(No Model.) 4 Sheets—Sheet 1.

A. FROMMHOLD & F. VOIGTMANN.

DRAFT REGULATOR.

No. 459,330. Patented Sept. 8, 1891.

Fig. 3.

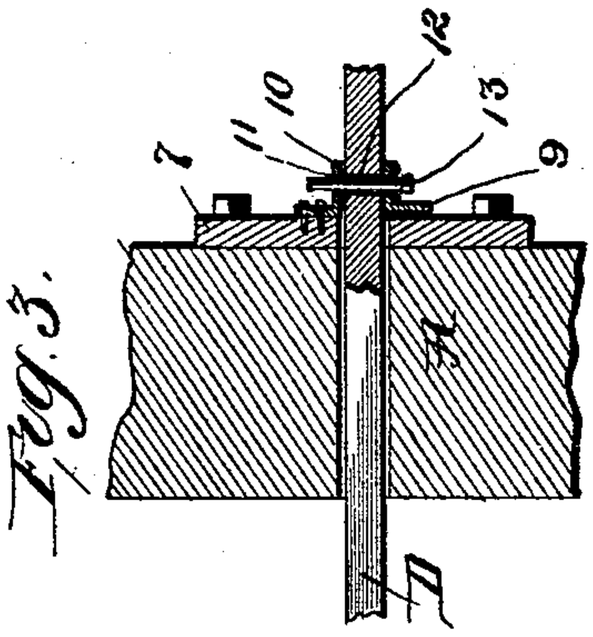


Fig. 4.

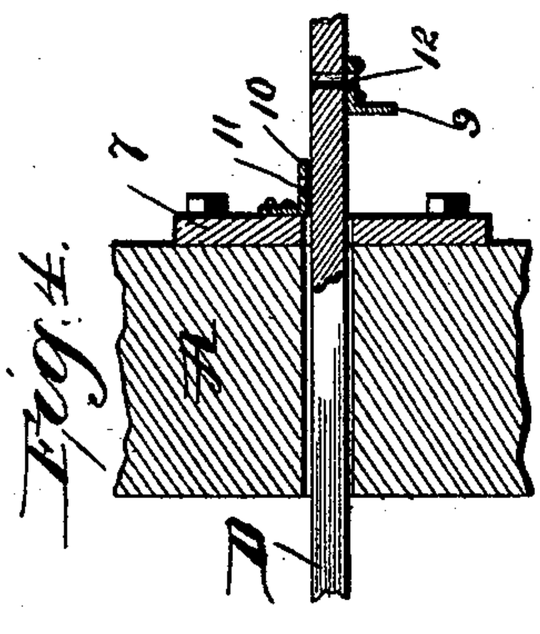


Fig. 2.

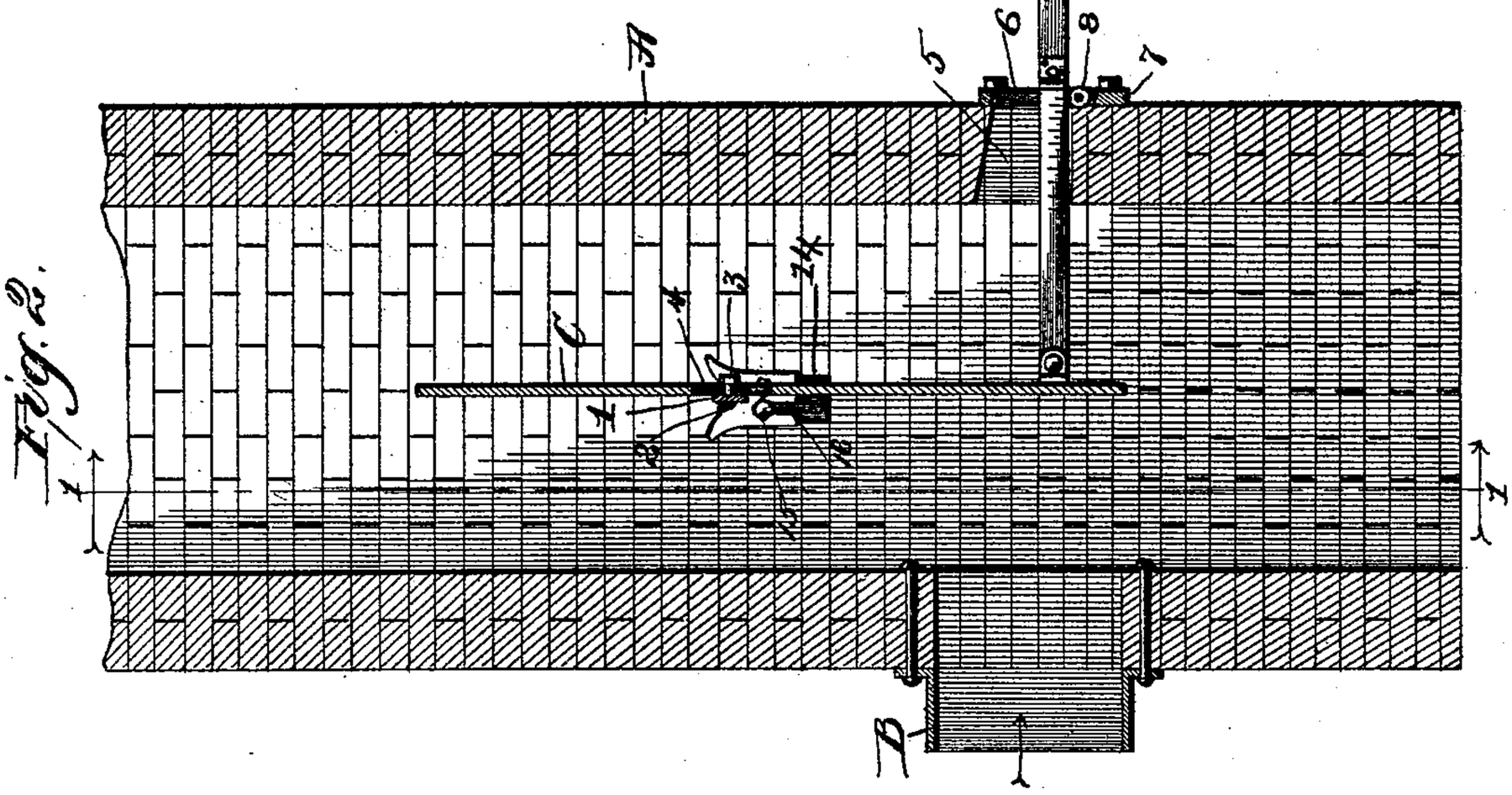
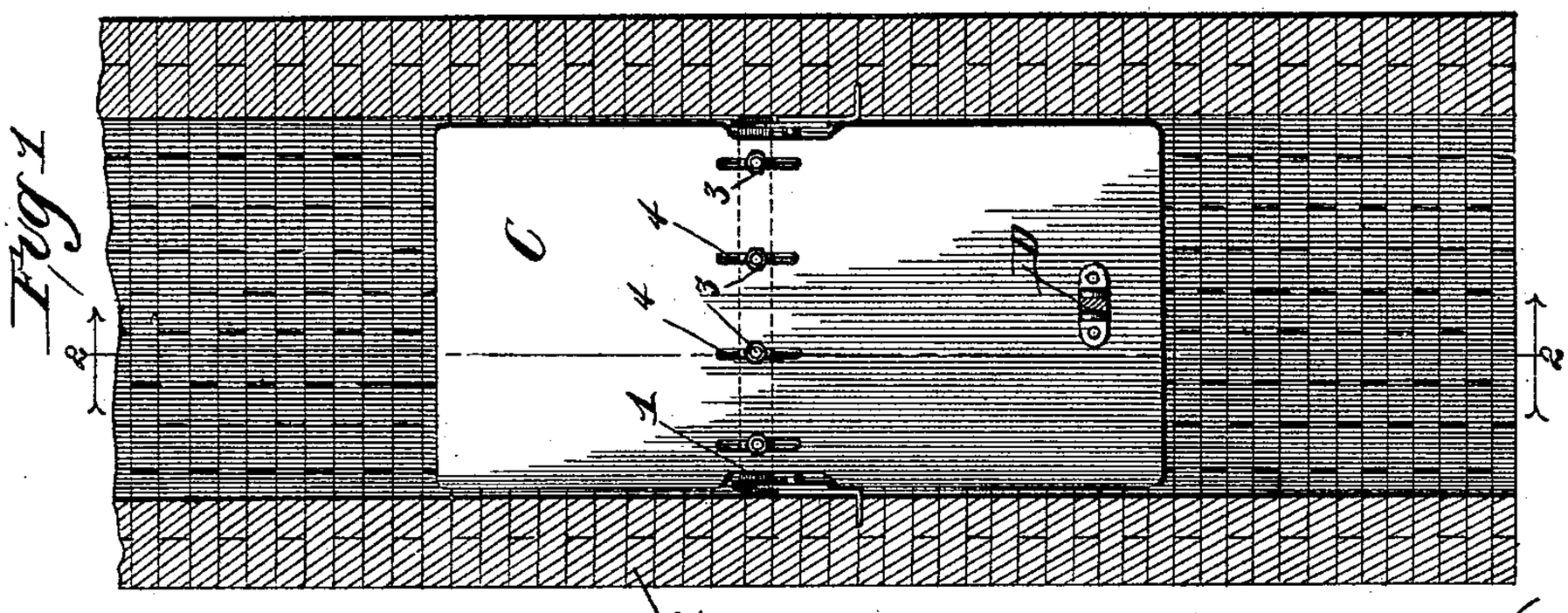


Fig. 1.



Witnesses

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Fig. 7.

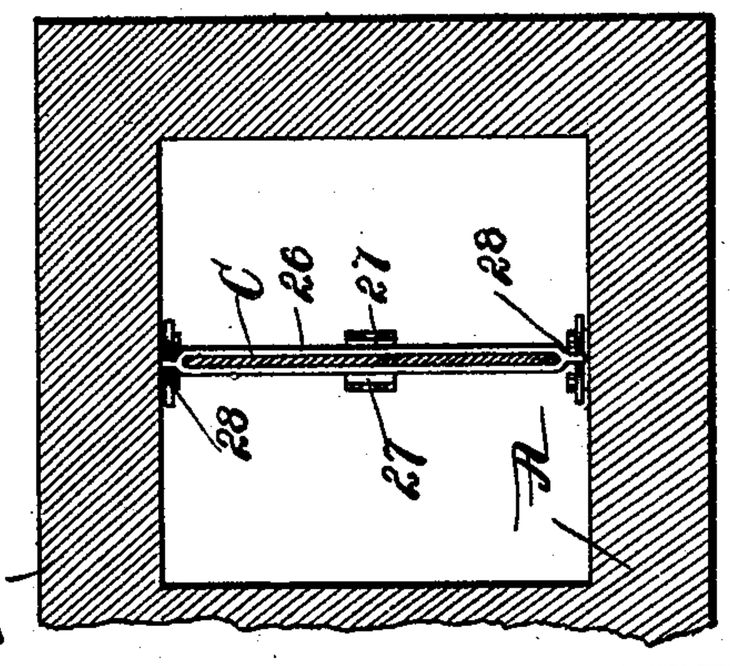

Fig. 6.

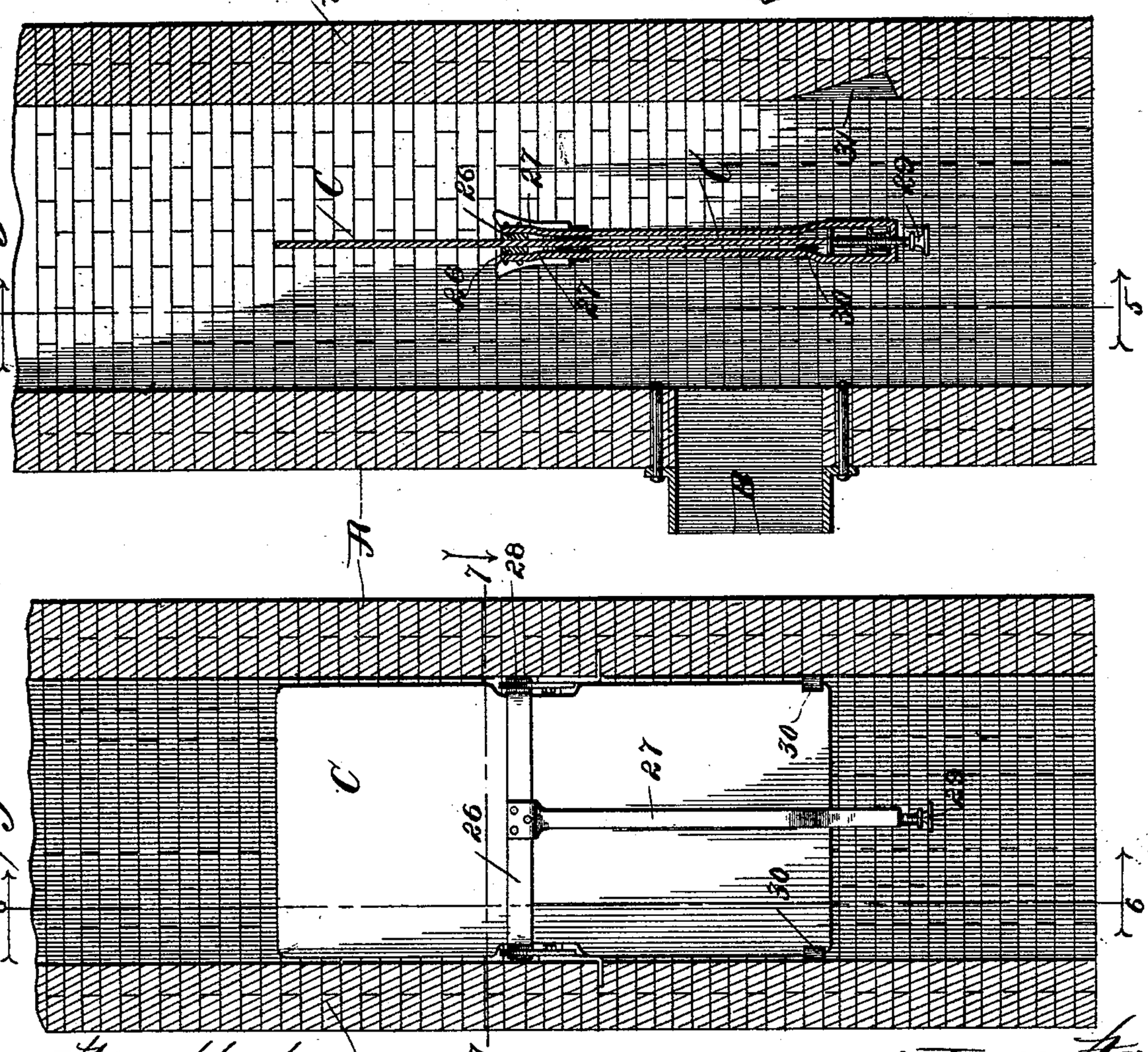

Fig. 5.

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DRAFT REGULATOR.

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Fig. 11.

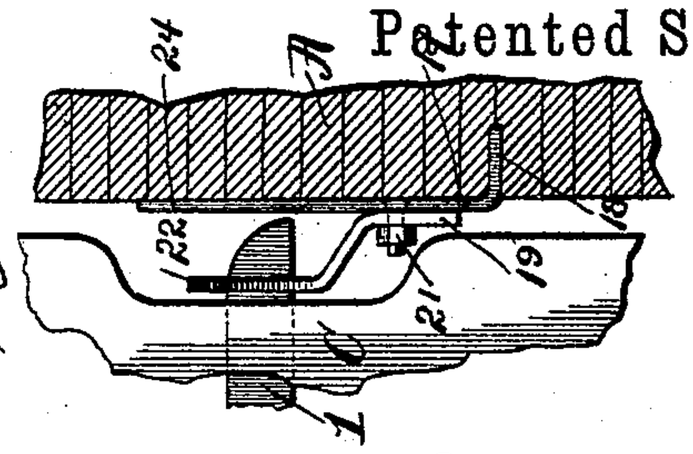


Fig. 10.

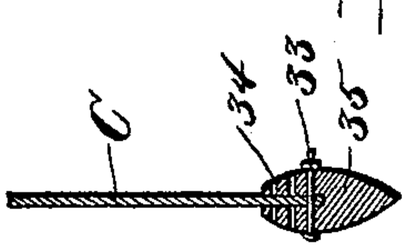


Fig. 12.

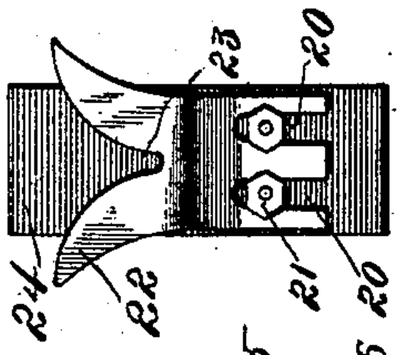


Fig. 9.

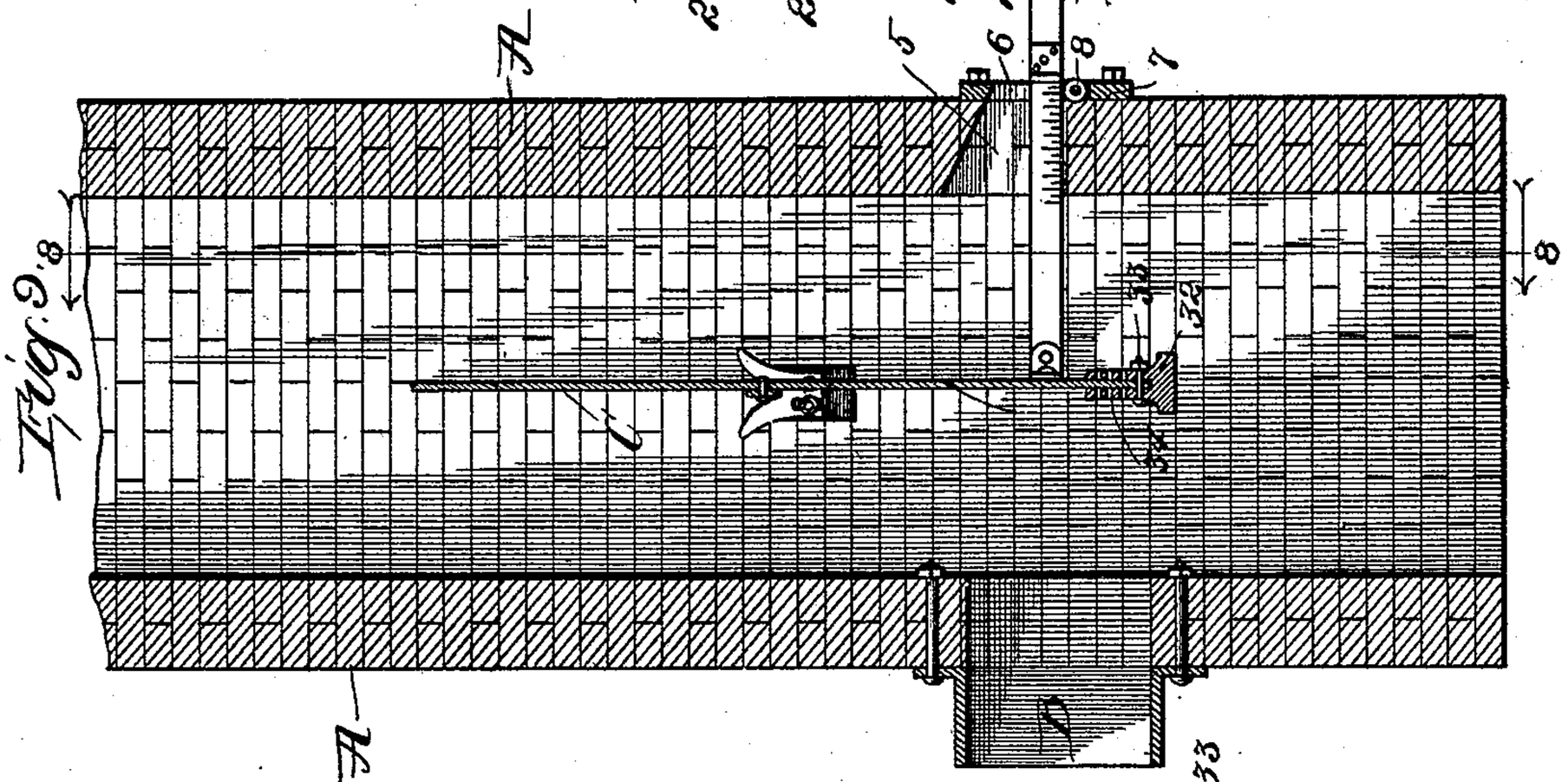
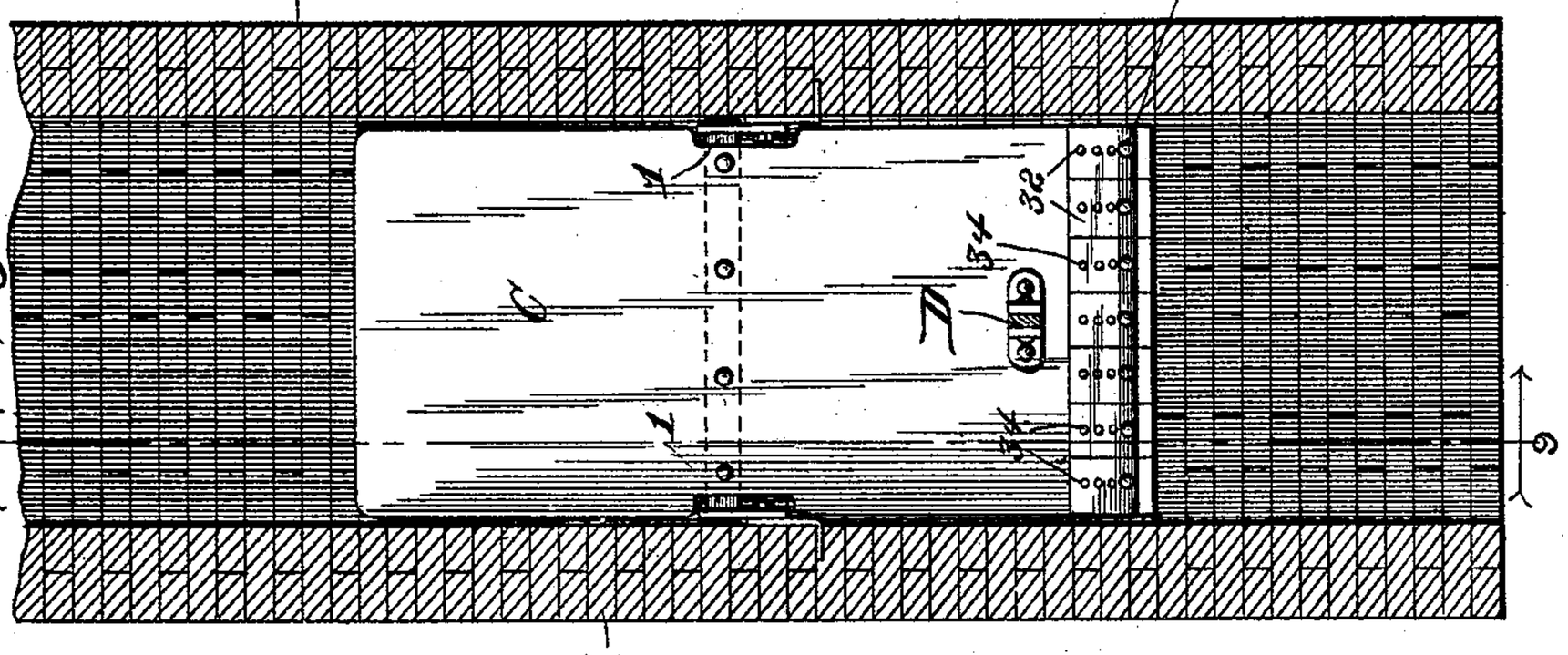


Fig. 8.



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(No Model.) 4 Sheets—Sheet 4.

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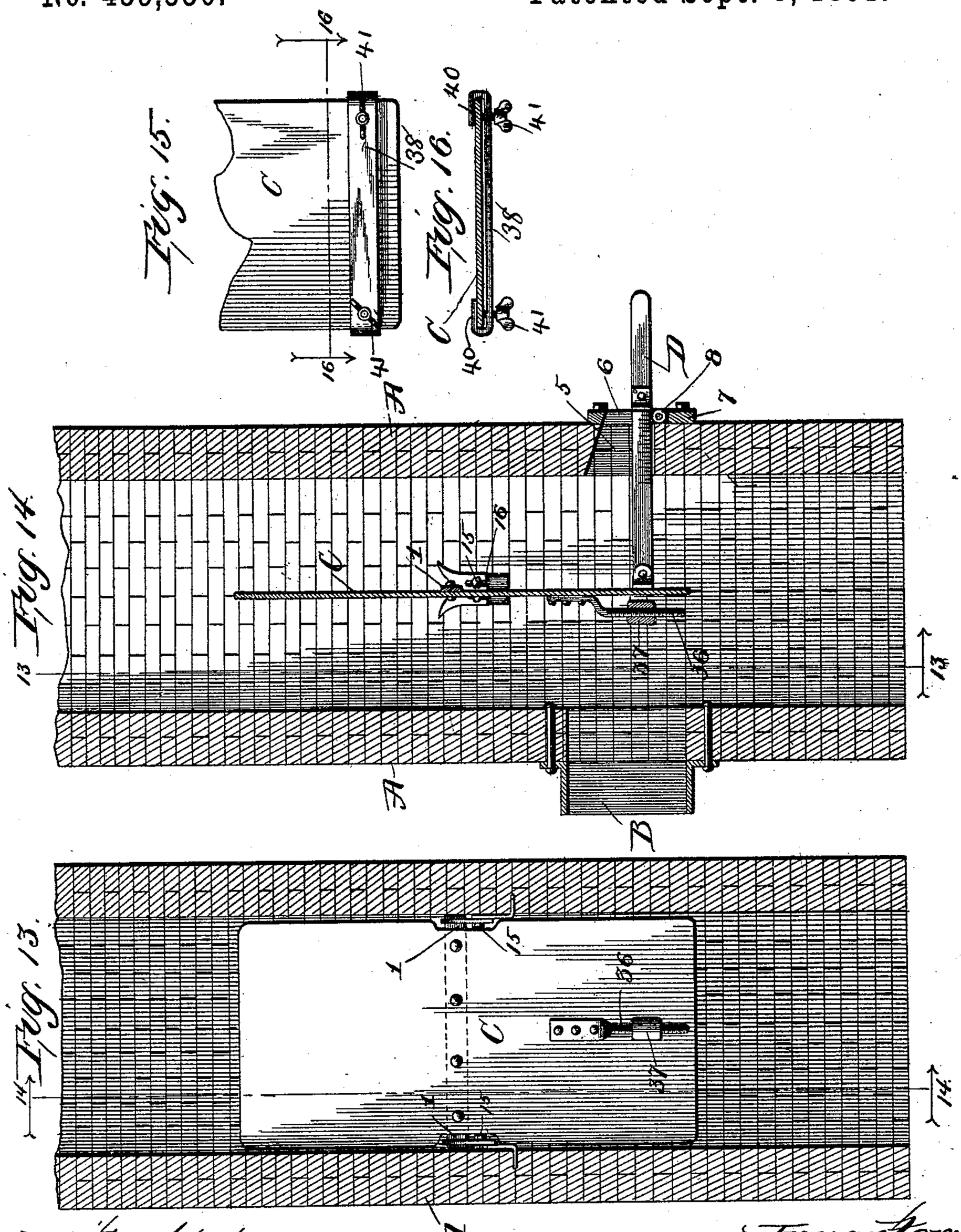

Witnesses:

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Inventors:
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Frank Voigtmann
By Lothrop & Kennedy
Attys

UNITED STATES PATENT OFFICE.

ALFRED FROMMHOLD AND FRANK VOIGTMANN, OF CHICAGO, ILLINOIS, ASSIGNORS TO FROMMHOLD & VOIGTMANN, OF SAME PLACE.

DRAFT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 459,330, dated September 8, 1891.

Application filed August 10, 1891. Serial No. 402,304. (No model.)

To all whom it may concern:

Be it known that we, ALFRED FROMMHOLD and FRANK VOIGTMANN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Draft-Regulators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a draft-regulator or damper for chimneys, stacks, stove-pipes, and the like, and more particularly to that class of draft-regulators shown and described in United States Patent No. 456,528, granted July 21, 1891, to James M. Adolphus and ourselves, the object being to provide improvements in that class of draft-regulators and to simplify the construction and reduce the cost of the same.

The invention consists in the features of construction and combination of parts hereinafter fully described and specifically claimed.

In the accompanying drawings, making a part of this specification, Figure 1 is a vertical sectional view of a stack provided with a draft-regulator constructed with our invention and taken on the line 1 1 of Fig. 2. Fig. 2 is a vertical sectional view on the line 2 2 of Fig. 1. Figs. 3 and 4 are fragmentary views, partly in section and in elevation, illustrating the indicator and set-bar in two different positions. Figs. 5 and 6 are vertical sectional views of a stack-regulator of a modified form of construction embodying our invention and taken, respectively, on the lines 5 5 and 6 6 of Figs. 6 and 5. Fig. 7 is a horizontal cross-section on the line 7 7 of Fig. 5. Figs. 8 and 9 are vertical sectional views of a stack provided with a draft-regulator of another modified form of construction embodying our invention and taken, respectively, on the lines 8 8 and 9 9 of Figs. 9 and 8. Fig. 10 is a sectional view of a portion of the damper and shows another form of weight that can be secured thereto. Fig. 11 is a fragmentary view, on an enlarged scale, of the stack and damper and illustrates a pivotal connection for said damper. Fig. 12 is a detail elevation, on an enlarged scale, of the pivot-support and bearing-plate. Figs. 13 and 14 are vertical sectional views of a stack provided with a draft-regulator of a further modified form of construction embodying our invention and taken, respectively, on the lines 13 13 and 14 14 of Figs. 14 and 13. Fig. 15 is a fragmentary view of the damper, showing still another modified form of construction embodying our invention; and Fig. 16 is a cross-sectional view of the same on the line 16 16.

The pivoted draft-regulator shown in the patent, No. 456,528, above mentioned operates automatically to regulate the draft within a draft-passage and is held in a substantially longitudinal position within the draft-passage against suitable stops by means of a counterbalancing device connected with said draft-regulator. The counterbalancing device shown in said patent comprises a system of links and levers connected with the damper and extending outside the stack and provided with a weight. To obviate the necessity of such a system of levers and links and to provide a counterbalancing device of simplified construction, the device and modifications hereinafter described have been invented.

In accordance with the principle comprised by our invention a damper that is heaviest below its pivotal point is pivotally supported within a draft-passage, so that the lower portion of said damper will, by reason of the preponderance of its weight, serve to hold the damper in an upright position. Should the draft become excessive, it will turn said damper on its pivot to close the draft-passage, and when the draft becomes normal said heavy end of the damper will bring said damper to an upright position once more.

A damper could be constructed in various ways to bring its heaviest portion below its pivot, and in Fig. 1 is shown a convenient embodiment of this idea, which consists in locating the pivot of said damper nearer one end of the damper than the other end.

It will be understood that although the damper is illustrated as rectangular in shape and as located in a stack yet it can be of any desired shape to correspond to the shape of

the draft-passage and can be located in any sort of a draft-passage where it is needed.

Referring now to Figs. 1 and 2, A indicates a stack, and B an opening in the side thereof, communicating with the furnace, (not shown,) and through which the products of combustion pass from the furnace to the stack. C is a damper pivotally supported within said stack and from the walls thereof. The pivot of said damper C consists of a bar 1, that is secured across the face of the same and projects beyond its sides. The projecting end portions of said bar rest in V-shaped notches of plate 2, secured to the walls of the stack, as more fully described hereinafter. The said bar 1 is secured to the damper C nearer one end than the other end, and thereby makes the damper heavier on one side of its pivotal point than on the other. When resting on its pivots within the stack, the heavy end of the damper will serve to hold the damper in an upright position in an obvious manner. The lower end of the damper is located in front of the opening B from the furnace, and the products of combustion issuing therefrom impinge against the said lower end of the damper. The excess of weight of the lower end of the damper is such that it will hold the damper in an upright position under the influence of a normal draft impinging against the same, but will allow the said damper to turn on its pivot to close the draft-passage whenever the draft becomes excessive. The extent to which said damper will turn and close the draft-passage is proportionate to the excess of draft, and as such excess decreases the damper will likewise turn on its pivot toward its upright position.

As a further and separate improvement, we have provided means whereby the pivotal point can be shifted or moved toward either end of the damper, and although various forms of construction could be resorted to for this purpose, we have illustrated a convenient and simple manner of accomplishing this end. The bar 1 is bolted to the damper and the bolts 3 pass through slots 4 in said damper, so that by loosening said bolts the bar can be moved as desired and then secured again. By this construction the preponderance of weight at the lower end of the damper can be adjusted with great nicety.

An indicator and sliding set-bar D is connected with the damper C, and extends through an opening 5 in the stack and through a slot 6 in a plate 7, secured on the outside of the stack. In the lower end of the slot 6 an anti-friction-roller 8 is mounted, and the indicator and set-bar D runs over said roller 8. The said bar D is provided on one side with a scale, as shown in Fig. 2, by means of which the position of the damper can be noted. The bar is also provided outside the stack, with a shoulder 9, that abuts against the plate and prevents the lower end of the damper from passing toward the opening B from the upright position thereof. Near the slot 6 the plate 7 is provided with a lug 10, having an opening or perforation 11, that registers with a perforation 12 in the bar D when the damper is in an upright position, so that by means of a pin 13, passed through said perforations, the damper can be held in an upright position. It is obvious that said indicator and set-bar can be located in various other positions than the one shown without departing from our invention.

In Figs. 11 and 12 is illustrated, on an enlarged scale and in detail, the preferred pivotal connection of the damper. In the other figures of the drawings—Figs. 1 and 2, for instance—the end of the bar 1 rests in the V-shaped notch in a plate 2, which is vertically adjustable upon a face-plate 14, secured to the walls of said stack by means of bolts 15 upon said plate 14 passing through slots 16 in said plate 2. This construction provides a pivotal connection between said parts, but in Figs. 11 and 12 is shown a preferable form of construction. A indicates a portion of the stack and C a portion of the damper. A bearing-plate 17 is secured against the face of the wall of the stack by means of its bent lower end 18 being driven into the wall. A pivot-plate 19 is provided with slots 20 in its lower end portion, which receive bolts 21 upon said bearing-plate, and by means of which said pivot-plate is secured to said bearing-plate. The upper end portion 22 of the pivot-plate is bent out and stands away from the bearing-plate and is provided with a V-shaped notch 23, which receives the edge of the pivot-bar 1 of the damper. The bearing-plate extends some distance above the pivot-plate and forms an abutting surface for the end 24 of the pivot-bar 1, which is tapered, as shown, to reduce the friction between the end of the bar and said plate to a minimum. It will be noted that by reason of the adjustability of the pivot or bearing plate 19 the damper can be hung with great precision and accuracy.

In Figs. 5, 6, and 7 is shown another construction for shifting the pivotal point of the damper to regulate the excess of weight below such pivotal point. In this construction the damper C is located within a supporting-frame consisting of a belt or loop 26 and a depending stirrup or strap 27. The loop 26 is provided at its ends with lugs 28, forming pivots that rest in the pivot-plates on the walls of the stack. The damper C is mounted loosely with said supporting-frame so as to be capable of longitudinal movement therein, and the said frame is provided with a device for raising or lowering said damper relative thereto, which conveniently consists of a set-screw 29, passing through the lower end of the stirrup or strap 27 and bearing against the lower end of the damper. It is obvious that by turning the set-screw the damper can be raised or lowered within the supporting-frame to adjust the preponderence of weight of the lower

end portion of the damper. In this construction stops 30 are located to engage the damper and to prevent the lower end from moving toward the opening B from an upright position, although it is plainly obvious that the set-bar and indicator D, Figs. 1, 2, 3, and 4, can be employed equally as well with this construction. The wall of the stack toward which the lower end of the damper swings is recessed, as at 31, to receive the portion of the stirrup and strap projecting below the end of the damper, as will be obvious.

From the foregoing description it will be seen that the damper is provided with a counterbalancing device by making the lower end thereof heavier than the upper end, and we have shown above one way of accomplishing this end—namely, locating the pivotal point of the damper nearer one end of the damper than the other. We have also shown two forms of construction for shifting the pivotal point of the damper, whereby to obtain the desired preponderance of weight of one end portion of the damper over the other end portion for the reasons above pointed out. We have, however, in Figs. 8, 9, 10, 13, 14, 15, and 16 shown another way in which to make one end portion of the damper heavier than the other end, which consists in securing to the lower end of the damper a weight or weights. We have also shown three different forms of construction embodying this idea, and illustrating the different ways in which the weighted lower end of the damper can be made heavier or lighter to cause the damper to work accurately and with the best results. In these forms of construction the damper is pivoted at about its center in the manner above described.

In Figs. 8 and 9, to the lower end portion of the damper a series of weights 32 are secured in any desired way, but preferably by means of bolts 33, that pass through perforations 34 in said weights, and perforations along the lower end portion of the damper. The weights 32 are forked or bifurcated to receive the lower end of the damper, and are each provided with a series of perforations 34, by means of which they can be secured upon the damper at variable distances from its pivotal point for obvious reasons. In this construction the set-bar and indicator D is shown, but it will be understood that it can be dispensed with and any other stop employed.

In Fig. 10 a weight 35 of a different shape is illustrated.

In Figs. 13 and 14 the damper is shown as provided on its lower end portion with an outwardly and downwardly projecting arm 36, upon which a weight 37 is secured, and is vertically adjustable thereon by reason of its screw-threaded connection with said arm 36. The indicator and set-bar is shown also in this construction, but it will be understood that it can be omitted, if desired, so long as stops are arranged to prevent the lower end of the damper from approaching the opening B from an upright position.

In Figs. 15 and 16 a weight 38 is shown having hooked ends 40, that embrace the side edges of the damper, as shown, and said weight is secured upon the damper by thumbscrews 41, that pass through the weight and bear against said damper. The said weight 38 can be moved vertically upon the damper for obvious reasons, and a plurality of such weights 38 can be used, if desired.

It is obvious that various changes, variations, and substitutions can be made in the constructions illustrated without departing from our invention, and it will be understood that except in the claims for the specific construction we do not limit ourselves to the precise construction herein shown, but contemplate making any changes and substitutions not departing from the spirit of our invention. It will be further understood that the relative dimensions of the several parts can be varied as desired. For instance, the space between the side edges of the damper and the walls of the stack can be changed as found convenient.

We claim as our invention—

1. A draft-regulator consisting of a freely-pivoted damper having its pivot located above its middle and devices, substantially as described, for changing the relative location of said pivot and damper.

2. A draft-regulator consisting of a freely-pivoted damper having a shifting-pivot normally located above the middle of the said damper.

3. A draft-regulator consisting of a freely-pivoted damper, said damper having longitudinal slots in which the pivots of said damper are removably secured.

4. A draft-regulator consisting of a freely-pivoted damper having longitudinal slots, and a pivot-bar removably secured within said slots.

5. The combination, substantially as hereinbefore set forth, of a damper pivotally supported within a chimney or other draft-passage, and a sliding bar connected with said damper and projecting outside of said casing and provided with devices for holding said bar and damper immovable.

6. The combination, substantially as hereinbefore set forth, of a damper pivotally supported within a chimney or other draft-passage, an indicator-bar connected with said damper and projecting outside of said chimney or draft-passage, and an anti-friction roller located beneath said bar.

7. The combination, substantially as hereinbefore set forth, of a damper and a vertically-adjustable pivot-plate for supporting the same.

8. The combination, substantially as hereinbefore set forth, of a damper, a pivot-plate for the same having slots, and bolts secured

to the wall of a draft-passage and removably secured within said slots.

9. The combination, substantially as hereinbefore set forth, of a bearing-plate secured to the wall of a draft-passage, a pivot-plate, and a damper having laterally-projecting tapered pivots resting upon said pivot-plate.

In testimony whereof we affix our signatures in presence of two witnesses.

ALFRED FROMMHOLD.
FRANK VOIGTMANN.

Witnesses:
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OTTO LUEBKERT.