Oct. 4, 1949. A. A. SODERMAN 2,483,509

AIR CONDITIONING APPARATUS

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Fig. 1.

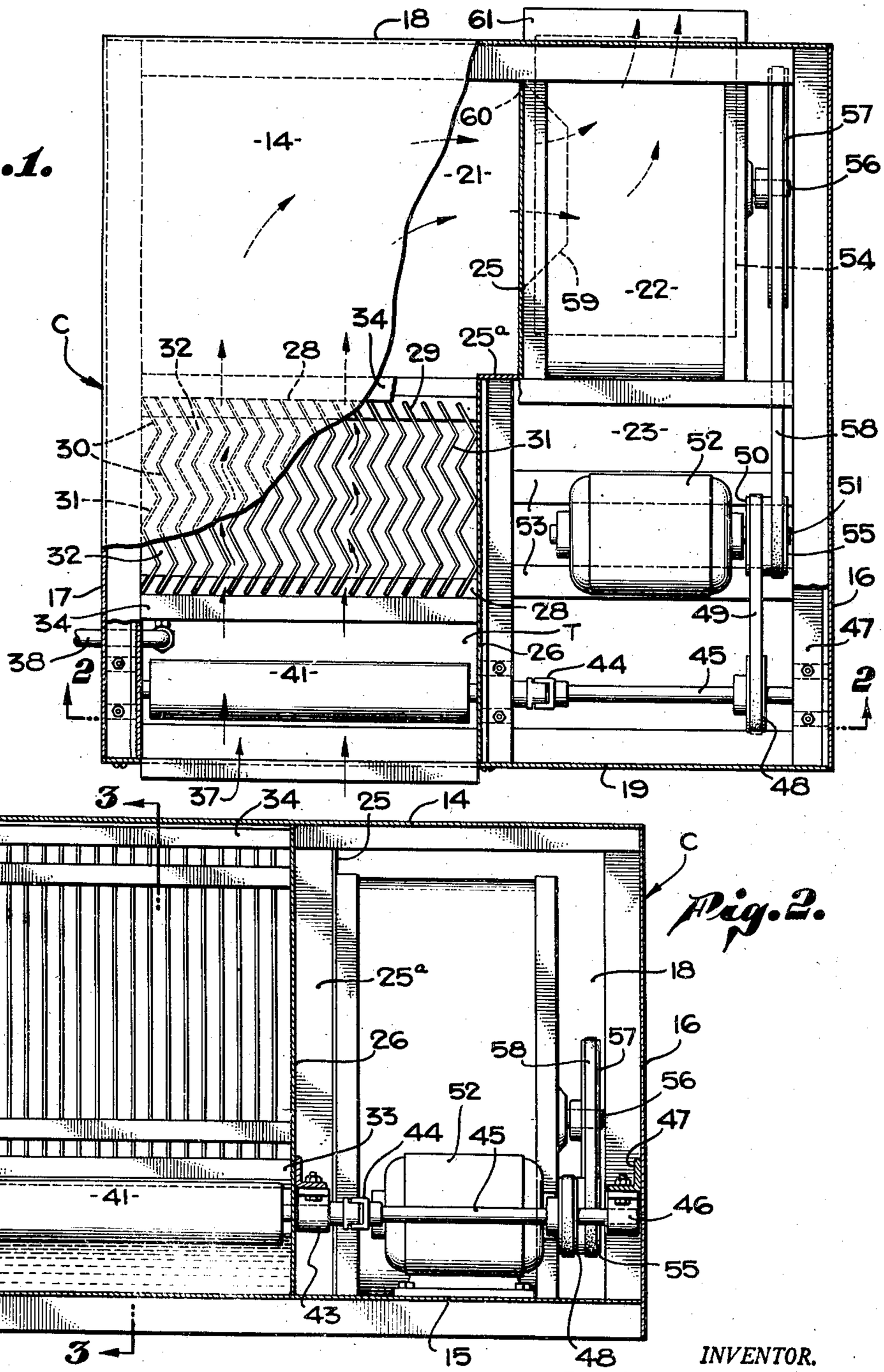

Fig. 2.

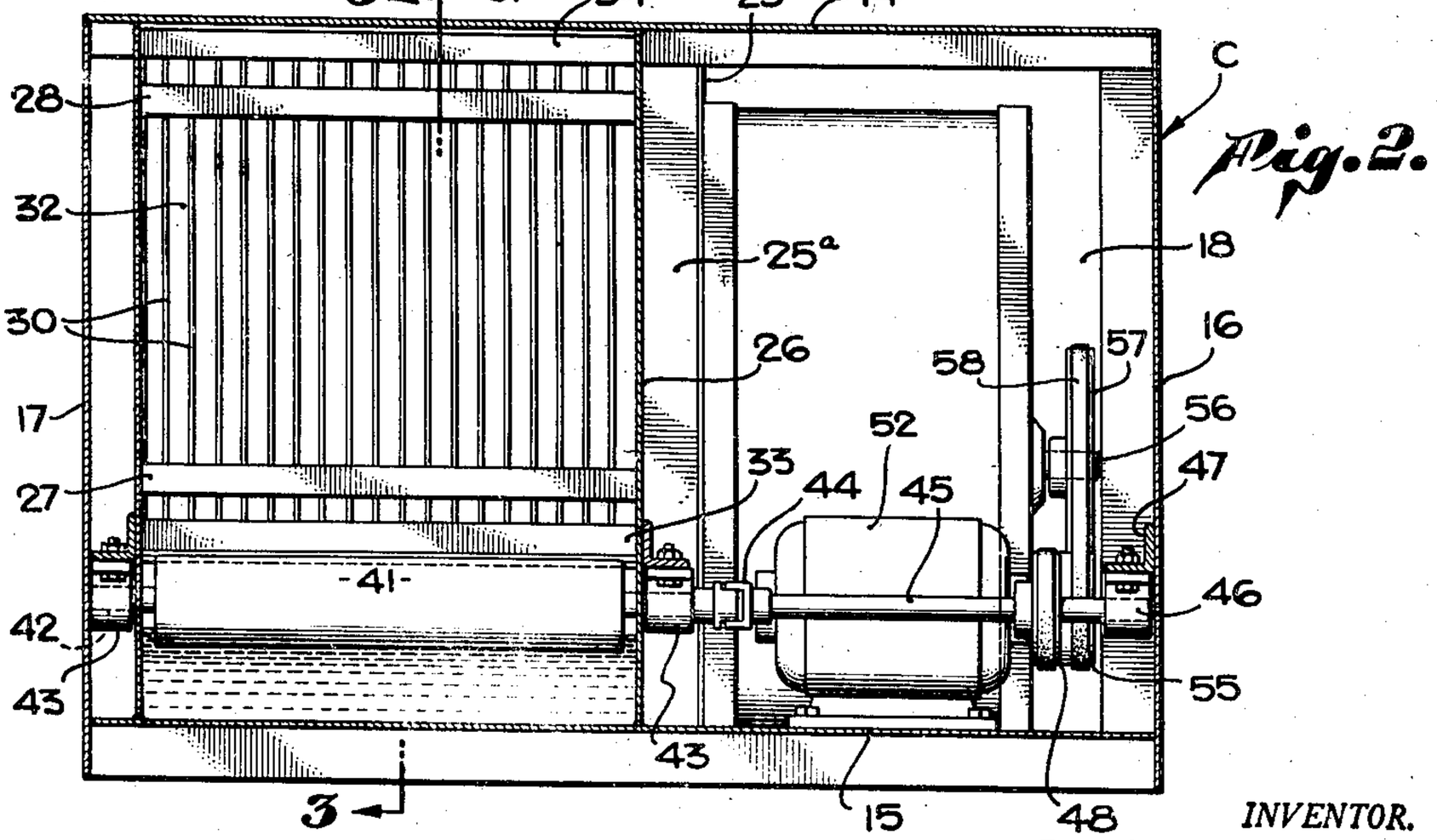

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Fig. 3.

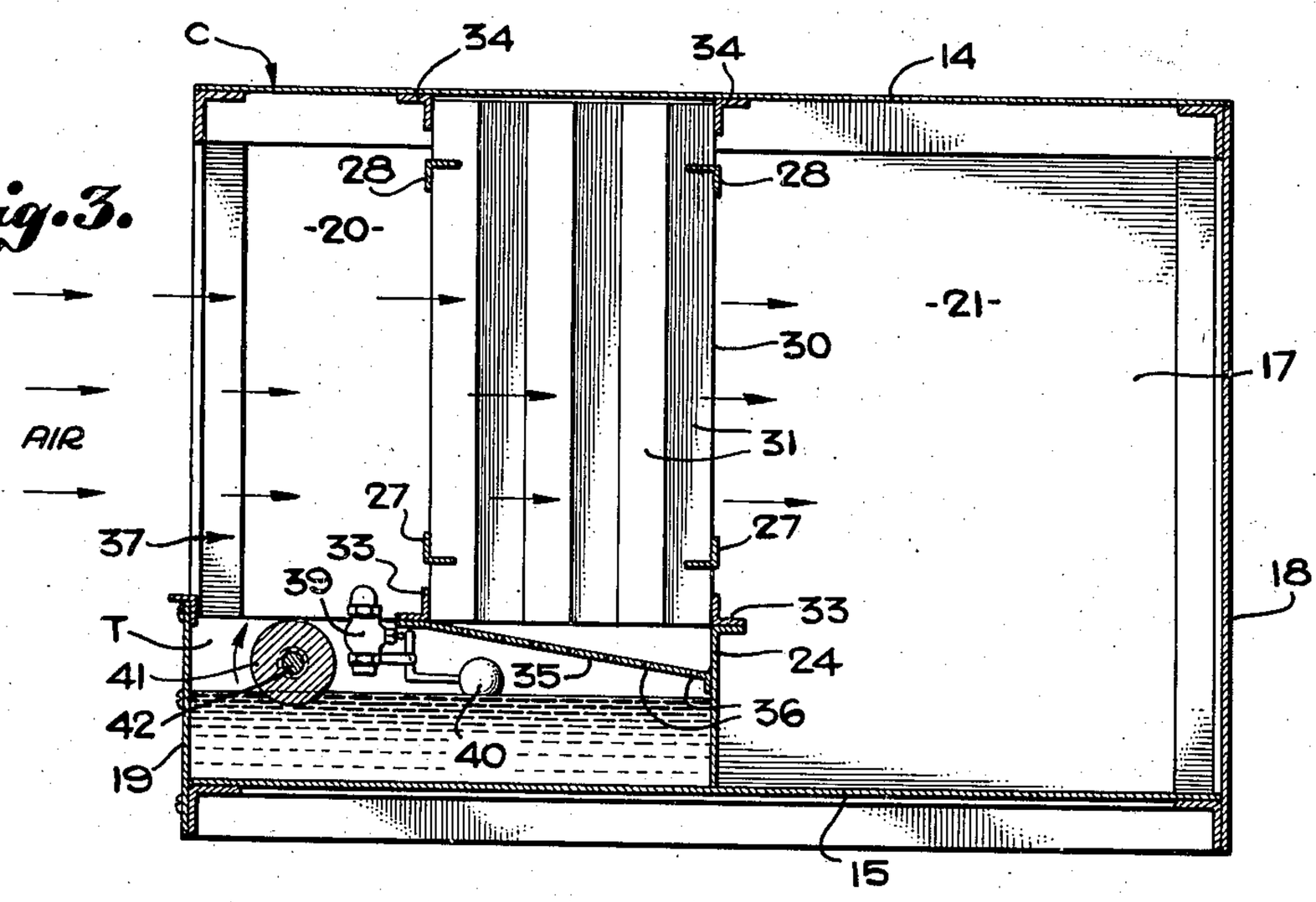
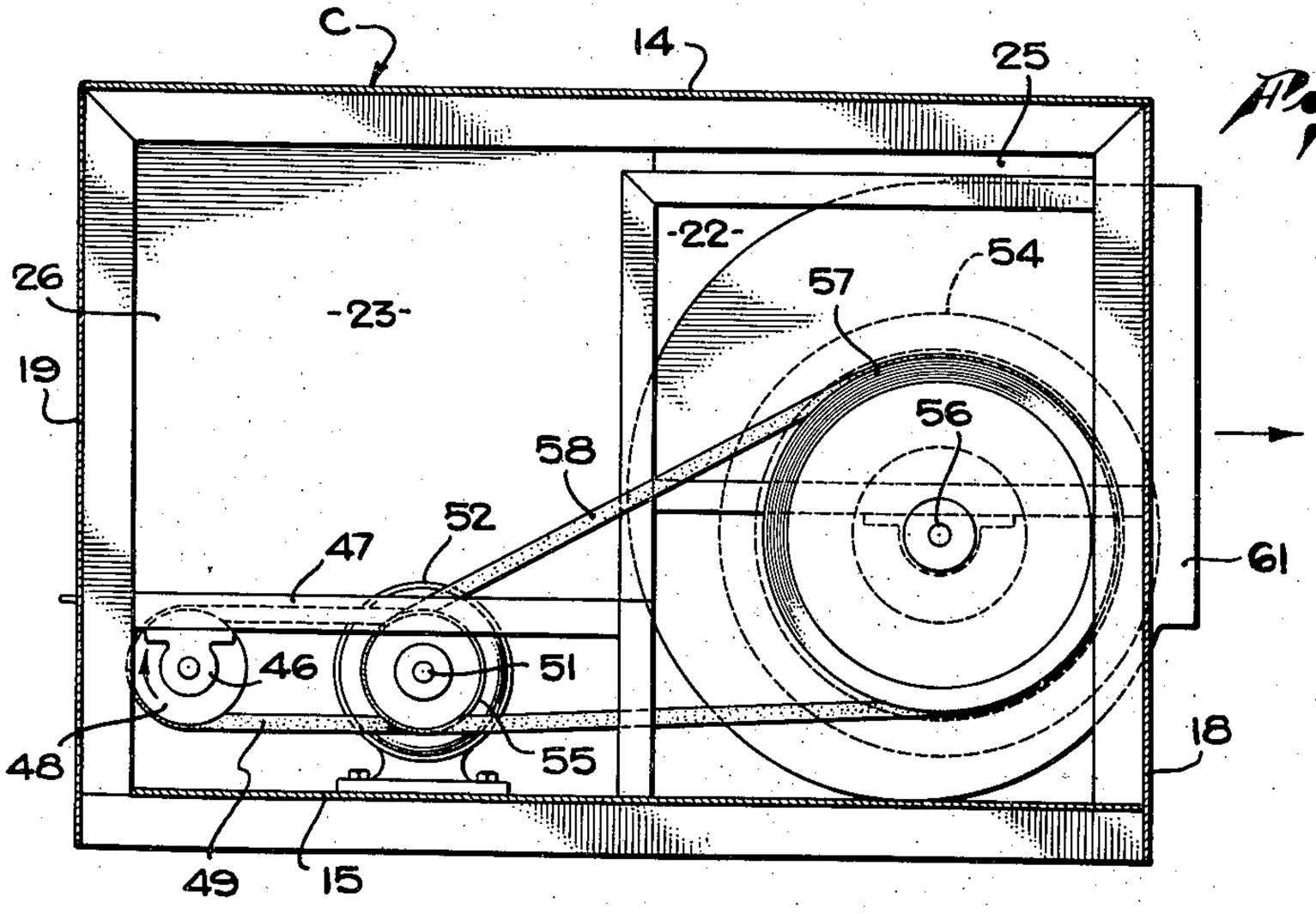


Fig. 4.



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UNITED STATES PATENT OFFICE

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AIR CONDITIONING APPARATUS

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Application January 11, 1947, Serial No. 721,611

3 Claims. (Cl. 62—139)

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My invention relates to air conditioning apparatus of the type employing water for both cooling and cleaning the air. Such apparatus employs air filtering elements in the form of perforated pads or metal or wood shavings, and a pump for delivering water to the filtering elements so that as the air is filtered it is also cooled.

In high temperatures and low humidity climates where alkaline water is so prevalent, such a type of apparatus presents many defects and disadvantages. Because of the filtering elements, they soon become clogged or so contaminated with the alkali deposits and other matter as to become useless or to require frequent cleaning. Even before the filtering elements reach these stages of unusefulness the alkaline content of the water soon so coats the elements that the air in its passage therethrough picks up considerable moisture and thus becomes so saturated with aqueous vapor that as finally discharged from the apparatus the air is extremely damp and, hence, highly undesirable. Also, the pump parts accumulate alkali deposits necessitating frequent part replacements.

It is a purpose of my invention to provide an air conditioning apparatus in which the filtering elements and the attendant disadvantages aforesaid are entirely eliminated, and the air as finally discharged from the apparatus, is cooled and thoroughly cleaned by water, and yet devoid of moisture.

It is also a purpose of my invention to provide an air conditioning apparatus in which the use of a rotary or reciprocating water pump is avoided and its disadvantages eliminated, the water in my apparatus being impelled by a device without parts on which alkali or other matter can accumulate to render the device inoperative, or to require replacement of its parts.

I will describe only one form of air conditioning apparatus embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings:

Fig. 1 is a view showing in top plan, with a portion of the top casing broken away, one form of air conditioning apparatus embodying my invention.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a side elevational view with the side casing wall removed.

With specific reference to the drawings, my

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apparatus in its present embodiment comprises a rectangular casing C made up of a frame and plates constructed and arranged to provide a top wall 14, a bottom wall 15, side walls 16 and 17, a back wall 18, and a front wall 19. The casing is divided interiorly into compartments 20, 21, 22, and 23, by partitions 24, 25, and 26, the partition 25 having an angular flange 25a (see Fig. 1) which coacts with the partition 26 to seal one corner of the compartment 21, against passage of air into the compartment 23.

Supported within the compartment 20 on two pairs of angle bars 27 and 28 secured at their ends to the wall 17 and the partition 26, and engaging within slots 29, are a series of vertically extending baffles 30. Each baffle is of zigzag or other tortuous contour transversely from end to end, to provide a plurality of walls or facets 31, and the several baffles are spaced in parallelism vertically from end to end to form therebetween a series of passages 32 which, by virtue of the facets 31, are of tortuous form horizontally.

As best shown in Fig. 3, two pairs of angle bars 33 and 34 are secured to the wall 17 and the partition 26, so as to extend across the upper and lower ends of the baffles 30.

The front wall 19, with the partition 24, the bottom wall 15, and the partition 26, all coact to form a trough or container T for water, and as will be seen from Fig. 3 this trough extends across the lower ends of all of the passages 32, and well in advance of the baffles 30. That part of the trough directly below the baffles is spanned by a plate 35 which is secured to one of the bars 33 and the partition 24 so as to slope downwardly, and thus provide drainage for water falling thereon. In addition the plate is formed with a multiplicity of small openings 36 so that water can pass downwardly into the trough, and yet little if any air will pass through the plate when the apparatus is operating.

Air is admitted to the compartment 20 in advance of the baffles 30 through an inlet opening 37 formed in the front wall 19 and substantially coextensive in area with that of the baffles.

Water is supplied to the trough T from a pipe 38 (see Figs. 1 and 3) having a valve 39 controlled by a float 40 to maintain the water in the trough at a predetermined level so that a water impelling member 41 will operate continuously to throw water upwardly into the path of air entering through the inlet opening 37 and before it reaches the baffles 30.

The impelling member 41 may be in the form of a roller fixed to a shaft 42 journaled in bear-

ings 43, and connected at one end by a universal joint 44 to a second shaft 45 journaled in a bearing 46 depending from a bar 47 (see Fig. 4). To the shaft 45 is fixed a pulley 48 around which is trained an endless belt 49. The belt is also trained about a pulley 50 fixed to the shaft 51 of a motor 52 secured to bars 53 in the bottom of the casing. The motor is located in the compartment 23 which is open to the compartment 22 so that it may be connected to drive a blower 54 of the squirrel cage type located in the compartment 22.

The motor shaft 51 is provided with a second pulley 55, and the blower shaft 56 with a pulley 57, an endless belt 58 operatively connecting the two pulleys.

The blower 54 has a side air inlet 59 (see Fig. 1) which registers with an opening 60 in the partition 25, and a peripherial outlet 61 which registers with an opening in the back casing wall 18. Thus the blower inlet 59 is in communication with the compartment 21, to draw air therefrom and discharge it to atmosphere through the outlet 61.

The operation of the apparatus is as follows:

Under operation of the blower 54 air is drawn into the casing C through the inlet 37 passing horizontally through the passages 32, and thus the air is divided into a multiplicity of streams with each stream caused, by the angular facets 31, to describe tortuous paths. After traversing the passages 32, the air moves through the compartment 21 and into the blower 54 through the inlet 59, from whence it is discharged from the casing through the blower outlet 61.

Concurrently with the above described air flow as produced by the blower, the roller 41 is driven in a clockwise direction as when viewed in Fig. 3, and under such rotation, water from the trough T is impelled upwardly in finely divided form and into the path of the incoming air, as indicated by the arrows. As a consequence the finely divided water is thoroughly intermixed with the air in its movement toward the baffles 30, and the water being at a temperature considerably lower than the air, the air is thus cooled. This cooling operation continues in the movement of the air and water into the passages 32, but because of the tortuous form of the passages as provided by the baffles, the water particles are caused to strike the facets successively and are thus precipitated from the air and downwardly between the baffles, and finally into the trough through the perforations in the plate 35.

By reason of the many facets provided by the baffles the air as it finally leaves the baffles, is practically devoid of moisture content, and, hence, as ultimately discharged from the casing is cool and dry.

Because of the vertical arrangement of the baffles and the construction of the water impeller, any solid matter contained in the water being employed, which accumulate on the surfaces of the baffles and the impeller, cannot reduce the conditioning efficiency of the apparatus to deliver air which is cool and dry. Little solid matter can accumulate on the surface of the impeller because

of the centrifugal force produced by its rapid rotation, coupled with the fact that it is constantly being washed by the water in the trough. Also, the impeller shaft bearings 43 are remote from the trough, and by the use of suitable gaskets no water or solid matter can enter the bearings.

The solid matter accumulating on the baffles is ultimately drained onto the plate 35, but it can at no time interfere with proper cooling and dehydration of the air.

From the preceding description, it becomes manifest that my apparatus is admirably adapted for use in areas where the water has a high alkaline content, because regardless of the amount of alkaline or other content, operation of the apparatus is not impeded by accumulation of the water content on its parts, nor will any of its parts require replacement because of such accumulation.

Although I have herein shown and described only one form of air conditioning apparatus, embodying my invention, it is to be understood that various changes and modifications may be made therein without departing from the spirit of my invention and the spirit and scope of the appended claims.

I claim:

1. An air conditioning apparatus, comprising: a casing having an inlet and an outlet; means for creating air flow inwardly through said inlet to and outwardly of said outlet; a second means in the path of air flow in said casing for causing the air to define horizontally tortuous paths; a trough for water in said casing adjacent said inlet; and a roller in said trough rotatable about a horizontal axis for projecting water upwardly into the air before it enters said second means.

2. An air conditioning apparatus, comprising: a casing having an air inlet and an air outlet; a blower between said inlet and said outlet for creating air flow from the inlet to the outlet; baffles in said casing constructed and arranged to divide the air flow into a plurality of streams and to cause each stream to define horizontally tortuous paths; a trough for water in said casing beneath said baffles; and a roller in said trough rotatable about a horizontal axis and partly submerged in the water so that when rotated in a direction toward said baffles it will project upwardly into the air flow entering said passages.

3. An air conditioning apparatus as embodied in claim 2, wherein common means is provided in said casing for driving said blower and said roller.

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