10 of the fan structure, the plates being circular exteriorly and spaced from the shell 18 and with central openings divided into a plurality of alternating pockets and radial projections, the projections corresponding to and adapted to be riveted or otherwise secured upon the radial arms 4, the forms of these end plates being represented in Fig. 6.

One or more intermediate supporting structures may be employed, and for fans of ordinary size one of these structures only will be required, as in Fig. 3; but any required number may be employed for fans of larger capacity. The intermediate supporting structure consists of a plate 10', similar to the end plates 10 and provided with radial arms 10², corresponding to the radial portions of the end plates and extending inwardly to a hub 3', having a flange against which the arms are secured by a binding-ring 3² and rivets 5, as shown in Fig. 3. The end plates 10 and the intermediate plate 10' are connected by numerous curved fan-blades 6, corresponding in number to the arms of the spiders, and with flanged ends 8, secured to the several plates, as by rivets or similar devices 9.

The fan-blades 6 extend nearly to the hubs of the spiders at their inner edges and with their outer edges substantially flush with the rims of the several plates. Disposed between each pair of the main plates 6 are smaller curved auxiliary plates 15, flanged at the ends and secured by rivets or other suitable fasteners 16 to the several plates, the

plates and spiders, with their hubs and the shaft 1, constituting a complete and efficient fan.

5 The end spiders, with their hubs and arms, will generally be of cast metal, preferably steel, and the hubs of the intermediate spider will also be preferably of cast-steel, while the remainder of the fan structure will be preferably of plate or sheet steel pressed or bent
10 into the required shape.

The device is simple in construction, strong and durable, and can be inexpensively manufactured, and of any required size or capacity.

15 Fans of any required length may be readily constructed by simply providing a plurality of the intermediate hubs and the intermediate plates 10' and fan 6 and 15 and increasing the length of the shaft 1. If a
20 relatively small fan structure is required, the end spiders only, with one set of the end plates and one set of the fan-blades, may be employed, as will be obvious.

I claim—

25 1. In a device of the class described, a supporting-shaft, hubs spaced apart upon said shaft and provided with radial arms terminating in lateral offsets, annular members secured upon said offsets and having central
30 openings, and annular end plates secured to said annular members and with radial projections within said openings corresponding to said radial arms and secured thereto, curved primary blades extending between

said end plates and with end flanges secured 35 to said plates, said primary blades extending nearly to said shaft at the inner edges, and curved auxiliary fan-blades of less width than the primary blades and having end flanges secured to said end plates. 40

2. In a device of the class described, a main supporting-shaft, hubs spaced apart upon said shaft and provided with spaced radial arms terminating in lateral offsets, annular members bearing upon said offsets and secured thereto, circular plates secured to said annular members and with central openings and with radial projections adapted to be connected to said radial arms, an intermediate hub carried by said shaft, an intermediate plate having concentric openings divided by spaced radial arms connected to said intermediate hub, a plurality of curved primary fan-blades provided with flanges secured to said end plates and to the opposite sides of said intermediate plate, and curved auxiliary blades of less width than the primary blades and disposed between each pair of the same and provided with end flanges secured respectively to said end plates 55 and the opposite sides of said intermediate plate. 60

In testimony whereof I affix my signature in the presence of two witnesses.

ISAAC WAKEFIELD.

Witnesses:

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