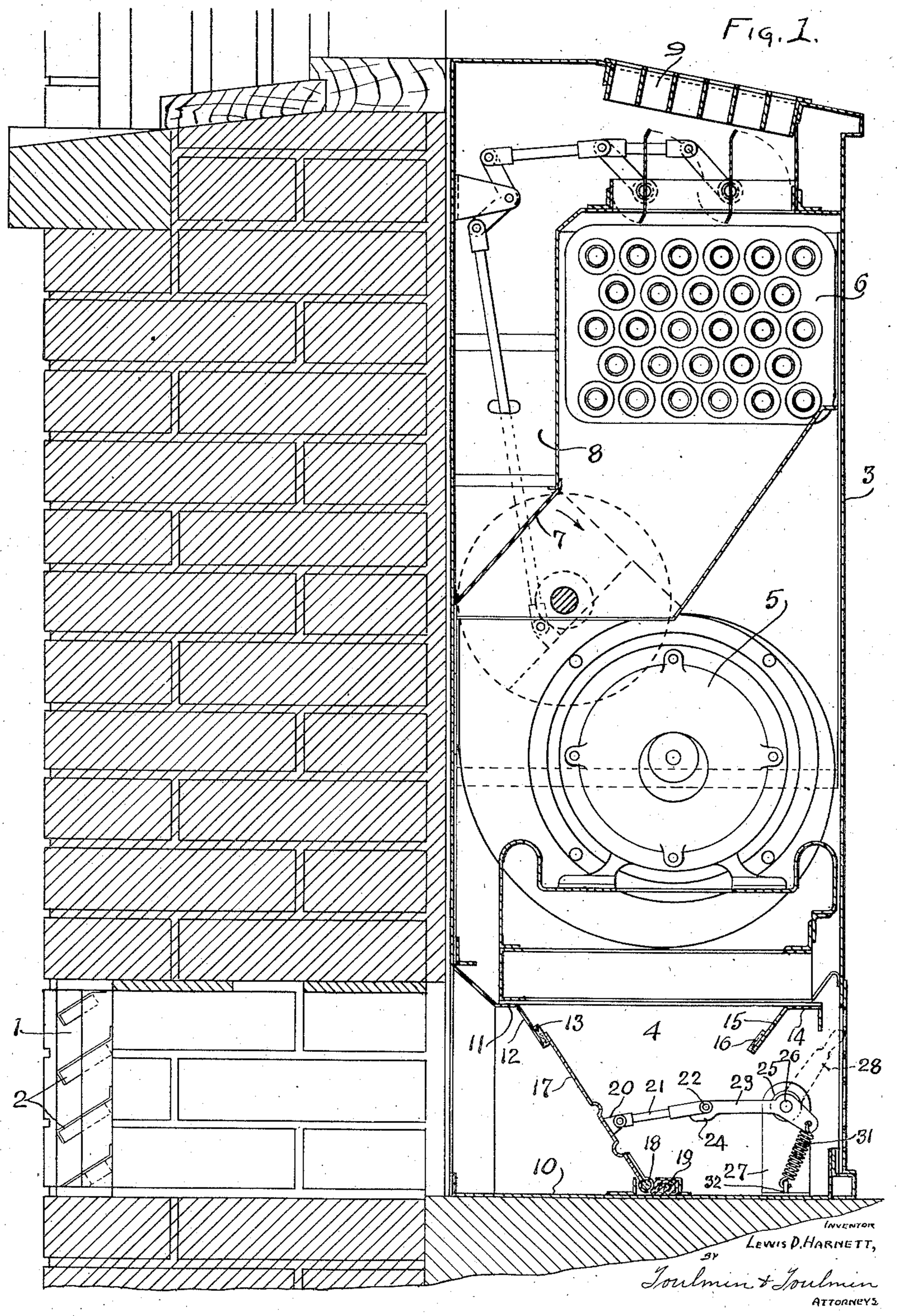
Oct. 7, 1930. L. D. HARNETT 1,777,848

DAMPER CONTROL

Filed Nov. 8, 1928 3 Sheets-Sheet 1

Fig. 1.



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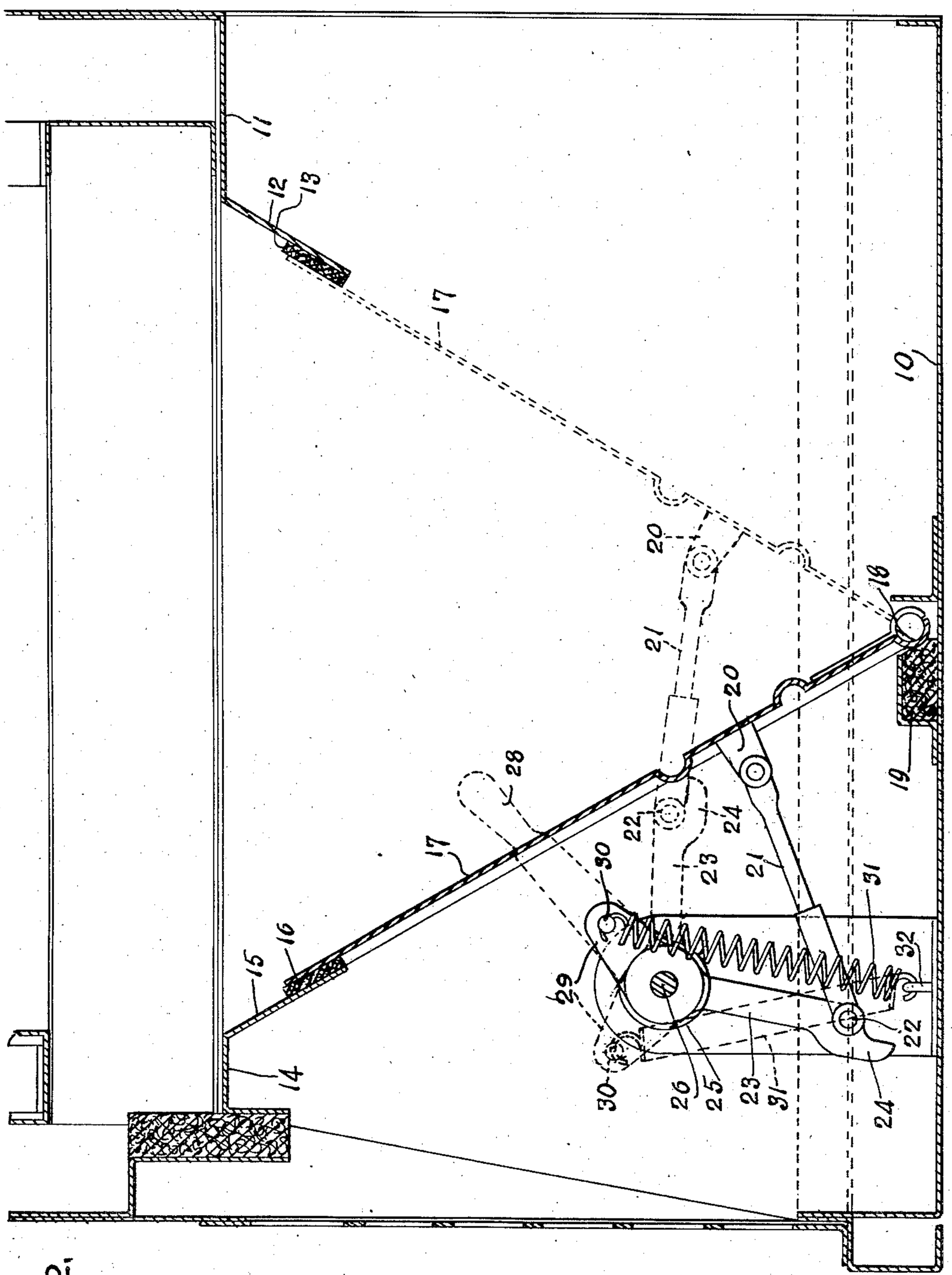

Fig. 2.

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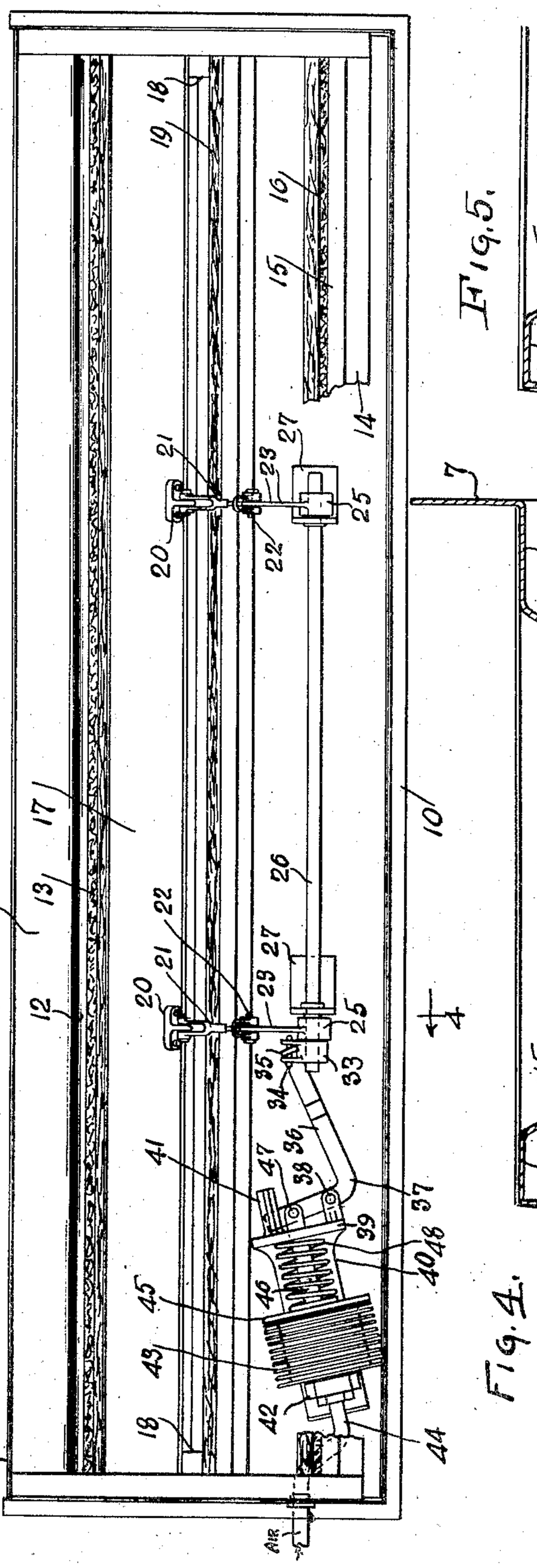

FIG. 3.

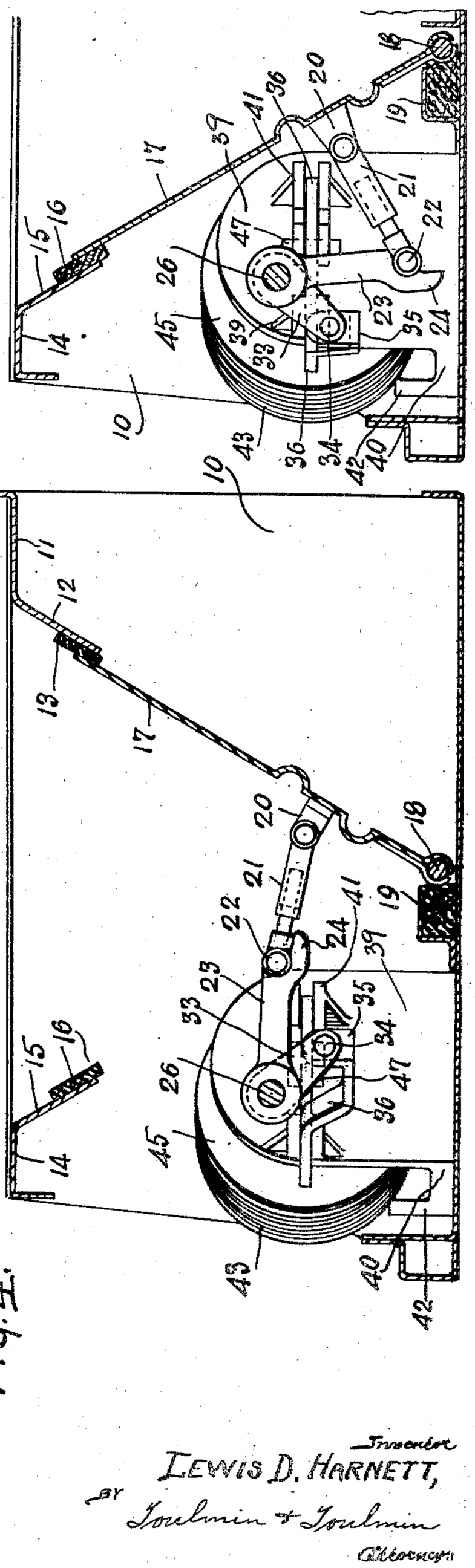

FIG. 4.

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UNITED STATES PATENT OFFICE

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DAMPER CONTROL

Application filed November 8, 1928. Serial No. 318,032.

This invention relates to apparatus for heating and ventilating school-rooms, hospitals and the like, and has for its object the control of the admission of air into the rooms in said buildings.

It is especially an object of this invention to provide means to control the admission of air during high wind storms in winter time, and other seasons of violent wind storms, the controlling means being operable manually.

For the purpose of illustration there is presented in the accompanying drawings a preferred embodiment of this invention, to which applicant does not wish to be limited.

In the accompanying drawings:

Figure 1 is a vertical section of a part of a building, and of this apparatus installed therein.

Figure 2 is a section of the apparatus showing the means for locking and shifting the damper when it is to be manually operated.

Figure 3 is a top plan view showing the air pressure means for operating the damper.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is a view similar to that shown in Figure 4 but with the damper open for the admission of air.

This apparatus is used in connection with hospitals, schools and other similar buildings, and comprises in part a metallic casing in which are mounted the active features.

In Figure 1 this apparatus is shown installed and ready for operation. The fresh air intake through the outside wall of the building is indicated by the numeral 1, which may be closed by weatherproof storm louvers 2. On the inside of the building, usually beneath the window, there is located a steel cabinet 3, containing the apparatus 4 involving the subject of this invention, the motor and fan 5 for circulating the air, the radiators 6 for heating the air and a mixing damper 7 for directing the air through the radiators, or through the by-pass 8 around the radiators, or for dividing the air, sending part through the by-pass and part through the radiators. The cabinet is provided at its top with an air mixing and air directing grate 9, which is arranged to give the air the desired direction of flow as it enters the room for the purpose of proper diffusion through the room.

This apparatus, in which the casing is designated by the numeral 10, may be made in any suitable size and may be fabricated to suit the purposes for which it is to be used. The casing is partly open at the top, where it provides a passage for the admission of air.

Extending transversely and to one side of the casing is a ledge 11, which has a downwardly extending part 12 having a felt pad 13 against which the upper part of the inlet damper is to engage when in one position. The other side of the casing has a like ledge 14, which has a corresponding downwardly inclined part 15 adapted to receive the damper when in its other position. This downwardly inclined part also has a felt pad 16 to be engaged by the damper. Each one of these felt pads is to form a complete airtight joint between these ledges and the damper 17. The damper 17 is pivoted near the central part of the base of the casing at a point indicated by the numeral 18, and is adapted to be swung from engagement with one ledge to engagement with the other ledge.

Located along the pivot or hinge of the damper is a felt pad 19 adapted to make the connection between the damper and the base of the casing as airtight as possible. Extending from the damper are lug members 20. In the present instance there are two of these lugs. Each one of the lugs 20 has pivoted thereto one end of an adjustable link 21. This link 21 is pivoted at its other end, as indicated by the numeral 22, to one end of an arm 23, which has adjacent the pivot 22 a stop 24, which is adapted to contact with part of the link 21 to hold the link and the arm against going too far beyond dead center.

On the other end of the arm 23 is a sleeve 25 which is fastened to the rod 26. This rod 26 extends longitudinally of the casing and is supported by the end walls of the casing and two bracket members 27. On one end of the rod 26, without the casing, is a handle 28, shown in dotted line in Figures 1 and 2. Within the casing and also on the rod 26 is

an arm 29 which extends in substantially the same direction from the rod 26 that the handle 28 does. On the outer end of this arm 29 is a lug 30 to which a spring 31 is attached at one end. The other end of the spring 31 is attached to a small bracket 32 located in the base of the casing.

As shown in Figure 1 the damper is in position to prevent the entrance of outside air into the building. In this position the pivot point 22 is out of line with the pivot point of the rod 26 and the pivotal connection between the lug 20 and the link 21 and are so held in this position. The spring 31 plays its part in maintaining this position but it alone could not do it without the assistance of the special structural relation between the arms and the link.

When it is desired to open the damper the lever 28 is shifted from the position shown in Figure 1 so that the toggle connection is broken and the damper is brought from engagement with the pad 13 to engagement with the pad 15.

This same operation is illustrated in Figure 2. In Figure 2 the damper is shown in full line, in open position for the admission of air into the building. In this position the lever is shown in dotted line. If the lever were shifted so as to bring the links and arms into the position indicated by the dotted lines then the damper would be in closed position and the pivot point 22 would be beyond the line of centers and would be in locked position, as indicated in dotted line. The spring 31 would be in the position shown in dotted lines.

Here we have described this apparatus as installed in a building and as manually operated. This means of operation is illustrated in Figures 1 and 2. While it is preferred to have the apparatus manually operated there is also provided air pressure and mechanical means for operating the apparatus.

In the air pressure operation of the apparatus the rod 26, instead of extending through the whole length of the casing, extends only part way of the length. This rod, in this form, is supported by the brackets 27 alone. On one end of the rod there is a bifurcated arm similar to the arm 28. This arm, in this instance, is indicated by the numeral 33, and has extending across the bifurcations a pin 34 adapted to pass through a hole in one end 35 of a lever 36.

The lever 36 is bell crank in shape and is pivoted near the elbow part 37 thereof to a stud 38 on the bracket 39, which is integral with the plate 40. The other end of the lever 36 is adapted to fit in a guide member 41. Extending up from the other end of the plate 40 from the bracket 39 is another bracket 42 to which is attached an air motor 43 in the form of a bellows.

Communicating with the air motor and passing through the upper part of the bracket 42 is an air pipe 44. This air pipe delivers air under pressure to the air motor for the purpose of operating the lever to shift the damper. The other end of the air motor consists of a disc member 45, which has attached thereto one end of a rod 46. The other end of the rod, after passing through the bracket 39, is pivoted to the lever 36 at the point indicated by the numeral 47. Around this rod 46 is a spring member 48 seated between the disc member 45 and the bracket 39, which tends to hold the bellows in closed position and the lever 36 in a position to operate the arms and the links to close the damper, as illustrated in Figure 4.

The spring 48, acting through the bracket 39 and lever 36, tends to hold the damper in closed position to prevent the inrush of tempestuous or stormy air. However, when the heated condition of the building becomes such that ventilation is needed, as when the building is to be closed, a lever is shifted to operate a valve to admit air under pressure to the motor so that the rod 46 is caused to move against the pressure of the spring 48 to shift the lever 36 in such a way that the toggle connection at the pivot 22 is shifted from the position shown in Figure 4 to that shown in Figure 5, and the damper is swung to the position illustrated in Figure 5 and the outer air is admitted into the casing and thence through the heating coils, or through the by-pass 8, or through both, and through the air mixing and air distributing grating 9 into the room.

Figures 3, 4 and 5 show the mechanically and air pressure operated form of this apparatus. When there is no pressure in the bellows the spring forces the bellows closed and operates the lever 36 to rotate the rod 26 to bring the arms and links into the position shown in Figure 4. In the position here shown the pivots 22 are above the pivotal connections between the lugs 20 and the links 21, and between the arms 23 and the rod 26, with the stops 24 engaging the adjacent parts of the links 21. In this position the links and arms securely hold the damper 17 closed against any violent wind pressure.

For the purpose of breaking the connection between the arms and the links and shifting the damper from the closed to the open position, pressure is admitted through the pipe 46 into the motor, which causes the lever 36 to rock the rod 26. The rod 26, being thus rocked, causes the toggle connection between the links 21 and the arms 23 to be broken and the damper to shift from the closed to the open position for the admission of fresh air.

The air motor 43 may, through the pipe 44, be connected to some source of air pressure. In the furnace room, or some other

suitable place, there is a valve in pipe 44 to control the admission of air under pressure from said source into the motor, whereby the air pressure in the motor shifts the lever 36 to break the toggle connection between the links 21 and the arms 23 to open the damper by air pressure.

I desire to comprehend within my invention such modifications as may be clearly embraced within my claims and the scope of my invention.

Having thus fully described my invention, what I claim is new and desire to secure by Letters Patent, is:

1. In a heating and ventilating apparatus, a casing having an air inlet opening, means to close and keep said opening closed against high wind pressure, said means including toggle links and pressure operated means to shift said links to open said passageway.

2. In a heating and ventilating apparatus, a casing having an air inlet opening for the admission of air, means in said opening to control the admission of air, automatic means to operate said means to close the opening and to lock said means in closed position, and air pressure operated means adapted to unlock said locking means and open the opening for the admission of air.

3. In a heating and ventilating apparatus, a casing having an inlet for the admission of air, a damper in said inlet to control the admission of air, automatically operated toggle means to lock said damper in closed position, and air pressure operated pressure means to shift the toggle to open said damper to permit the passage of air.

4. In a heating and ventilating apparatus in combination with a casing having an air inlet, a damper for said inlet, means having one position to hold said damper closed against violent wind pressure and another position to hold the damper open for the admission of air, and automatic and air pressure means for shifting said means from one position to the other.

5. In a heating and ventilating apparatus in combination with a casing having an air inlet, a damper for said inlet, spring operated means for holding the damper closed against violent wind pressure, and a pressure operated motor for opening the damper for the admission of air.

6. In a heating and ventilating apparatus in combination with a casing having an air inlet, a damper for said inlet, a shaft in said casing, means connecting the damper and the shaft, adapted in one position to hold the damper closed against violent winds and in another position to hold the damper open for the admission of air, means acting on said shaft to shift said means to damper closed position, and pressure means adapted to act on said shaft to shift said means to open the damper.

7. In a heating and ventilating apparatus in combination with a casing having an air inlet, a damper for said inlet, a shaft in said casing, toggle means connecting the damper and the shaft, adapted in one position to hold the damper closed against violent winds and in another position to hold the damper open for the admission of air, means acting on said shaft to shift said toggle means to damper closed position, and pressure means adapted to act on said shaft to shift said toggle means to open the damper.

In testimony whereof, I affix my signature.

LEWIS D. HARNETT.