

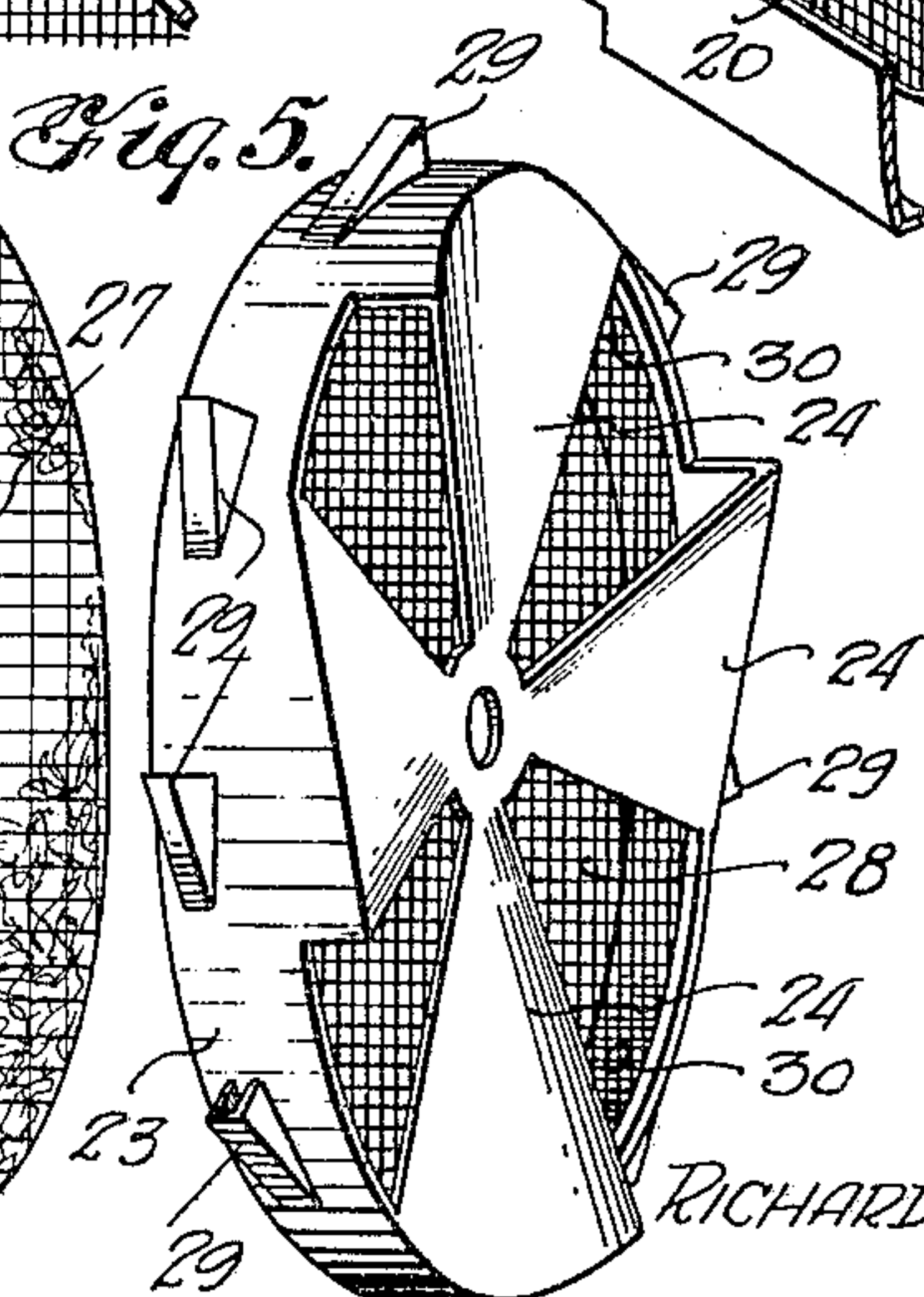
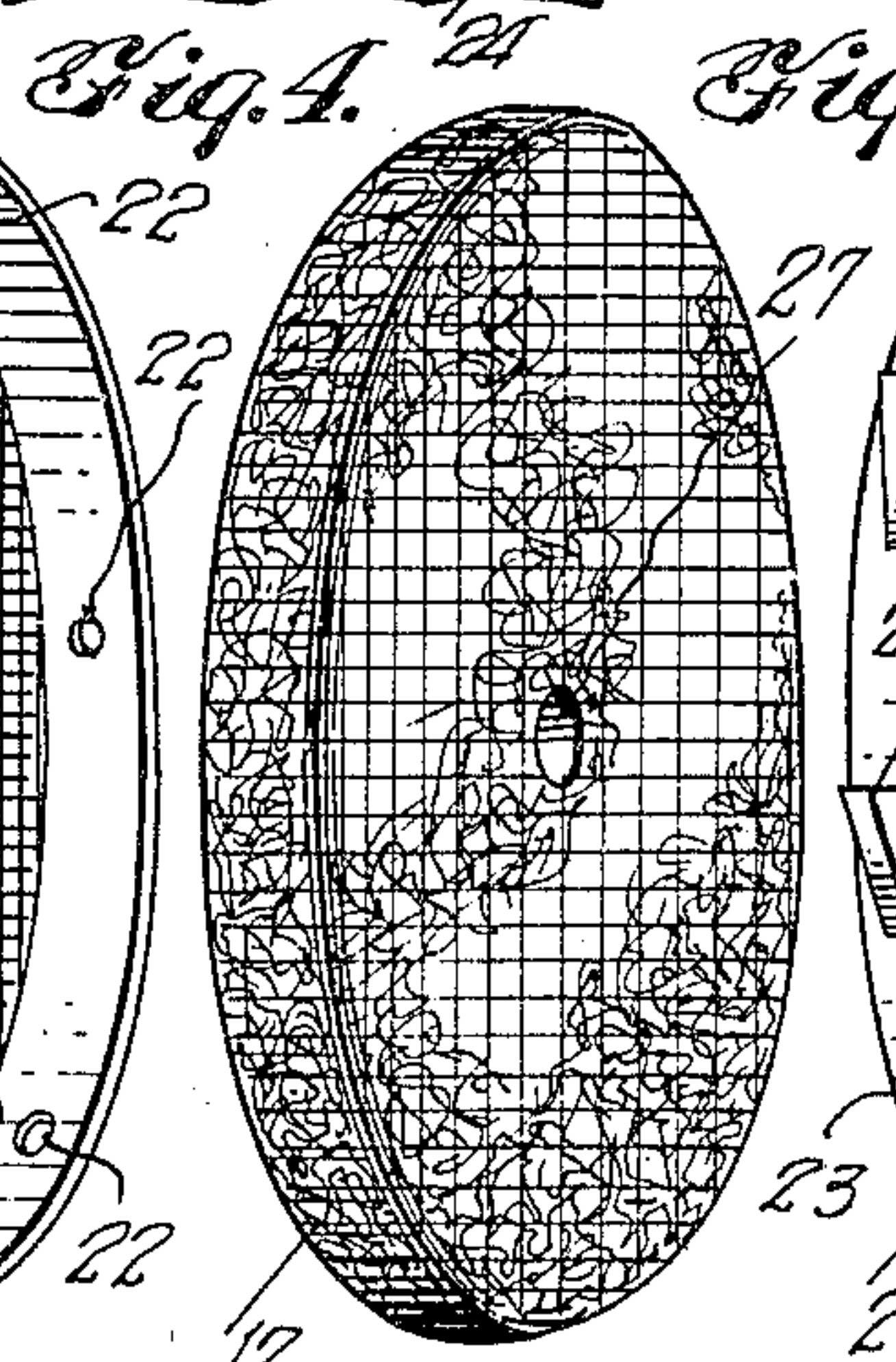
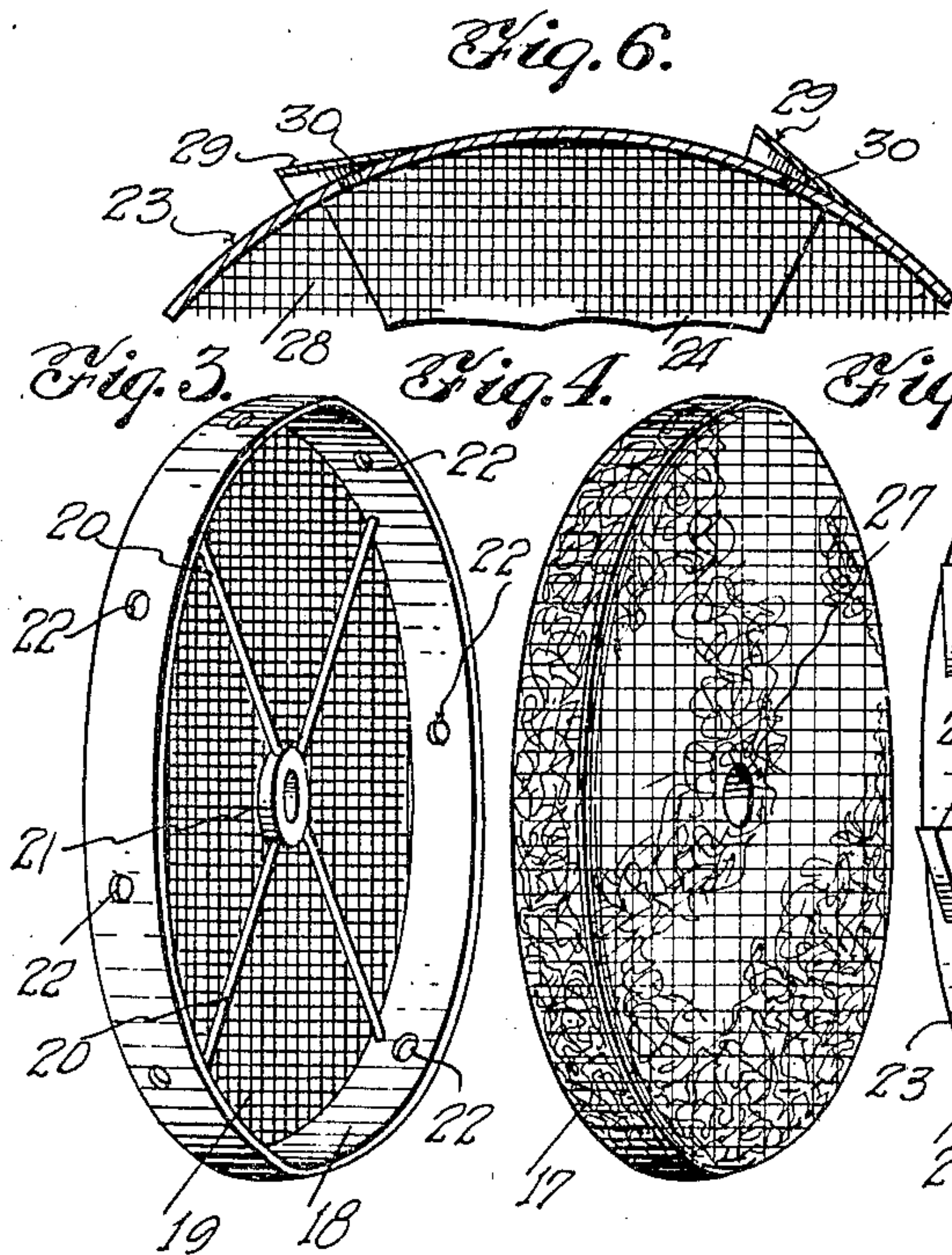
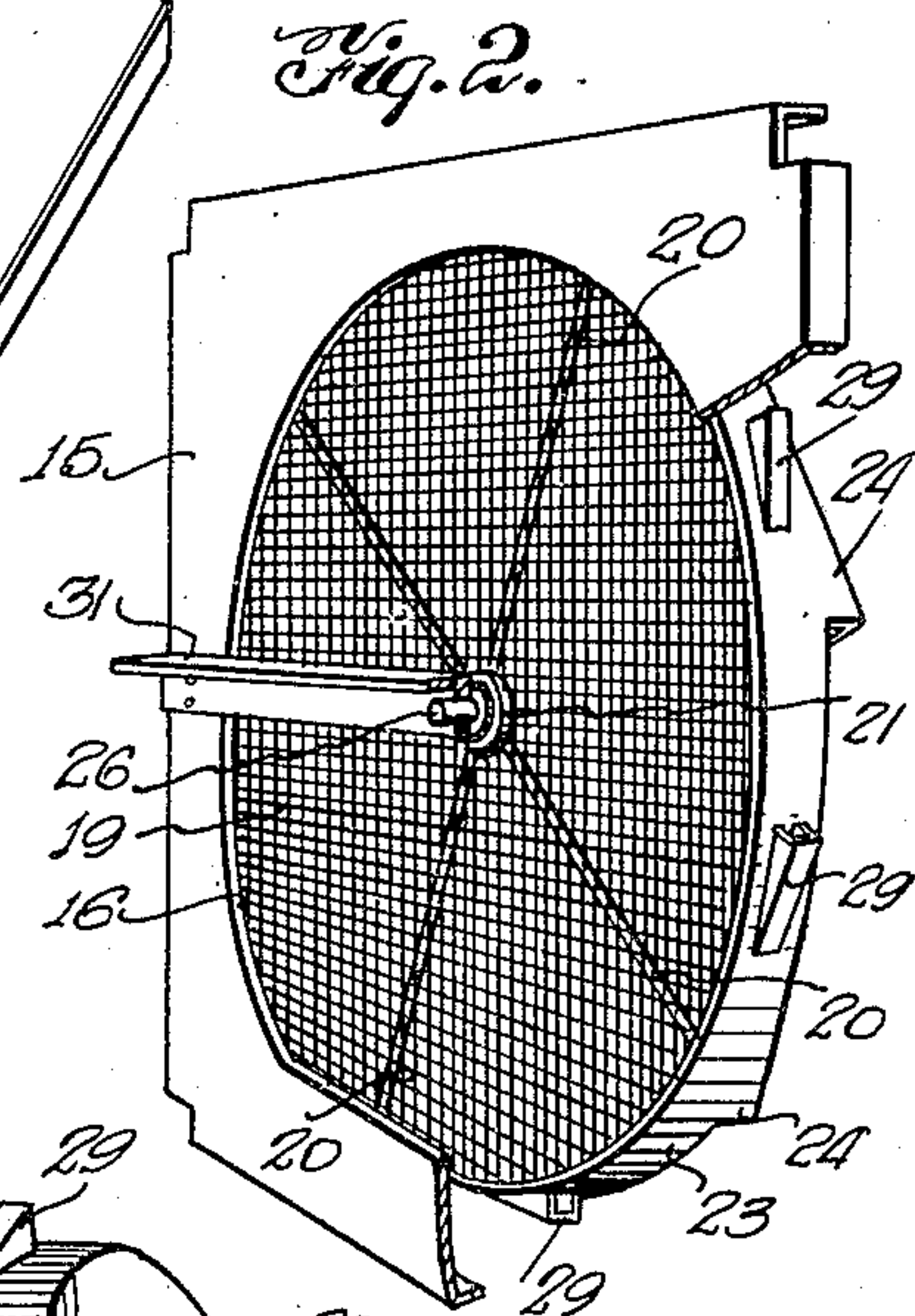
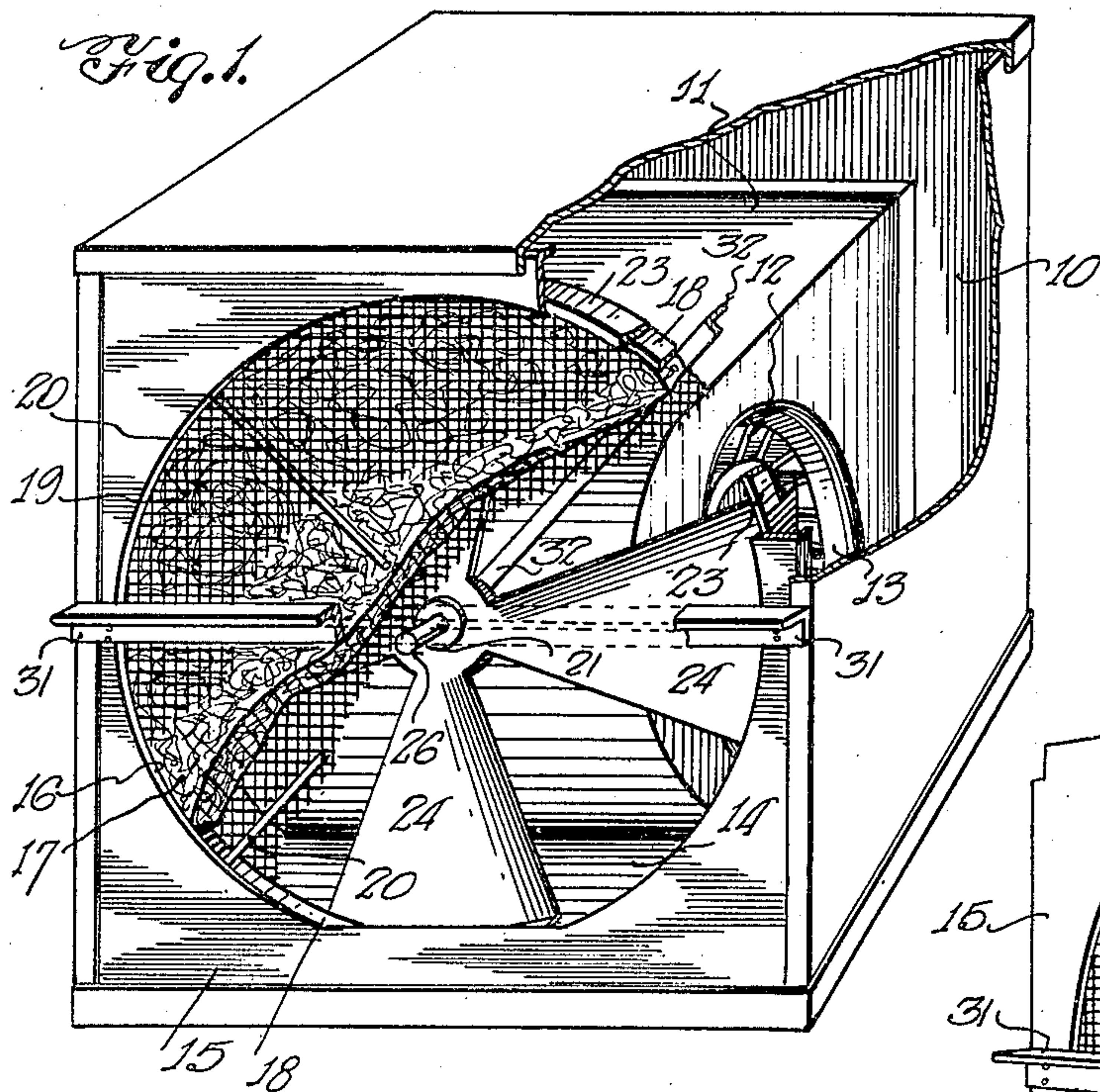
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2,343,820

EVAPORATIVE COOLING UNIT

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EVAPORATIVE COOLING UNIT

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5 Claims. (Cl. 261—30)

This invention relates to evaporative cooling apparatus and it has particular reference to a rotary filter mat.

The principal object of the invention is to provide an air cooling element designed for adaptation to the cabinet of conventional types of evaporative cooling units which utilize a fan or blower in the cabinet, the said invention including a circular air filter and a foraminous casing having means thereon by which air, drawn there-through by the fan, will propel the same and in so doing, will successively move a series of radially arranged cups, also carried by the casing, through a liquid reservoir in the cabinet, to elevate and deposit liquid onto the mat.

Another object of the invention is to eliminate the liquid pump and its operating motor which have heretofore been essential in the operation of evaporator units of the character mentioned, for maintaining a supply of water above for precipitation through the filter mats. By dispensing with the pump and the motor for operating the same, not only is there an obvious saving in cost but likewise a considerable saving in time usually spent in maintenance work, made necessary in part by frequent motor repairs and replacements since the pump motor, in many instances, is exposed to the deteriorating effects of moisture during operating periods of the unit.

Another object of the invention is to provide a filter mat assembly and impeller which is installed in its entirety in a panel which latter will conveniently replace the mat of a conventional air cooling unit and which panel is mounted in the cabinet in a manner similar to that customarily employed for mounting the stationary mat.

With the foregoing objects as paramount, the invention has particular reference to certain features of accomplishment, to become manifest as the description proceeds, taken in connection with the accompanying drawing, wherein:

Figure 1 is a perspective view of a conventional type of evaporative cooling unit with portions broken away and showing the rotary mat of the invention installed.

Figure 2 is a perspective view of the panel and mat impeller of the invention, the panel being partly broken away.

Figure 3 is a detail perspective view of the exterior flanged portion of the foraminous mat casing.

Figure 4 is a detail view of the mat per se.

Figure 5 is a detail view of the impeller, and

Figure 6 is a fragmentary view of the impeller flange in circumferential section, showing the cups thereon.

Continuing with a more detailed description of the drawing, reference is primarily made to Figure 1 wherein numeral 10 denotes a cabinet of the kind ordinarily used in constructing well known types of evaporative cooling units. This cabinet has an open rear end while its front end is provided with a louvered opening with which the exhaust 11 of the blower 12 communicates. Usually, a filter mat of conforming proportions is placed in the open rear end of the cabinet and while not shown in the drawing, a motor operates the blower 12, causing air to be drawn through the mat, into the side intakes 13 of the blower housing and exhausted through the front of the cabinet. As stated previously, a pump and a pump operating motor is usually required to elevate water from the pump or reservoir 14 and discharge it into channels or troughs conveniently disposed above the mat or mats in the cabinet, to trickle downwardly through the mats to saturate them, thereby reducing the temperature of the air moving through the mats.

The present invention dispenses with the mats, pump, pump motor and water receiving and distributing troughs and employs instead a panel 15 of a size suitable to replace the mat removed from the rear opening in the cabinet 10. This panel has a large central opening 16 therein through which air is drawn when the blower 12 is operated.

The elements of the air filter and its operating means are assembled and mounted over the opening in the panel 15 in the manner shown in Figures 1 and 2 and these include the previous filter mat 17, composed of any suitable type of material, usually aspenwood or cottonwood shavings enclosed in a netted container of fabric. This mat is of circular shape and is received in the outer section of the casing, shown in detail in Figure 3 and consists of a flange or rim 18 on which is affixed the screen 19. The flange 18 is reinforced with radial spokes 20, extending from a centrally disposed hub 21. The flange is also provided with annularly spaced apertures 22, to which reference will be later made.

The means by which air current induced by the blower through the mat 17 causes the latter to revolve is shown in Figure 5 in detail and consists of an annular flange 23 having thereon an impeller comprised of radially extending vanes 24 which are either formed in a single piece

with the flange as by die stamping or by affixing the vanes to the flange by welding or other means. A hub 25 is formed centrally of the vanes and when assembled with the companion parts, the hub receives the stub shaft 26, the latter passing through the aperture 27 in the mat 17 and through the hub 21 complementary to the stub 26. The vaned element, just described, which will be hereinafter referred to simply as the impeller, has a screen 28 which serves, with the screen 19, to enclose the mat 17 without retarding to any material degree, the air passing therethrough.

Circumferentially disposed in spaced relation about the perimeter of the impeller is a plurality of cups 29. The open ends of these cups face in the direction of rotation of the impeller and as they pass through the liquid contained in the reservoir 14 of the cabinet 10, they dip up a quantity of the liquid and in ascending, the liquid enters an aperture 30, embraced by each cup in the impeller flange 23 and continuing through one of the corresponding apertures 22, previously mentioned as being in the flange 13 and which register with apertures 30, the liquid will enter the mat 17 enclosed between the flanged elements.

With the elements of the mat assembly properly joined together as explained they are mounted as one unit on the inside of the panel 15, as shown in Figure 2. As a means for supporting the assembly, a horizontal angle iron brace 31 is affixed across the front of the panel to provide a support for the bearing which carries the outer end of the stub shaft 26. This is preferably a frictionless type of bearing as is likewise the bearing in which the inner end of shaft 26 is journaled. This latter bearing is supported by a V-shaped arrangement of braces 32 (Figure 1) although only one of such braces is shown.

When the panel 15 is set into place in the cabinet 10, and the blower started, the air constrained thereby to enter the cabinet through the mat 17 will, by reason of the angular faces of the vanes 24, cause the entire mat assembly to revolve, the rotative speed being primarily determined by the velocity of the air, combined with the angular setting of the vanes 24.

It is therefore apparent that as the mat assembly rotates, the liquid picked up by the cups 29 on the impeller flange will be deposited by each cup successively onto the periphery of the mat and the latter being pervious, the liquid will permeate the same and maintain it in a reasonably saturated condition during all operative periods of the blower.

In most conventional types of evaporative coolers, there exists an objectionable feature which is that the point in the mat, usually the center thereof, where the air velocity is greatest, evaporation is such that the fiber of the mat is quite dry while surrounding portions thereof are overly moist. This is due to the fact that while the water delivered to the mat is uniformly distributed, the air drawn therethrough is not. Moreover, these conventional mats quickly become odorous due to accumulated foreign matter resulting from inadequate drainage or flushing. The present invention insures an ample supply of moisture to compensate for that evaporated at the point in the mat where the air penetrates it at the highest velocity and at the same time, there is present a cleansing or continuous flushing action by reason of the rotative movement of the mat, which has the effect of imparting to the

water and any foreign matter, a centrifugal force tending to thrust the same toward the edges of the mat and out of the same.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claims is also considered to be within the spirit and intent of the invention.

What is claimed is:

1. In an evaporative air cooling apparatus, a cabinet having openings in each end and a liquid reservoir in the bottom thereof, a fan in said cabinet for moving air therethrough, a panel adapted to be mounted in one end of said cabinet and having a central opening therein, a circular pervious air filter mat, a pair of screens between which said mat is interposed and having annular relatively telescoping flanges forming with said screens a casing for said mat, said flanges being provided with aligned and circumferentially spaced apertures, a series of radial vanes overlying one of said screens and against which air is drawn by said fan to effect rotation thereof and said mat, a cup covering each of the aligned apertures in said flanged elements, a shaft rotatably supported centrally of the opening in said panel and on which said mat casing is mounted for rotation whereby said cups will successively enter said reservoir and elevate water therefrom to be deposited onto said mat through said apertures.

2. In an evaporative air cooling apparatus, a cabinet having a fan therein for moving air therethrough and provided with a water reservoir in the bottom thereof, a panel receivable in one open end of said cabinet having an opening therein, a pervious filter mat, a foraminous casing therefor having telescopically related flanges and rotatably disposed in the opening in said panel, means integral with one of said flanges, having vanes struck therefrom and overlying one face of said casing and influenced to rotate by air constrained by said fan to pass through said mat and means also on the flanges of said casing for elevating predetermined quantities of water from said reservoir and depositing the same onto the periphery of said mat as said casing rotates.

3. In an evaporative air cooler, a cabinet having water reservoir in its bottom and a fan for moving air therethrough, a panel opposite the air discharge of said cabinet having an opening therein, a pervious filter mat over said opening, a foraminous casing for said mat having annular telescopically related flanges provided with circumferentially spaced apertures, impeller blades arranged integral with one of said flanges and adapted to overlie one face of said casing and through which air is drawn by said fan to effect rotation of said mat casing and means embracing the apertures in said flanges for elevating water from said reservoir and depositing the same through said apertures onto said mat during rotation of said casing.

4. In an apparatus for cooling air, a cabinet, a liquid reservoir therein, a panel in one end of said cabinet having an opening therein, a pervious filter mat, a foraminous casing therefor rotatably disposed over said opening, telescopically related flanges on said casing impeller blades carried by one of said flanges and over-

lying one face of said casing, means in said cabinet for constraining air to pass through said mat and against said blades to effect rotation of said mat casing and means carried also by said casing for elevating liquid from said reservoir and depositing the same onto said mat during rotation of said casing.

5. A rotary filter mat for an evaporative air cooling unit, a panel adapted to be received in one end of the cabinet of said unit and having a central opening, a foraminous, flanged casing for said mat and rotatably disposed over the

opening in said panel, a series of angularly disposed blades radially arranged on one of the flanges of said casing and by which said casing is rotated by air moving against said blades and a series of circumferentially spaced cups carried by one of the flanges of said casing and aligned with apertures in the companion flange for elevating water from the bottom of said cabinet to a point above said mat for discharge thereinto during rotation of said casing.

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