

(No Model.)

I. D. SMEAD.

COMBINED DRAFT RETARDER AND FLUE SCRAPER.

No. 289,865.

Patented Dec. 11, 1883.

Fig. 1.

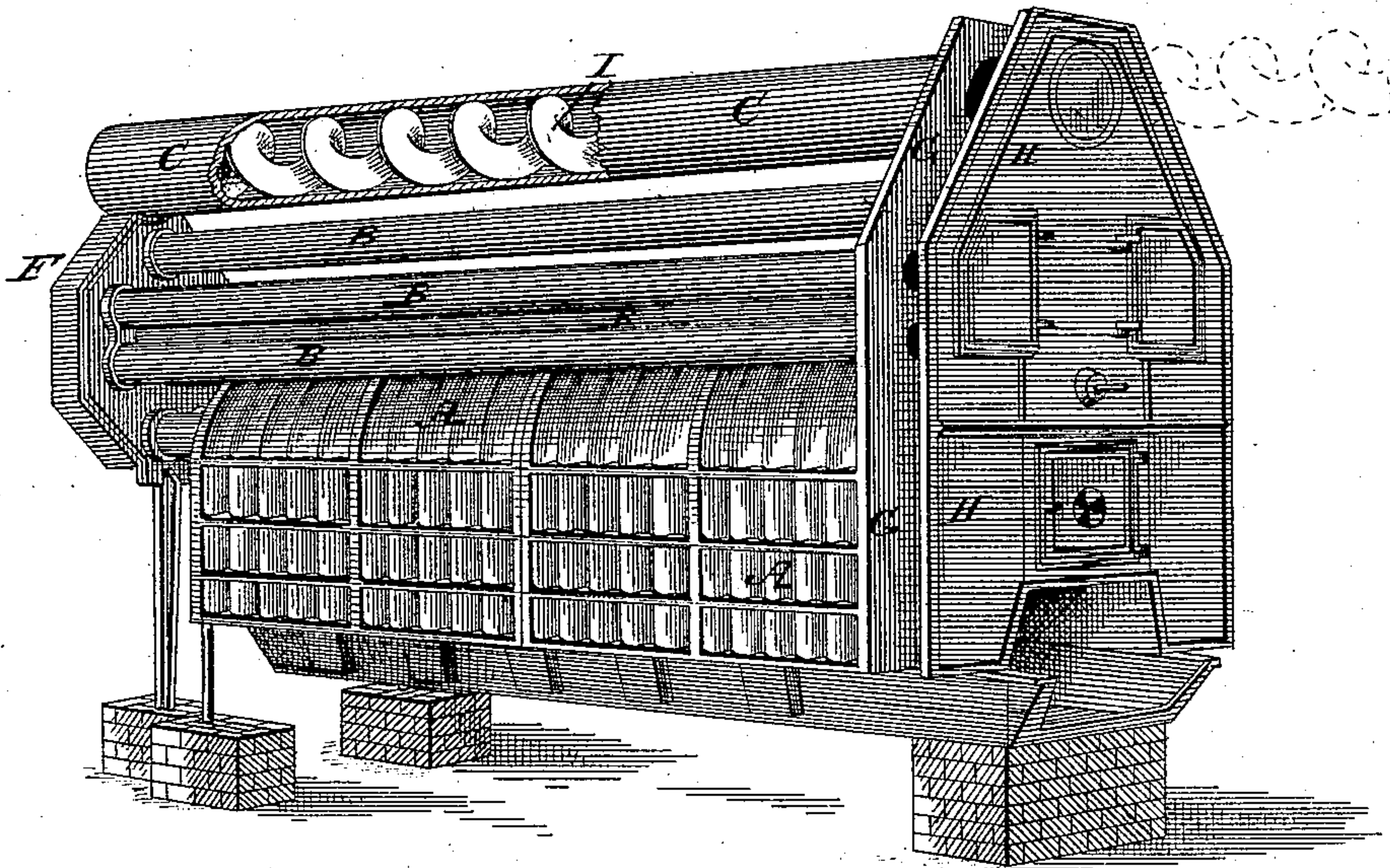
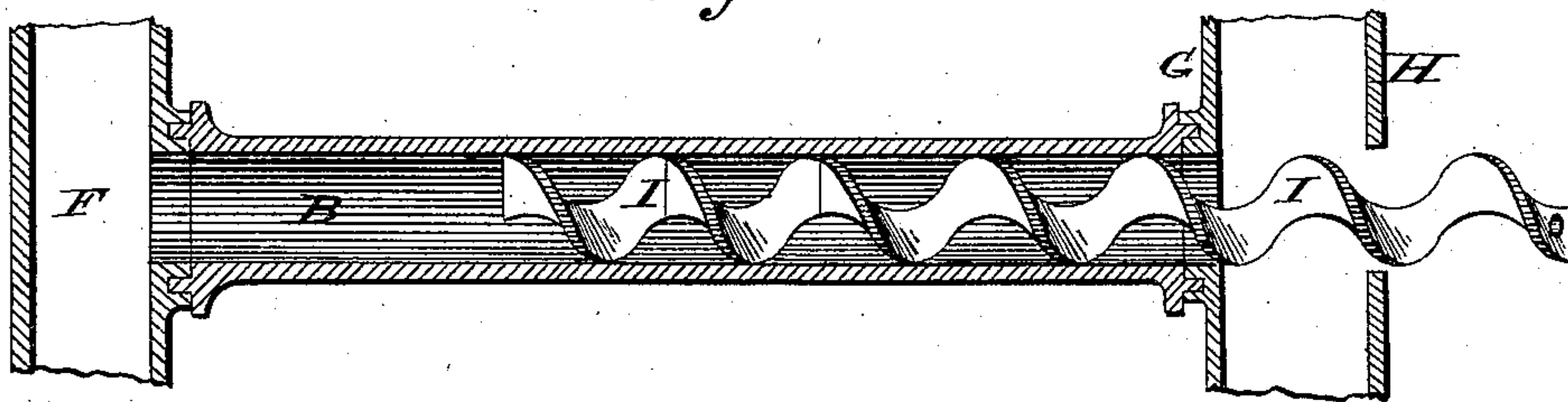


Fig. 2.



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COMBINED DRAFT-RETARDER AND FLUE-SCRAPER.

SPECIFICATION forming part of Letters Patent No. 289,865, dated December 11, 1883.

Application filed June 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, ISAAC D. SMEAD, of Toledo, in the county of Lucas and State of Ohio, have invented certain Improvements in Combined Draft-Retarders and Flue-Scrapers, of which the following is a specification.

This invention relates to furnaces for warming buildings; and the invention consists in a spiral diaphragm so constructed that it can be inserted into the heat and smoke pipes of the furnace and be removed therefrom at will, for the twofold purpose of retarding the passage through said flues of the products of combustion, so as more effectually to utilize the heat, and also furnish a means of cleaning out said flues by removing the soot and ashes therefrom at will, all as hereinafter more fully set forth.

Figure 1 is a perspective view of a furnace, having a portion broken away to illustrate the invention. Fig. 2 is a longitudinal section of one of the flues or pipes, with the spiral diaphragm partially removed to illustrate the manner of cleaning out the flues.

My invention is more especially designed for use in connection with furnaces used for warming large buildings, and I have shown it applied to what is known as the "Ruttan furnace," which is generally used for warming large volumes of air for school-houses, churches, court-houses, and similar public buildings.

An experience of years in supplying these heaters for buildings in different localities and situations has demonstrated that in some cases where the draft is very strong the products of combustion are drawn through the flues or heat-tubes so rapidly that considerable of the heat is carried off through the chimney, and is not therefore as fully utilized as is desirable; and in all cases, in order to secure the best results, it is necessary that the flues shall be kept free from the soot and fine ashes which are sure to accumulate in them more or less, especially when soft coal is used, as is generally the case in the western portion of the country. This accumulation of soot and ashes is also much more rapid in a furnace having long horizontal pipes or flues, like this, than in those having vertical flues, and it is therefore the more necessary that means be provided for easily and quickly removing them.

In the drawings, A represents the body of the furnace, which is of unusual length, and which is connected at its rear end by two or more short tubes with a drum or compartment, F, from which a series of pipes, B, extend to the front end, where they open into a space or flue between the front plates, G and H, as shown, a single large pipe, C, extending from this space back over the top of the drum F, where the smoke-pipe is joined to it, the space between the plates G and H of course being closed tight all around its edges, it being shown open in the drawings simply to show the mouths of the pipes B and C. From this construction it will be seen that the heat and smoke pass from the fire-box A back into the drum F, thence forward through the pipes B into the front space or flue, and from thence back through the pipe C, and from thence off through the smoke-pipe and chimney.

In order to prevent the heat and products of combustion from being drawn through these flues too rapidly to permit the heat to be radiated, I construct one or more spiral diaphragms, I, in the form of a screw, as represented in the drawings, of a size to permit them to be readily shoved into the flues, and be drawn therefrom whenever desired. In cases where there is a very strong draft each of the tubes B, and also the large tube C, may be provided with these spiral diaphragms; but where the draft is not quite so strong it may be sufficient to place them in the tubes B only, and where the draft is still less one of them placed in the tube C alone will be sufficient, so far as retarding the passage of the smoke and gases is concerned.

Whenever it is desired to clean out the flues it is only necessary to open the doors in front of the flues and draw out the diaphragms I, as indicated in Fig. 2, which will at once remove all the soot and ashes, when the diaphragm will be replaced.

While I have shown the diaphragms I as extending the whole length of the flues, it is of course obvious that they may be made much less and be located at any point desired within the flues or tubes, preferably at or near the end where the smoke leaves the flue, thus serving in a measure to retard its passage, and, as it were, to hold the smoke and gases within

the flue until the heat is more fully radiated from the exterior of the tubes. I propose to make them of varying lengths, from a single turn or two to the full length of the tubes, so as to provide the means of adapting the furnace to all the variations of draft due to the various localities and conditions in which they are to be used. I propose to make these spiral diaphragms of thin cast-iron, and in all cases, whatever their length, they will be provided at their front end with a hole or stud, into or upon which a poker or other rod can engage for drawing them out.

As it is very desirable to keep the flues clean, in order that the accumulation of soot and ashes within them shall not prevent the radiation of the heat, I prefer, where the draft is light or not over strong, to place a short spiral in each flue or tube, so that by moving them back and forth in the flues they can each be quickly cleaned over their whole interior surface, the sum of the retardation of the passing currents of smoke due to these several short spirals being equal to a single long one, while at the same time they furnish the means for quickly cleaning each and all of the flues, which would not be the case if one flue only were thus provided. In practice these spirals will be cast in sections or short lengths, as indicated in Fig. 2, so that more or less of them can be inserted in each of the flues, and thus adapt the furnace to the strength of the draft, which varies greatly in different localities, height of chimney, and other conditions. When made in sections, the ends may be so constructed that they will fit together in such a manner as to form a continuous and regular spiral, the same as though made in a single piece. The twist or spiral should be a slow or gradual one, so as not to form too much of an obstruction to the draft.

While I have shown my invention applied to heating-furnaces, it is obvious that it may be applied in the same way to the flues of boiler-furnaces, especially to such as have a fan or other means for creating a strong draft, and I so propose to use it. By these means furnaces can be adapted to the various conditions under which they must necessarily be used, the heat being thereby more effectively utilized and the flues kept clean with very little trouble.

I am aware that spiral diaphragms have been described as being permanently secured in vertical heating-drums, and that a spiral or screw has been shown as located within the smoke-flue of a steam-boiler in such a manner as to permit it to be rotated by a crank for the purpose of removing the accumulations therefrom by its screw action, and also that a spirally-flanged scraper has been shown located within the water flues or tubes of a steam-boiler, with a rod protruding through a stuffing-box at one end to enable it to be moved to and fro therein for the purpose of scraping off the incrustation formed by the impurities of the water, and I do not claim either of these; but

What I do claim is—

1. In combination with the open-ended heat and smoke flues of a furnace, the removable spiral diaphragm, constructed and arranged to operate substantially as shown and described.

2. A removable spiral diaphragm for smoke and heat flues, made in sections, whereby more or less of said diaphragm may be used in the flue at will, as herein described.

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Witnesses:

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