Sept. 20, 1932. A. J. BOYNTON 1,878,668

APPARATUS FOR CLEANING GASES

Filed April 14, 1930 3 Sheets-Sheet 1

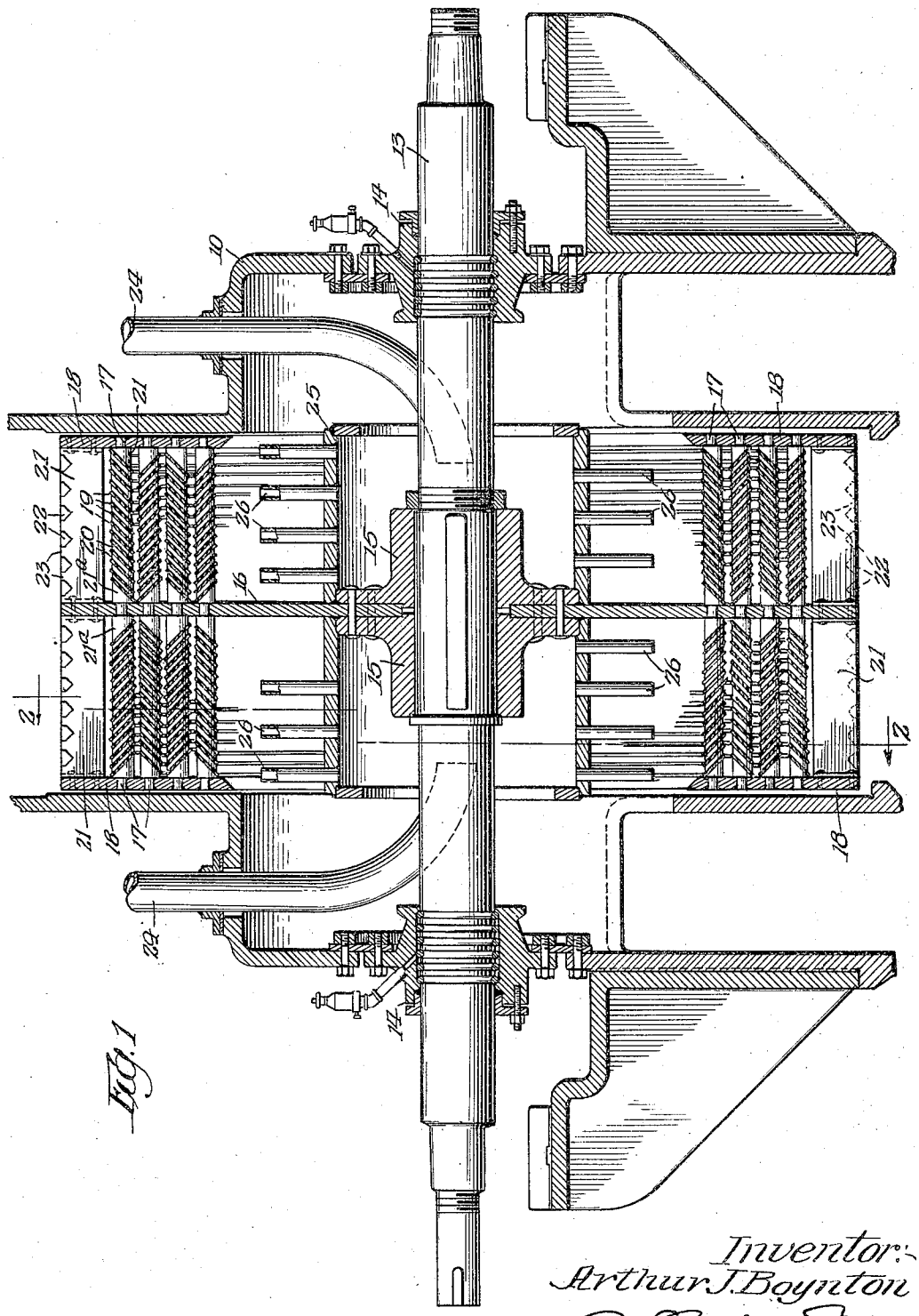


Fig. 1

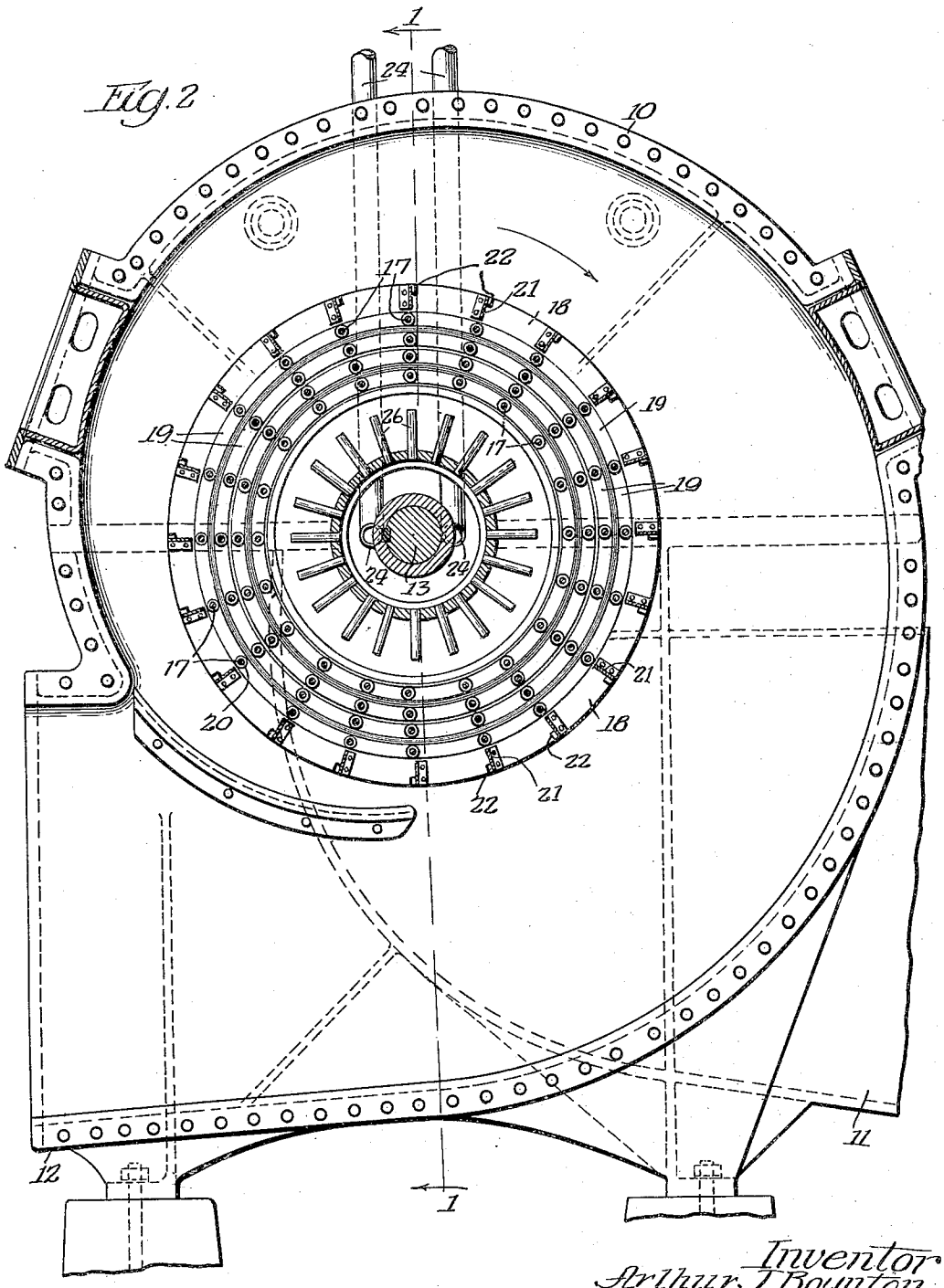
Inventor:
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By [illegible] Attys.

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Fig. 2



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Fig. 3

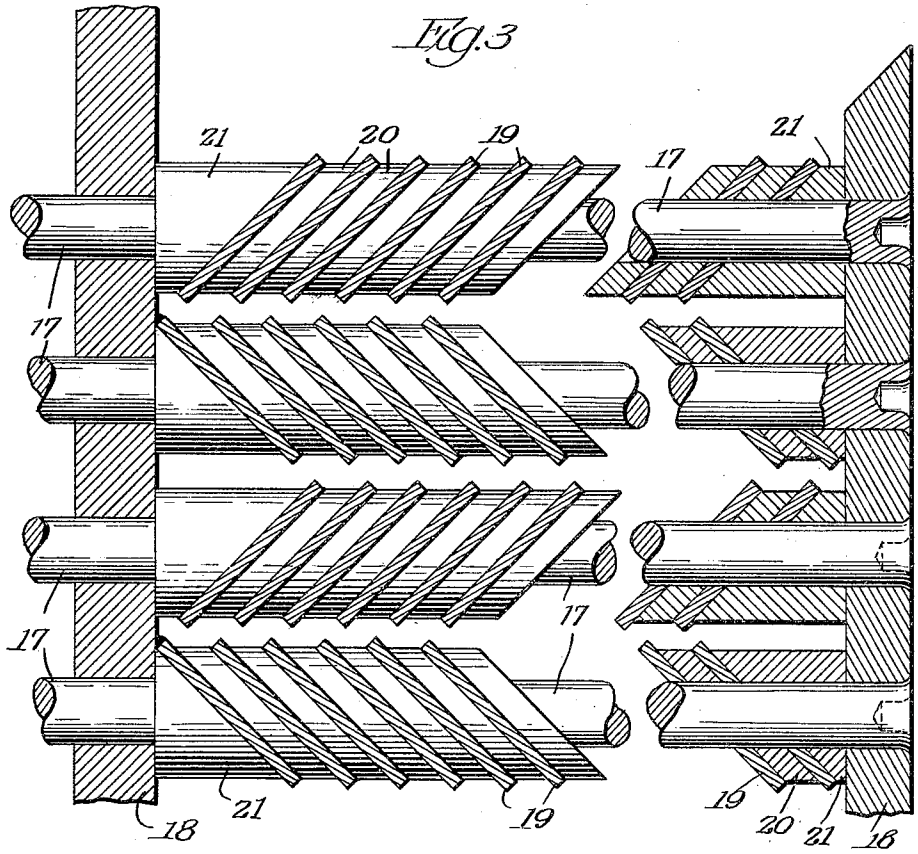


Fig. 4

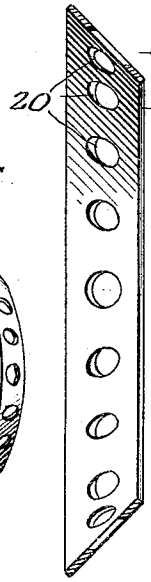


Fig. 5

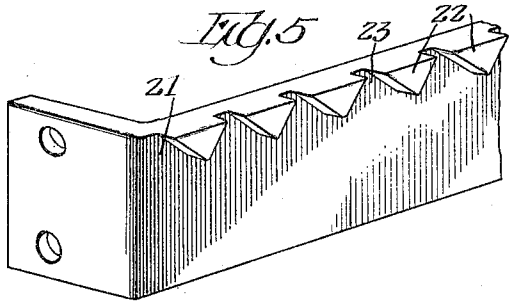
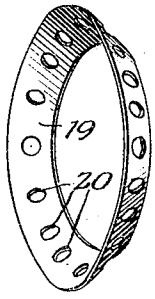


Fig 6



Inventor:
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Patented Sept. 20, 1932 1,878,668

UNITED STATES PATENT OFFICE

ARTHUR J. BOYNTON, OF WINNETKA, ILLINOIS, ASSIGNOR TO H. A. BRASSERT & COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

APPARATUS FOR CLEANING GASES

Application filed April 14, 1930. Serial No. 444,097.

This invention relates to improvements in gas cleaning apparatus of the type embodying rotating elements in the form of extended flat surfaces arranged in the path of flow of the gas and laterally spaced from each other to form passages therebetween through which the gas and water or other washing media flow, the gases and liquid impinging and flowing across such surfaces, with the result that friction will impart a further velocity to the mixture.

A further object is to provide in an improved apparatus of this character concentric rows of inclined surfaces, the surfaces of each row being laterally spaced, the surfaces being preferably in the form of frustums of cones, each succeeding row or circle of cone frustums being mounted so that the angle of inclination is at substantially right angles to the row immediately adjacent and on both sides thereof, with the result that the radially projected stream of mixed gas and water striking the innermost row of cone frustums will be diverted in such a way that the water strikes the inner surface of the cone frustums, friction with which, imparts a further velocity in the direction of the outward extension of the frustums of the cones, and with the further result that a solid sheet of water will be thrown in this direction from each cone frustum, the water being projected successively against the next outward row of cone frustums.

Furthermore, at the point where the gas and water issue from each set of cone frustums the direction of flow of the gas will be reversed and at the same time the gas will be thrown violently through the projected streams of water, the change of direction of the flow of the gas and the projection thereof through the water and the resulting turbulence imparting a high degree of cleanliness to the gas.

A further object is to provide improved means for overcoming the drop in pressure through the washing elements.

A further object is to provide improved means for directing or spraying water against the gas washing elements.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts, hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention, and in which

Figure 1 is a vertical sectional view taken on line 1—1, Figure 2, of an apparatus of this character constructed in accordance with the principles of this invention.

Figure 2 is a sectional view taken on line 2—2, Figure 1.

Figure 3 is an enlarged detail view partly in elevation, partly in section and partly broken away of a portion of the rotor.

Figure 4 is a sectional view of one of the deflector plates or cone frustums.

Figure 5 is a perspective view of one of the fan blades.

Figure 6 is a perspective view of one of the cone frustums.

Referring more particularly to the drawings the numeral 10 designates a housing having an inlet opening 11 and an outlet opening 12.

The housing is of any desired size and configuration and passing therethrough is a shaft 13 journaled in suitable bearings 14, the shaft being driven from any suitable source of power.

Within the housing 10 and secured to the shaft 13 for rotation therewith by means of suitable members 15, is a disc 16, which is spaced from the walls of the housing and is of any desired diameter, and secured to the disc and projecting laterally from both sides thereof are concentric series of bars or rods

17, the ends of these rods being connected with annular members 18, which latter are preferably disposed in close proximity to the walls of the housing 10.

Any number of these rows or series of bars 17 may be provided and mounted upon the bars on each side of the disc 16 are deflector members 19 of annular configuration and are shaped to form frustums of cones. The members 19 are provided with openings 20 therethrough and through which openings the respective bars or rods 17 pass for supporting the same and securing them for rotation with the disc 16 and with the annular members 18.

Intermediate these members 19, which serve as deflector members, are arranged spacing elements 20 and similar elements 21 are arranged between the disc 16 and the respective annular members 18 and the respective adjacent members 19.

The spacing members are provided with inclined faces to abut the respective faces of the conical members 19 and each succeeding circle or row of cone frustums is mounted at an angle so that the angle of inclination will be at right angles to the row immediately adjacent on both sides thereof so that when the gas and washing media is projected from one row or series of cone frustums the stream of water or washing media will be divided to flow to the next series of cone frustums, and at the same time the direction of flow of gas will be reversed and the gas will be projected violently through the stream of water or washing media being projected from one series of cone frustums to the next adjacent series, thereby providing turbulence, and further a complete mixture is promoted. The inner edge of the outer cone frustrums are arranged to intercept and divide the streams of gas and washing media projected from the next adjacent row of cone frustrums.

It will be noted that the radially projected streams of mixed gas and water strike the inner row of cone frustums and are diverted in such a way that the water will strike the inner surface of each cone frustum, friction with which imparts a further velocity in the direction of the outward extension of the frustum of the cone, with the result that there will be a solid sheet of water thrown in this direction from each cone frustum, the water being projected against the outward row of cone frustums when the process is repeated until the water has passed all of the series of cone frustums.

By changing or reversing the direction of flow of the gas and by forcing the same through the projected streams of water, considerable turbulence will result as well as a high degree of cleanliness to the gas.

Arranged at the outer periphery of the rotor are fan blades 21, any number of which may be provided and these blades are supported by being preferably secured to the annular members 18.

At the outer periphery of the forward face of the fan blades 21 projections 22 are provided and these projections are preferably of a tapered formation being spaced from each other laterally as at 23 to form openings or spaces therebetween which gradually reduce toward the edge of the fan blade and terminate in restricted openings so that the mist or moisture in the gas will be caught by the fan blades and will be forced through the openings 23 thereby causing the particles of mist to cohere to be thrown outwardly from the edges of the fan blades through the openings 23.

The fan blades also serve as a means to overcome drop in pressure through the washing element.

The cleaning media such as water may be admitted into the housing through suitable pipes 24 on either side of the shaft 13, and the disc 16 and is discharged into a casing 25 which rotates with the shaft 13 being supported and connected thereto in any suitable manner.

The internal diameter of the casing 25 is considerably greater than the external diameter of the shaft 13 so as to form a chamber into which the washing media is delivered and which is discharged, as the casing 25 rotates with the disc 16 and shaft 13, through tubes or passages 26 to be directed against the frusto-conical members 19 and therebetween.

It will also be manifest that with this construction there is provided extended surfaces over which the mixture passes and by contact therewith and by means of the friction caused therebetween the water will be thrown out or projected from the conical members in a substantially solid stream through which the gas will be directed.

By arranging the series of conical members with angles of inclination in different directions, it will be manifest that the direction of flow of the gas and water as it passes from one series of deflector members to the next series will be changed a number of times during their flow between the successive series of deflector members.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

A gas cleaning apparatus embodying a casing, a rotor therein, said rotor embodying a plurality of concentric series of cone frustrums, the cone frustrums of each series being laterally spaced to form passages there-

between for the gas and a washing media, the inner edge of the outer cone frustrums being arranged to intercept and divide each stream of gas and washing media projected from the next adjacent inner row of cone frustrums, fan blades mounted upon the rotor adjacent the outer periphery thereof and beyond the outermost row of cone frustrums, and means carried by the forward outer edge of the fan blades to cause a cohesion of the particles of mist as they leave the fan blades, the said means embodying passages gradually reducing in size from the entrance to the exit thereof and through which latter passages pass the globules of moisture formed by such cohesion.

In testimony whereof I have signed my name to this specification, on this 11th day of April, A. D. 1930.

ARTHUR J. BOYNTON.