

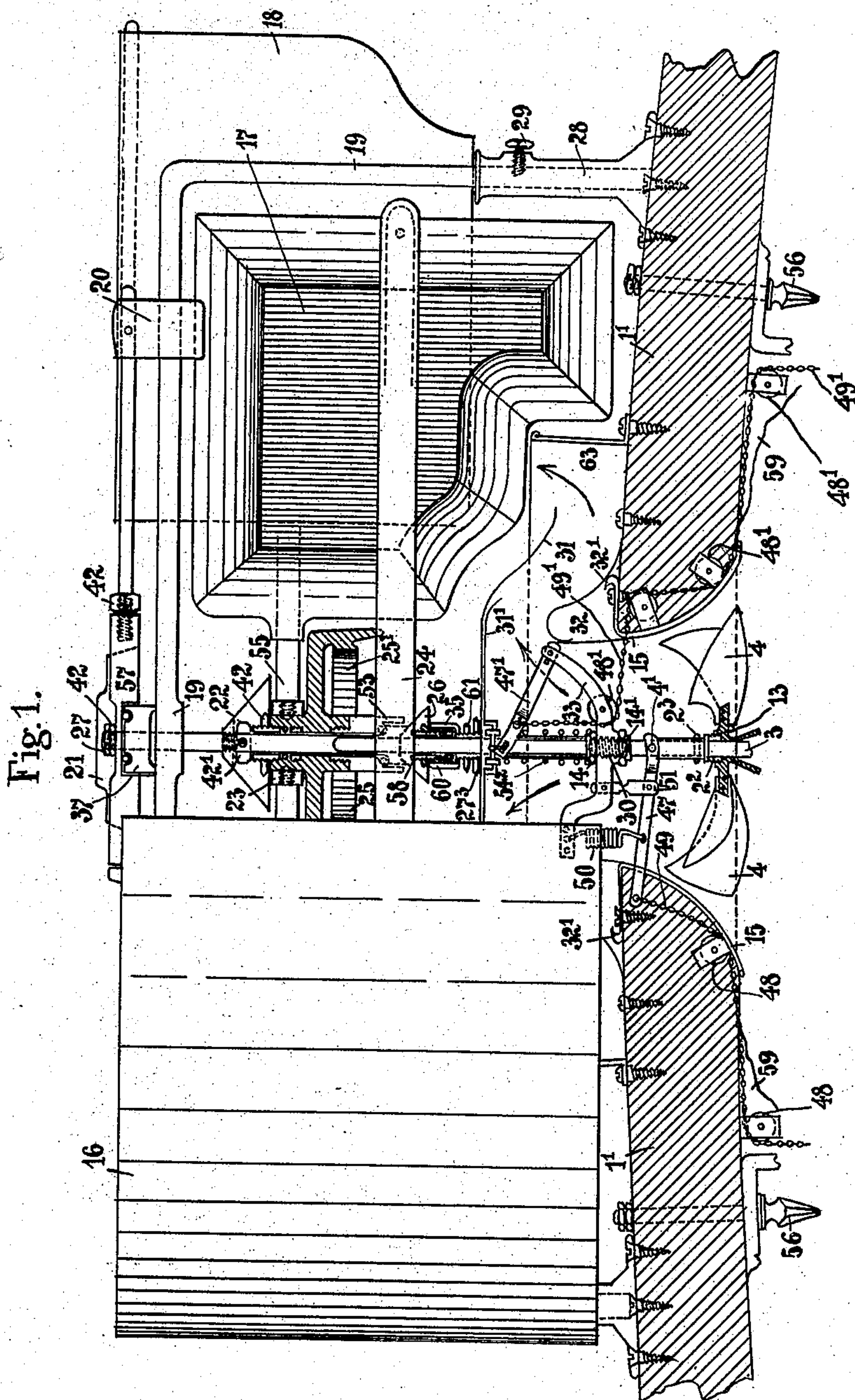
No. 894,671.

L. LAGNA-FIETTA.
AUTOMATIC EJECTOR AND VENTILATOR.

APPLICATION FILED FEB. 26, 1906.

PATENTED JULY 28, 1908.

5 SHEETS—SHEET 1.



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6 SHEETS—SHEET 2.

Fig. 2.

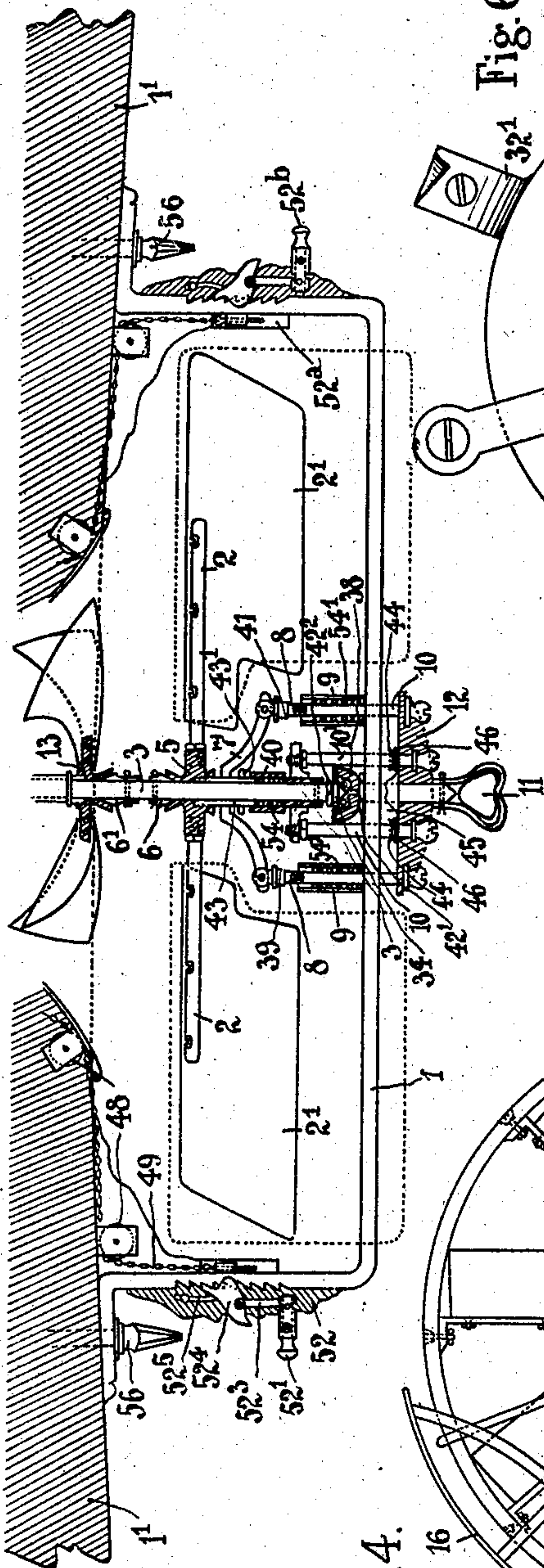


Fig. 4.

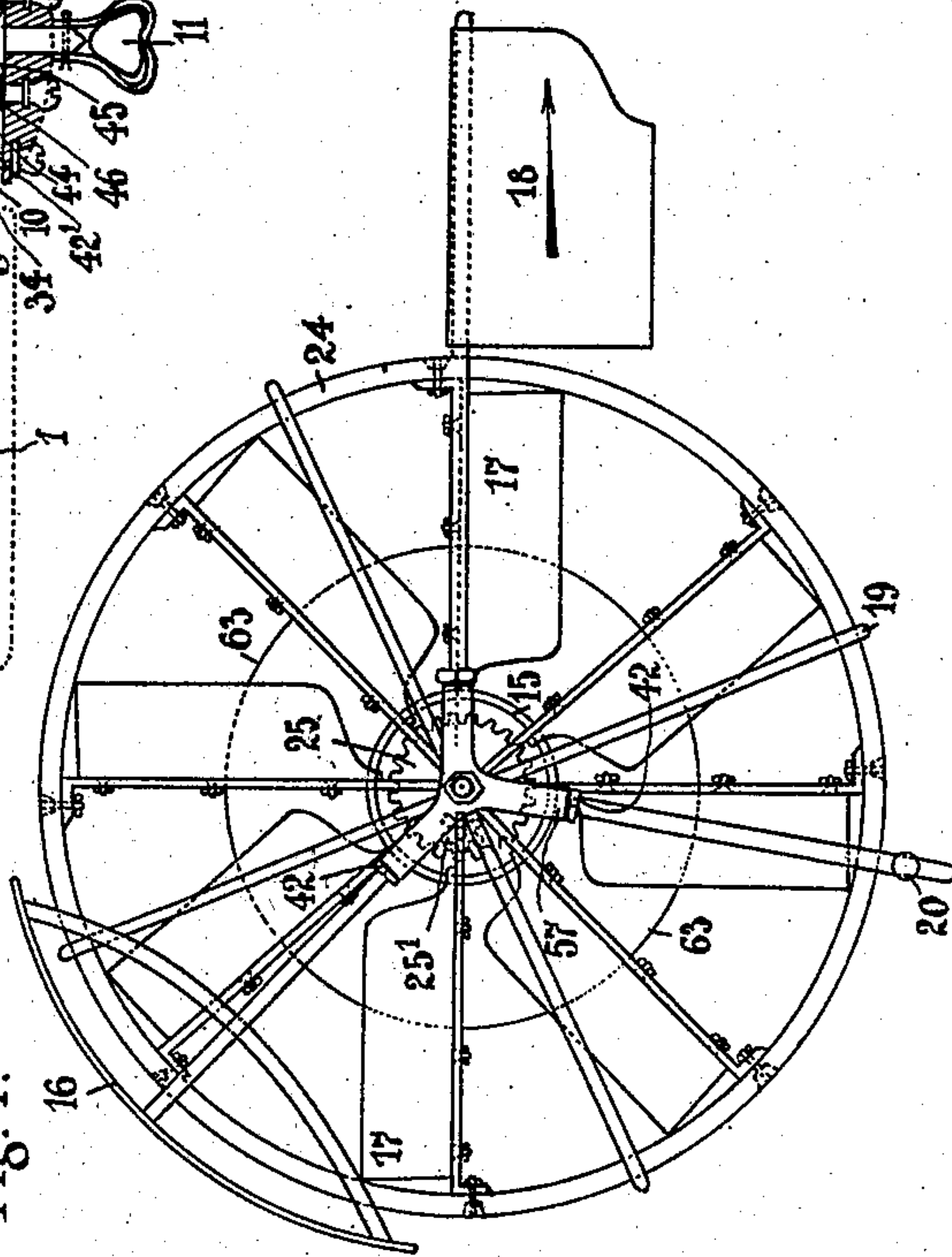
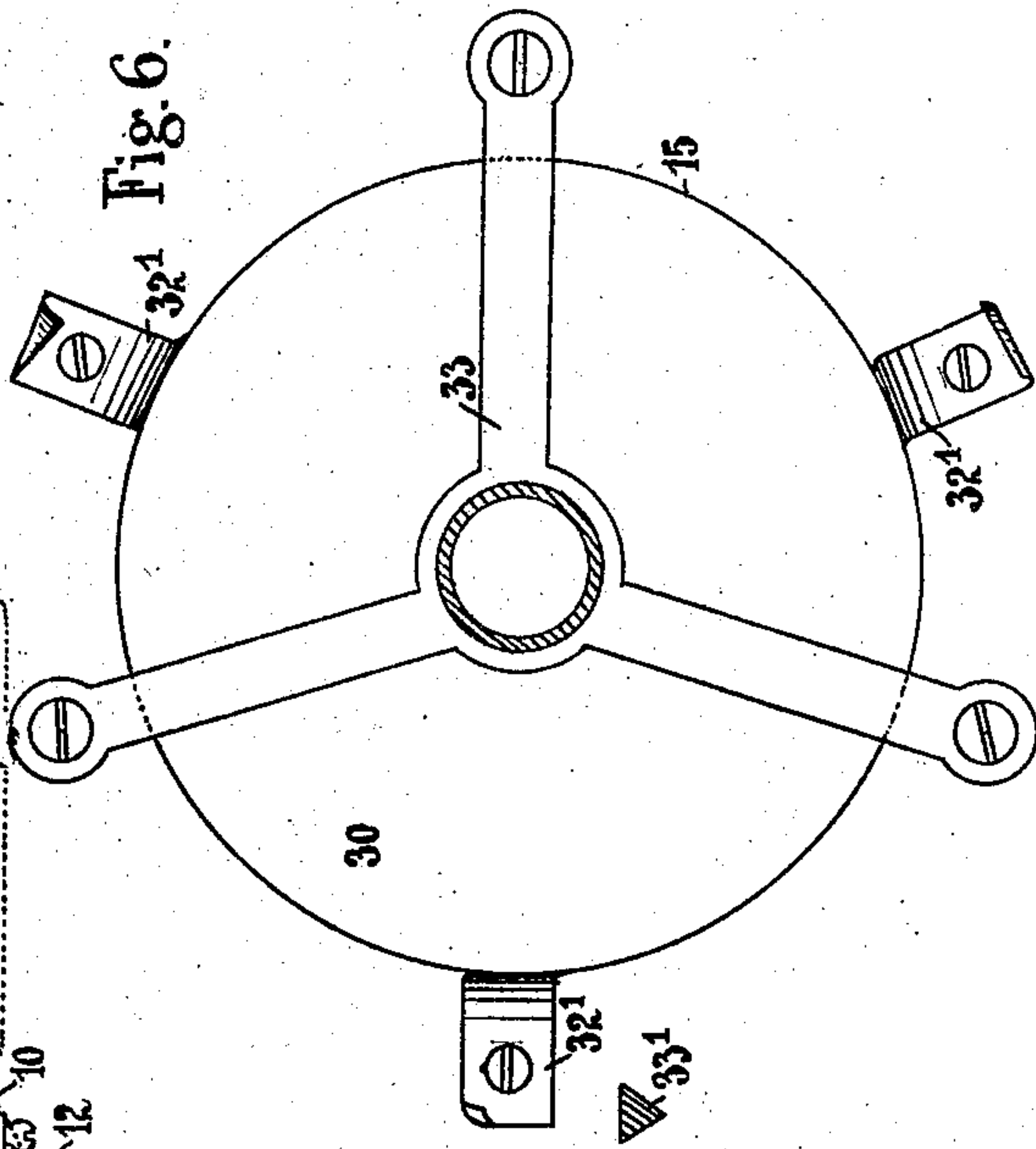


Fig. 6.



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m m a t t h i e s o n
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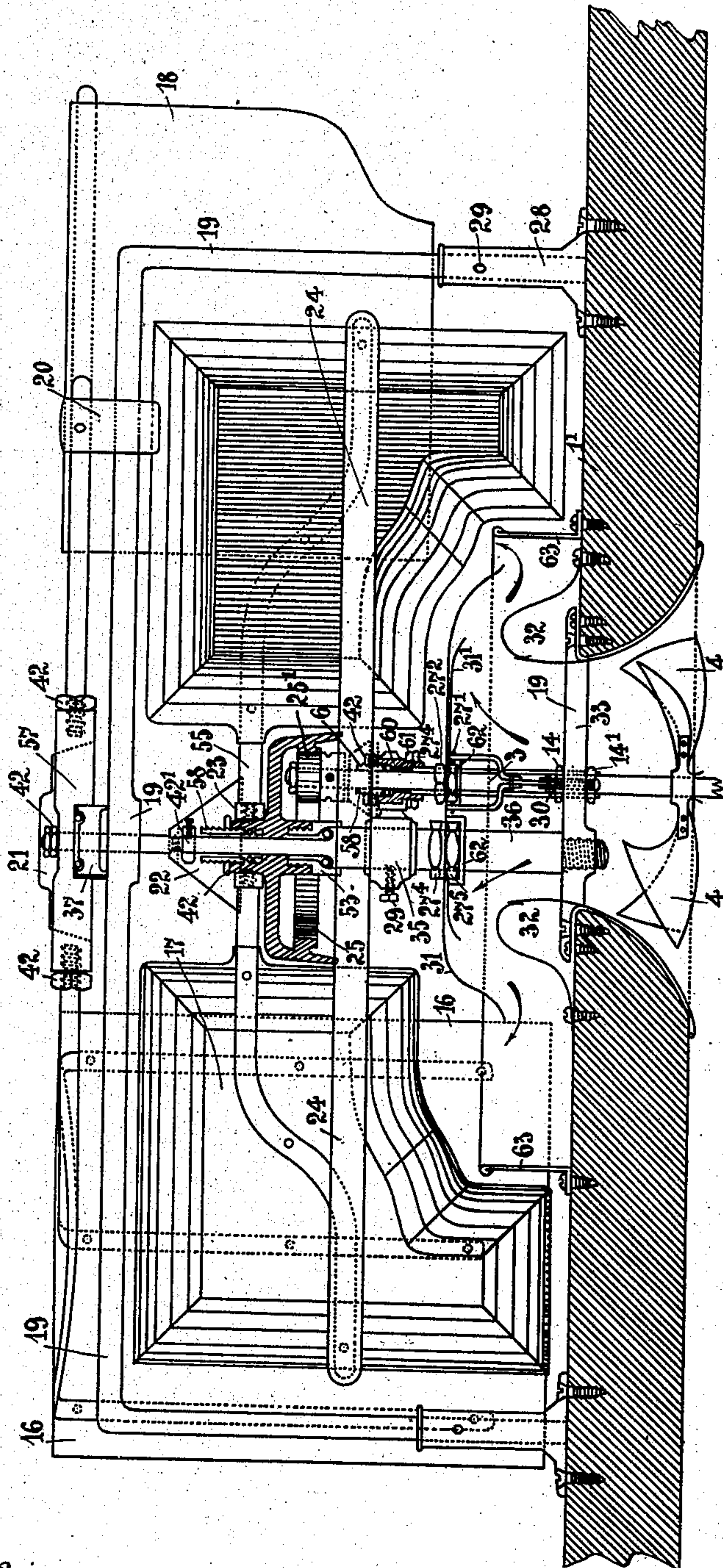
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5 SHEETS—SHEET 3.

Fig. 3.



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5 SHEETS—SHEET 4.

Fig. 5.

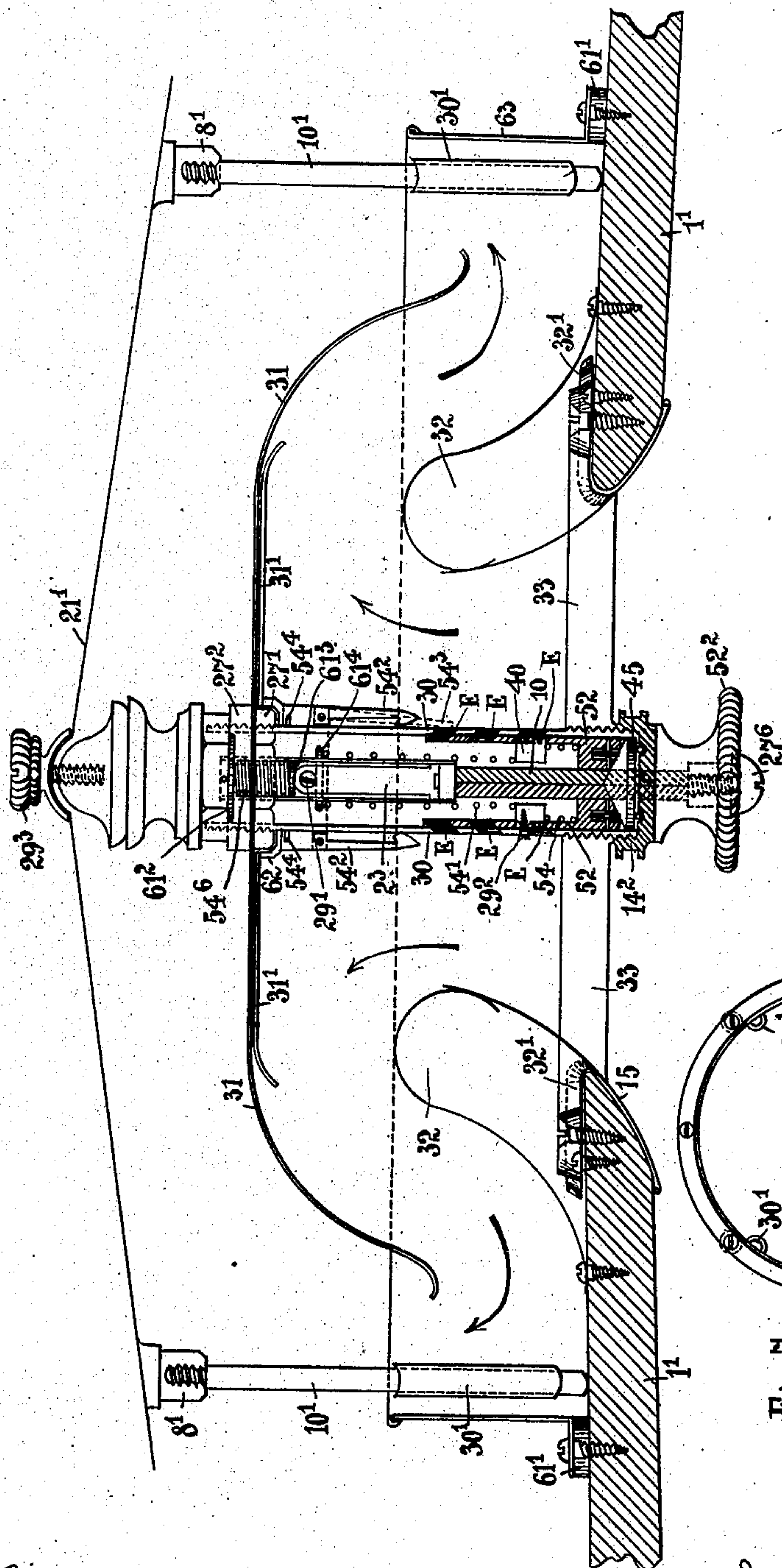
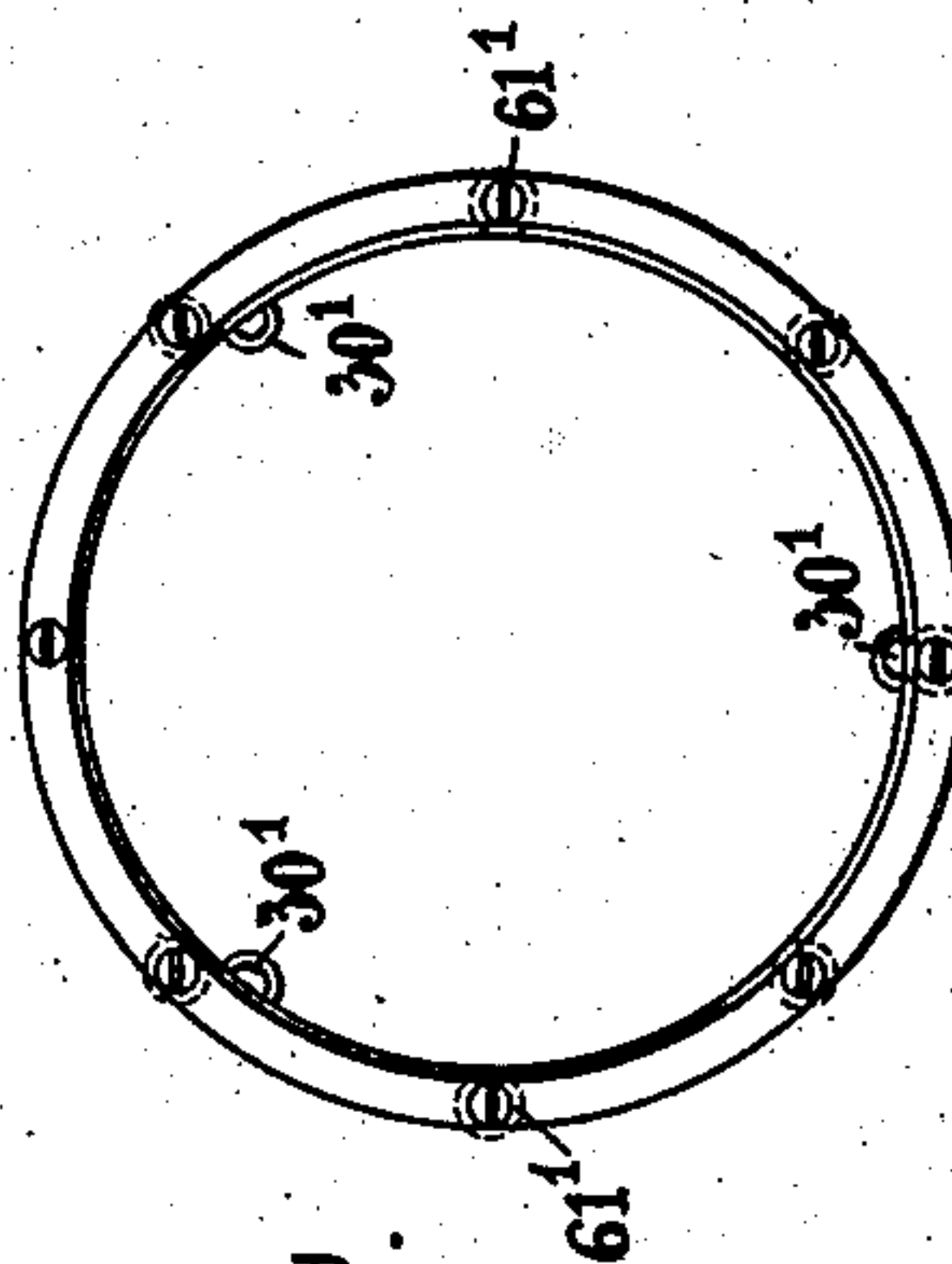


Fig. 7.



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5 SHEETS—SHEET 5.

Fig. 9

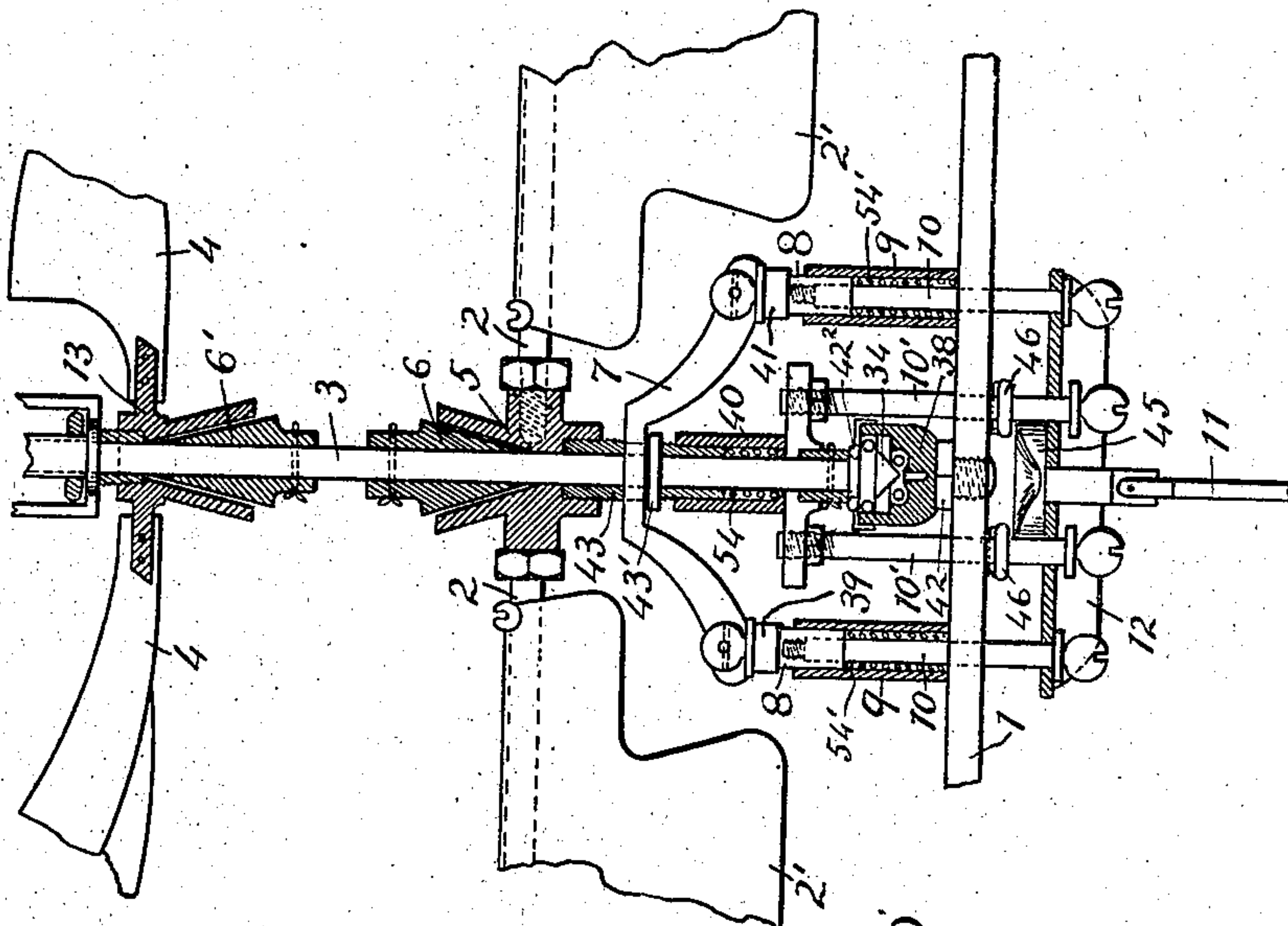


Fig. 8

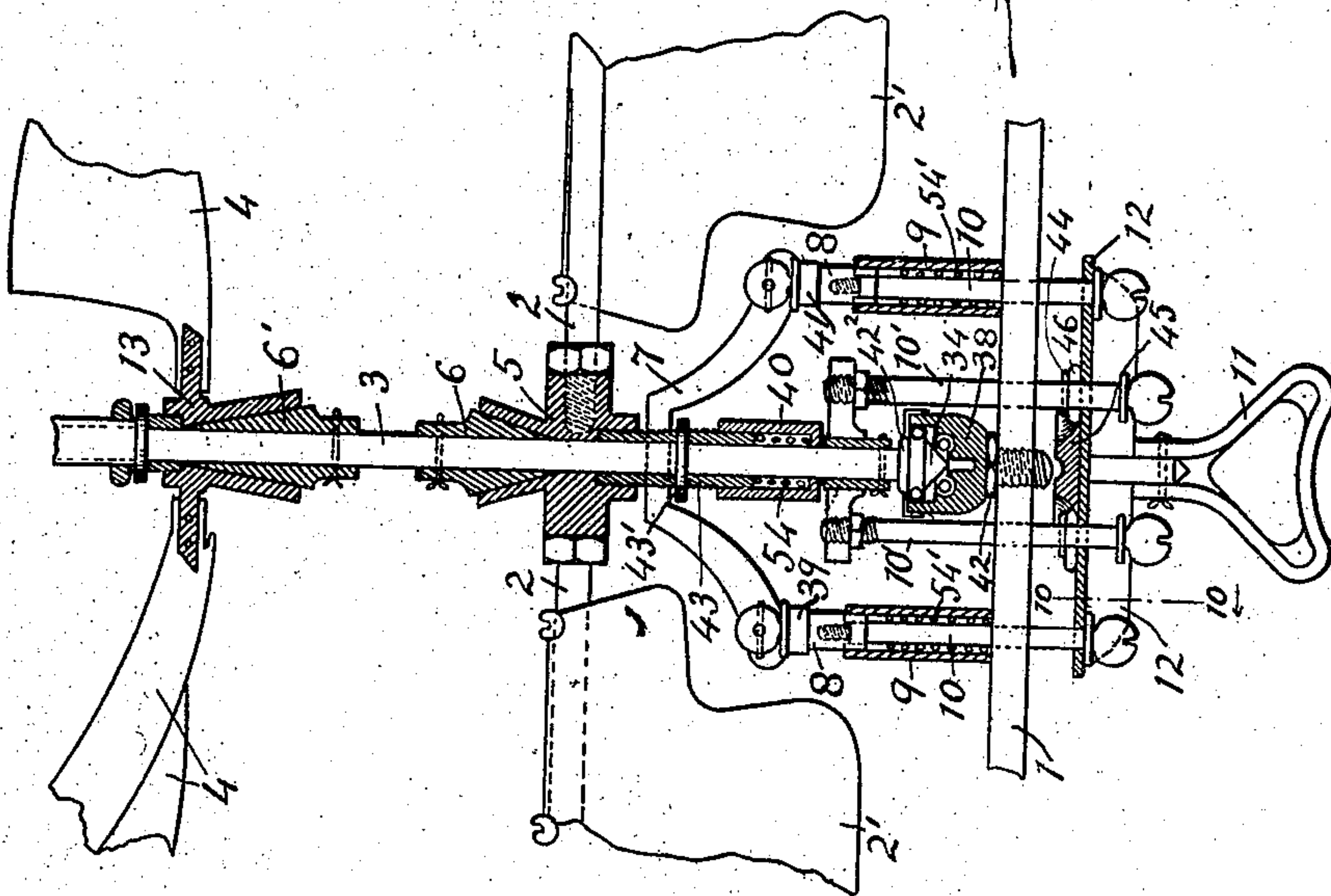
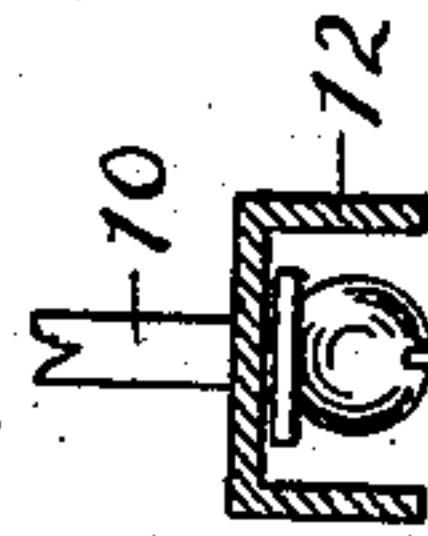


Fig. 10



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UNITED STATES PATENT OFFICE.

LUDOVICO LAGNA-FIETTA, OF TURIN, ITALY.

AUTOMATIC EJECTOR AND VENTILATOR.

No. 894,671.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed February 26, 1906. Serial No. 302,861.

To all whom it may concern:

Be it known that I, LUDOVICO LAGNA-FIETTA, a subject of the Italian King, residing at Turin, Italy, have invented new and useful Improvements in Automatic Ejectors and Ventilators; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to an apparatus for ventilating, and has particular reference to means for circulating the air within a car and for withdrawing vitiated air therefrom. It is to be understood however, that I do not limit myself to the use of the apparatus in connection with a car, as it may be applied to buildings of various kinds.

Of the accompanying drawings:—Figure 1 is a side elevation, partly in section of the apparatus which is mounted above the roof of a car or other structure, said figure showing the ejector located in an opening in the roof, and showing also the motor fan and mechanism which operates said ejector. Fig. 2 is similar to Fig. 1 but showing the ejector, and the ventilating or circulating fan which is located below the roof within the car. Fig. 3 is a view similar to Fig. 1 at a right angle thereto. Fig. 4 is a plan view, on a smaller scale of the motor fan and supports. Fig. 5 is a sectional view of a modified structure hereinafter referred to. Fig. 6 is a plan of the bracket mounted across the opening in the roof. Fig. 7 is a detail plan, on a reduced scale, of the roof ring shown in Fig. 5. Fig. 8 is a view similar to, and on a larger scale than, the central portion of Fig. 2, the parts being in the relative positions which they occupy when the ventilator is operating. Fig. 9 is a similar view, the parts being shown in the relative positions which they occupy when out of operation. Fig. 10 is a detail sectional view on line 10—10 of Fig. 8.

Similar reference characters indicate the same or similar parts in all of the views.

Referring first to the structure shown in Figs. 1, 2, 3, 4 and 6, a depending support 1 is shown as secured to the under side of the roof 1' by suitable bolts 56. The said roof is formed with an opening 15 for the ejector fan 4 which is employed to withdraw vitiated air. Mounted upon the roof 1' are brackets 28, said brackets being formed as sockets to receive the lower ends of a frame 19. Said frame, as shown in Fig. 4, has four legs which are adjustably secured in the brackets 28 by

screws 29, (see Fig. 1) and a central portion through which passes the upper end of a shaft 3. The lower end of said shaft (see Fig. 2) is supported by the socket 38 having a cone bearing 34 for said shaft.

A suitably formed bracket 33, crossing the opening in the roof, provides a support for the lower end of a fixed or stationary shaft 36, the upper end of said shaft passing through the frame 19 and through a block 37 mounted on said frame 19. A bracket 57 (see Figs. 1 and 3) is mounted to rotate about the upper end of the shaft 36 and is held in position by nuts 27 and 42, and is supported by a suitable ball bearing provided in or on the block 37 so that said bracket 57 may revolve freely. Said bracket is formed with three arms, each of said arms being screwed thereinto and locked by a nut 42, and having a radially projecting rod. One of said rods is provided with a curved wind shield 16, another with a vane 18, and the third with a balance weight 20. The object of this construction is to cause the wind which is to drive the motor fan to be automatically shielded from the returning wings or blades 17. Said wings or blades 17 are carried by arms 55 which project from the hub of a casting which is mounted to rotate about the stationary shaft 36, and is formed with an internal gear wheel 25, which meshes with a pinion 25', (see Fig. 3) which pinion is secured to the upper end of the shaft 33. It will now be understood that wind acting on wings 17, will cause the shaft 3 and the ejector fan 4 to rotate at a considerably accelerated speed. And at the same time the ventilating fan below the opening 15 is also rotated. But the ventilating fan and the ejector fan are not always driven with the shaft 3 but may be connected to the shaft 3 or disconnected therefrom at will, by mechanism which I will now describe.

Secured to the shaft 3, below the opening 15, are two friction cones 6 and 6'. The body 13 of the ejector fan is secured to the lower end of a sleeve 2² which is rotatable on the shaft 3, the upper end of said sleeve being secured at 4' to the inner forked end of a lever 47 which is pivoted at 51 to a suitable support. Said lever is normally held in the position shown in Fig. 1 by a spring 50. The outer end of said lever is connected by a chain 49, running over pulleys 48, with a slide 52 (see Fig. 2) mounted on an upright portion of the supporting frame 1. Said up-

right portion is formed with rack teeth to be engaged by a pawl 52⁴, mounted in said slide and pressed toward the rack by a spring 52⁵. Said pawl is connected by a link 52³ with a knob or handle 52¹. This structure is such that, by means of the knob or handle 52¹ the pawl 52⁴ may be engaged with or disengaged from the rack, and the slide 52 adjusted so that, by means of the chain 49, the lever 47 may be actuated to adjust the vertical position of the sleeve 2³ and the ejector fan so as to disengage it from or connect it with the upper friction cone 6' on the shaft 3. This permits the ejector fan to be put into or out of operation.

The ventilating fan below the ejector fan comprises a body 5 having arms 2, to which are secured the plates or wings 2'. The body 5 is formed with an internal cone to engage the driving cone 6 and is carried at the upper end of a sleeve 43 mounted on the shaft 3. To said sleeve is connected a bridge piece 7, the ends of which are connected by means of couplings 39 and 41, to plungers 8 mounted in cylinders 9, the latter being supported by the frame 1. Springs 54 in the cylinders 9 act upon the plungers to hold the bridge 7 and the sleeve 43 and the ventilating fan in a raised position. The sleeve 43 is also connected to a sleeve 40 which latter is provided with arms connected by rods 10 with a bracket 12 having a key or handle 11. By pulling down the said handle 11 the bracket is lowered and the sleeve and bridge and fan are lowered to separate the driving connection from the cone 6. To keep the parts in this position, a suitably shaped plate 45 is actuated by the handle 11 to secure the mechanism so that the ventilating fan will not be actuated by the shaft 3. Upon release of the handle, the springs in the cylinders, return the parts to operative position.

Referring to Figs. 1 and 3, the guide tube 30 is mounted in bracket 33, said tube extending into the lower part of the block 60, said block containing ball-bearings for the shaft 3. The block 60 is held by an arm 35 which is secured to the fixed shaft 36 by a screw 29. Said tube 30 also passes through disk caps or plates 31, 31', the upper one of which is of a considerably greater diameter than the opening 15 in the roof, said caps and plates being secured to said tube by nuts 27' and 27². An upwardly projecting flange 32 around the margin of the opening 13 guides the air escaping through the opening while the downwardly bent edges of the disk or plate 31 prevents the entrance of rain. Around the tube 30 is a spiral spring 54² which normally presses the plate 31' upward. But said plate can be lowered to bear on the flange 32 and close the passage for air when desired. The mechanism for doing this comprises a lever 47' pivoted at one end to bracket 33 and having its other

end connected with the tube by a pin and slot connection. A chain 49' is connected to the lever and passes around suitably mounted pulleys 48', the lower ends of said chain (see Fig. 2) being connected to a slide 52^a having an operating knob or handle 52^b. The construction of this slide and the mechanism for actuating it and holding it is substantially the same as have been shown at the left in Fig. 2, as hereinbefore described. By operating said slide 52^a the position of the cap plate 31' relatively to the flange 32 may be adjusted as desired.

Surrounding the opening 15 some distance outside the flange 32, is a projecting ring 63 which prevents rain or snow from being thrown against or over the flange 32. The wings 17 are preferably connected together by a ring 24.

In Fig. 1, caps 21, 22 and 26 are shown as mounted in positions to prevent access of rain to the bearings and other parts below them.

The object and operation of the parts so far described having been explained in connection with the description of the structures thereof, further description of the operation of the entire mechanism will not be required, further than to state that when the movement of the car on which the apparatus is mounted causes the air to impinge against one side of the wings 17 successively, or if the apparatus is mounted on a stationary building and wind actuates the wings 17, the gear 25 actuates the pinion 25' and drives the shaft 3. By engaging or disengaging either the ejector fan or the ventilating fan with the frame or shaft 3, the apparatus may be caused to circulate air below the roof, or exhaust it through the opening 15, or both as may be desired.

Referring now to Figs. 5 and 7, it will be seen that the construction of most of the parts is the same as in the other figures omitting the fans and rotating shaft, but with the following explained differences:—A cover 21' is provided with threaded sockets 8' fitting upper ends of the rods 10' which are mounted in guides 39' secured to the projecting ring 63, the latter being secured to the roof by screws passing through ears 61. In this form, the guide tube 30, supported by the bracket 33 is provided with holes adapted to receive hooks 54² depending from a sleeve which carries cap plates 31'. Within the tube 30 is a rod 2³, the upper end of which is connected to the plate 31'. The lower end of the rod 2³ passes through a cap 14² at the lower end of the tube 30 and has a knob 52² connected to it by a screw 27⁶. A spring 54 bears at its upper end against a stop 61⁴ and normally holds the plate 31 in the position shown in Fig. 5. When the knob 52² is pulled, the rod 2³ and the plate 31' are lowered, the hooks 54² engaging the openings in

the tube 30. This enables the passage way for outflowing air to be regulated as desired. To release the parts so that they will return to normal position by the spring 54', the knob is given a quarter turn. This turns a cam plate 46 which fits an angular portion of the rod, said cam plate lifting the slide 52 which is mounted within the tube 30. The slide 52 has upwardly extending portions formed with openings E. The upward movement of the slide 52 causes the under side of the opening E to push the hooks outward and release them from the openings in the tube 30.

When the ventilator is in operation, the parts occupy the relative positions best shown in Fig. 8 in which it will be seen that the bridge 7 is disconnected from the annular projection or ring 43'. The body 5 of the ventilator is connected with the friction cone 6 which is fixed to the shaft 3. The rotation of the shaft 3 actuates the body 5 and the blades or wings radiating therefrom. At this time the rings or collars 46 secured to the rods 10' are lowered by the cam plate 45. But the coil springs 54' around the rods 10 hold the bridge or yoke 7 raised, thereby preventing friction with the annular ring 43'.

To stop the action of the ventilator the key 11 is given a quarter turn in either direction, carrying with it the cam plate 45. This raises the rods 10' as shown in Fig. 9, and at the same time pulls down the rods 10 and the bridge 7 through the action of the plate or bracket 12 bearing upon the collars shown at the lower ends of the rods 10. The bridge 7 acts upon the annular projection 43' to pull down the body of the ventilator, against the action of spring 54 in the sleeve 40, separating the body 5 of the ventilator from the driving cone 6.

Having now described my invention, what I claim is:—

1. A ventilating apparatus comprising a shaft, two fans adapted to be actuated by said shaft, a motor for said shaft, and means whereby either one or both of said fans may be operatively connected with said shaft.

2. A ventilating apparatus comprising a shaft having friction cones, a motor for said shaft, two fans loosely mounted on said shaft and adjustable lengthwise of the shaft to engage or disengage said cones, and means for adjusting said fans.

3. In a ventilator for railway-cars and the like, the combination with a frame secured to the underside of the roof of the car, said roof having an air outlet, a ball-bearing supported by said frame, a vertical rotary shaft journaled in said ball-bearing, a ventilating fan loosely mounted on the lower part of said vertical shaft, means for connecting said fan with said shaft when desired, an ejecting fan also loosely mounted on the vertical shaft above said ventilating fan, means for

connecting said ejecting fan with the vertical shaft when it is desired, a vertically movable cap arranged above said air outlet, means for guiding the same along the vertical shaft, means for lowering the same upon the air-outlet, an air-motor arranged above the roof of the car, and suitable connections between the air-motor and said vertical rotary shaft to impart a rotary movement to the latter, substantially as set forth.

4. In a ventilator for railway-cars and the like, the combination with a frame secured to the underside of the roof of the car, said roof having an air outlet, a ball-bearing supported by said frame, a vertical rotary shaft journaled in said ball-bearing, a suitable ventilator loosely mounted on the lower part of said vertical shaft, a friction cone secured on the vertical shaft, a correspondingly recessed part on the hub-body of said ventilator and adapted to be brought in frictional engagement therewith, means for engaging and disengaging said parts when it is desired, an air-ejector also loosely mounted on the vertical shaft above said ventilator and in said air outlet, means for connecting said ejector with the vertical shaft when desired, a vertically movable cap arranged above said air-outlet, means for guiding the same along the vertical shaft, means for lowering the same upon the air-outlet to graduate the latter, an air-motor arranged above the roof of the car, and suitable connections between the air-motor and said vertical rotary shaft to impart a rotary movement to the latter, substantially as set forth.

5. In a ventilator for railway-cars and the like, the combination with a frame secured to the underside of the roof of the car, said roof having an air outlet, a ball-bearing supported by said frame, a vertical rotary shaft journaled in said ball-bearing, a ventilator loosely mounted on the lower part of said vertical shaft, a friction cone secured on the vertical shaft, a correspondingly recessed part on the hub-body of said ventilator and adapted to be brought in frictional engagement therewith, means for engaging and disengaging said parts when desired, an air ejector also loosely mounted on said vertical shaft above said ventilator and in said air outlet, a friction cone secured on the vertical shaft below said ejector, a correspondingly recessed extension on the hub-body of said ejector, adapted to be frictionally engaged with said cone, means for lowering and raising the ejector into and out of engagement with said cone when it is desired, a vertically movable cap arranged above said air-outlet, means for guiding the same along the vertical shaft, means for lowering the same upon the air-outlet to graduate the latter, an air-motor arranged above the roof of the car, and suitable connections between the air-motor and said vertical rotary shaft to impart a ro-

tary movement to the latter, substantially as set forth.

6. In a ventilator for railway-cars and the like, the combination with a frame secured to the underside of the roof of the car, said roof having an air outlet, a ball-bearing supported by said frame, a vertical rotary shaft journaled in said ball bearing, a ventilator loosely mounted on the lower part of said vertical shaft, a friction cone secured on the vertical shaft, a correspondingly recessed part on the hub-body of said ventilator and adapted to be brought in frictional engagement therewith, means for engaging and disengaging said parts when desired, an air ejector also loosely mounted on said vertical shaft above said ventilator and in said air outlet, a friction cone secured on the vertical shaft below said ejector, a correspondingly recessed extension on the hub-body of said ejector adapted to be frictionally engaged with said cone, a tubular upper extension on the hub of said ejector, a pivoted double armed lever one end of which is linked to said extension, a traction spring pulling the opposite end of said lever constantly upwardly, a chain attached to said lever, guide pulleys for said chain, a slide block on the frame of the apparatus, a projecting knob connected with said block and adapted to be moved up and down by hand, means for adjusting said knob and slide-block in the desired position, a vertically movable cap arranged above said air-outlet, means for guiding the same along the vertical shaft, means for lowering the same upon the air outlet to graduate the latter, an air-motor arranged above the roof of the car, and suitable connections between the air-motor and said vertical rotary shaft to impart a rotary movement to the latter, substantially as set forth.

7. In a ventilator for railway-cars and the like, the combination with a frame secured to the underside of the roof of the car, said roof having an air outlet, a ball-bearing supported by said frame, a vertical rotary shaft journaled in said ball-bearing, a ventilator loosely mounted on the lower part of said vertical shaft, a friction cone secured on the vertical shaft, a correspondingly recessed part on the hub body of said ventilator and adapted to be brought in frictional engagement therewith, means for engaging and disengaging said parts when desired, an air-ejector loosely mounted on said vertical shaft above said ventilator and in said air-outlet a frictional cone secured on the vertical shaft below said ejector, a correspondingly recessed extension on the hub-body of said ejector adapted to be frictionally engaged with said cone, means for lowering and raising the ejector into and out of engagement with said cone when desired, a movable cap arranged above said air-outlet and adapted to be moved vertically along the vertical

rotary shaft, a guide sleeve around the latter below said cap, a coil spring fitted around said guide sleeve to normally hold the cap in its upper position a stationary bracket, an arm pivoted on the same and pivotally connected with said cap, a chain attached to said arm, guide-pulleys for said chain, a slide-block adapted to be moved up and down on a part of the frame, means for holding the same in adjusted positions, an air-motor arranged above the roof of the car, and suitable connections between the air-motor and said vertical rotary shaft to impart a rotary movement to the latter, substantially as set forth.

8. In a ventilator for railway-cars and the like, the combination with a frame secured to the underside of the roof of the car, said roof having an air outlet, a ball-bearing supported by said frame, a vertical rotary shaft journaled in said ball-bearing, a ventilator loosely mounted on the lower part of said vertical shaft, means for connecting said ventilator with said shaft when desired, an air ejector loosely mounted on the vertical shaft above said ventilator, and in said air-outlet means for connecting said ejector with the vertical shaft when desired, a vertically movable cap arranged above said air-outlet, means for guiding the same along the vertical shaft, means for lowering the same upon the air-outlet to graduate the latter, a frame above the roof of the car, a stationary vertical shaft in said frame and in close proximity to the vertical rotary shaft, an internal gear-wheel rotatably mounted on said stationary shaft, a toothed pinion on the upper end of the rotary shaft and meshing with said gear wheel, a plurality of radially and horizontally projecting arms on the hub of the latter, and fan-wings attached to said arms, substantially as set forth.

9. In a ventilator for railway-cars and the like, the combination with a frame secured to the underside of the roof of the car, said roof having an air outlet, a ball-bearing supported by said frame, a vertical rotary shaft journaled in said ball-bearing, a ventilator loosely mounted on the lower part of said vertical shaft, means for connecting said ventilator with said shaft when desired, an air ejector loosely mounted on the vertical shaft above said ventilator, and in said air-outlet means for connecting said ejector with the vertical shaft when desired, a vertically movable cap arranged above said air-outlet, means for guiding the same along the vertical shaft, means for lowering the same upon the air-outlet to graduate the latter, a frame above the roof of the car, a stationary vertical shaft in said frame and in close proximity to the rotary vertical shaft, an internal gear wheel rotatably mounted on said stationary shaft, a toothed pinion on the upper end of the rotary shaft and meshing with said gear-

wheel, a plurality of radially and horizontally projecting arms on the hub of the latter, fan-wings attached to said arms, a three-armed rotary bracket mounted on the upper
5 end of said stationary shaft, a vane attached to one arm, a balance weight attached to the second arm, and a wind shield attached to the third arm, substantially as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

LUDOVICO LAGNA-FIETTA.

Witnesses:

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E. BERTOLIN.