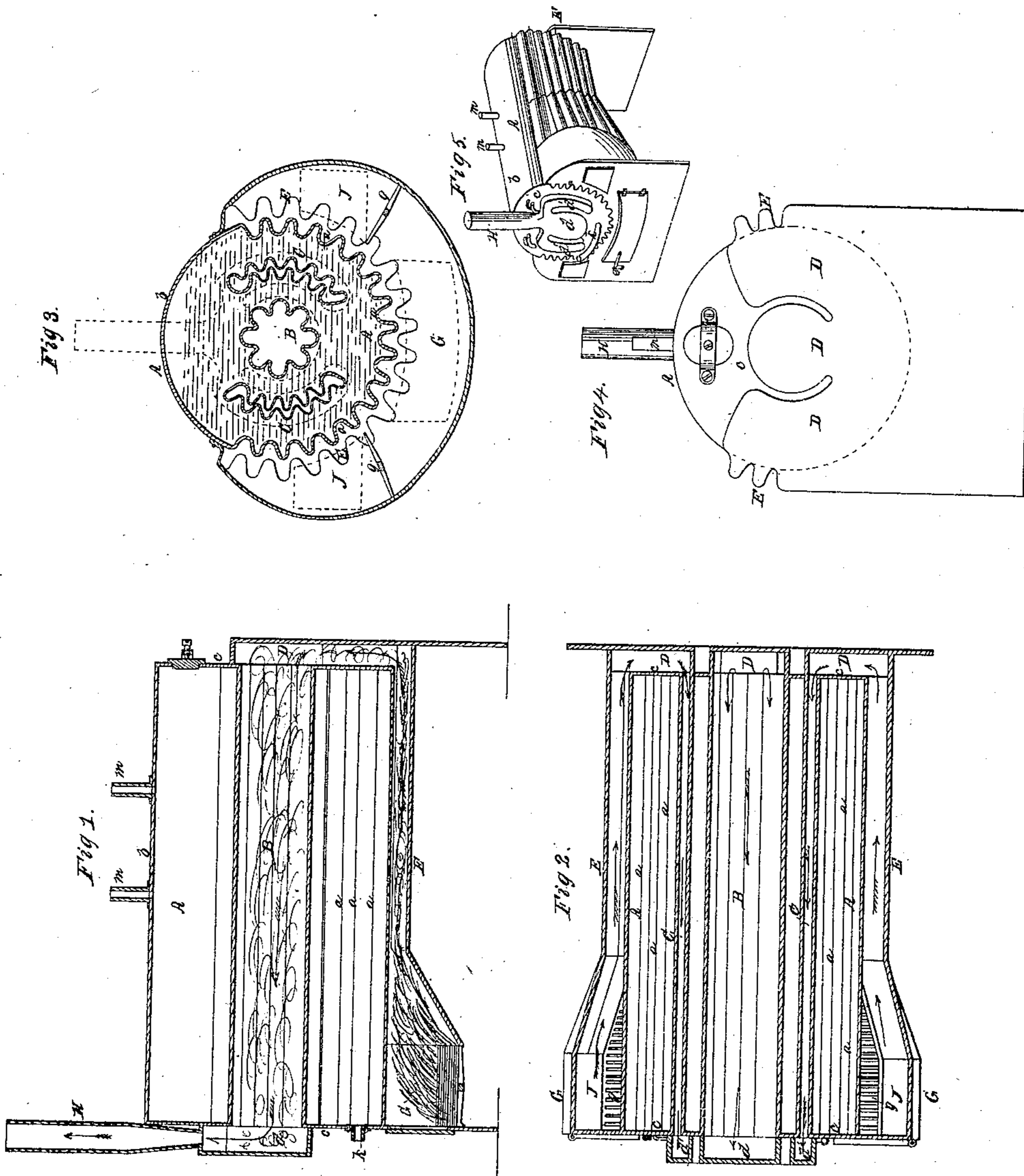


S. HOYT.
STEAM BOILER.

No. 40,563.

Patented Nov. 10, 1863.



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IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. 40,563, dated November 10, 1863.

To all whom it may concern:

Be it known that I, SAMUEL HOYT, of the city of New York, county, and State of New York, have invented certain new and useful Improvements in Fluted or Corrugated Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a longitudinal vertical central section through my improved steam-boiler. Fig. 2 is a horizontal section through the boiler. Fig. 3 is a view of the interior of the boiler, as seen by removing the front plate. Fig. 4 is an elevation of the rear end of the boiler. Fig. 5 is a perspective view of the improved boiler.

Similar letters of reference indicate corresponding parts in the several figures.

The object of my invention is to construct a steam-boiler which shall possess the advantages of a corrugated or fluted surface at such points as are exposed to the heat of the furnace, and also of a plain, uncorrugated surface at such points as are not thus exposed. It also has for its object increasing the heating-surface of the flues which pass through the boiler-shell; also, increasing the capacity of the fire-box, and finally, applying heat more directly to the sides of the boiler, all as will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The boiler-shell may be constructed of any desirable form, but the cylindrical form is best, and it may be made up of a number of plates riveted together. This shell A is subjected to the action of corrugating or fluting rollers or dies, and one-half, or more or less, of the shell is fluted, as shown at *a a* in Fig. 3. These corrugations extend longitudinally from one extreme end to the other of the shell, leaving a plain or uncorrugated surface, *b*, which forms the top or "dome" of the boiler. By thus partially corrugating the boiler-shell I obtain an increased heating-surface over the plain boilers, and a diminished heat-radiating surface over the corrugated boilers—that is to say, the steam which rises to the top of the boiler will not be exposed to a rapidly-cooling surface, which would not be the case if

the shell A was wholly corrugated. The heads *c c* of the shell A are applied in the usual manner of constructing fluted or corrugated boilers, and these heads are punched out for the reception of the ends of the flues B C C. The central flue tube, B, is corrugated, and so also are the two side flues, C C, which latter are in the form of sections of a circle concentric with the axis of the boiler, and the upper termini of which are just below the water-line.

Surrounding the rear ends of the three flues B C C is a flue-box, D, which is partially surrounded by the rear projecting end of the corrugated flue-jacket E. This jacket E forms a flue-space around that portion of the boiler-shell which is corrugated, and, extending forward about two-thirds of the length of the boiler, this jacket E flares outward, terminating in a fire-box, G, of a cycloidal form, in cross-sections, as shown in Fig. 3. This corrugated jacket, with its enlarged fire-chamber, incloses only that portion of the boiler-shell which is corrugated, and which it is desired to subject to the action of heat, leaving the uncorrugated surface of the shell uncovered. The flues B C C communicate at their front ends with chambers *d d' d'*, from which the products of combustion pass directly off into the smoke pipe H, as shown in Fig. 1. The heated gases and smoke will therefore pass to the back of the boiler, thence forward through the three flues B C C, finally escaping from the smoke-pipe, as indicated by the course of the arrows in Figs. 1 and 2. The enlarged flaring portion of the jacket E, which constitutes the fire-chamber G, is of such a size as to admit of grates *g g* being arranged in it, leaving a space between the inner edges of the grates and the boiler-shell for the free upward passage of the flames and heated gases from the main fire below. These grates *g g* incline downward from the boiler and form auxiliary fire-chambers J J on each side of the boiler for augmenting the heat at these points, while the main fire-chamber G, beneath the boiler, supplies its heat to the bottom thereof.

From the above description it will be seen that I obtain all the advantages of the corrugated or fluted boilers in having an increased heating-surface, and at the same time I avoid the disadvantages of such boilers by having

a greatly diminished cooling-surface. The heating-surface is increased where it is exposed to the fire and heated products of combustion, while the surface which is exposed to the cooling effects of the external air is comparatively small. The side flues, C C, are made of such a form that they present a very large surface to the surrounding water in the boiler, and occupy very little space laterally. The boiler is supplied with water by means of the feed-pipe *k*, entering the front head of the same, as shown in Figs. 1 and 5, and the steam is conducted off through steam-pipes *m m* in the usual manner.

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

1. Constructing the shell of a steam-boiler with that portion of its surface which is exposed to the fire and heat corrugated, and that portion which is not thus exposed plain

or uncorrugated, substantially as described.

2. Combining with a partially-corrugated boiler shell the corrugated jacket E, so applied thereto that it forms a flue-space, incloses that portion of the boiler-shell which is corrugated, and communicates with the internal flues, B C C, substantially as described.

3. The auxiliary fire-chambers J J, in combination with the main fire-chamber G and flaring-jacket E, substantially as and for the purposes described.

4. The combination of the internal curved flues, C C, with the central circular flue, B, substantially as described.

Witness my hand in the matter of my application for a patent for fluted and corrugated flue-boilers this 3d day of September, 1863.

SAMUEL HOYT.

Witnesses:

R. W. FENWICK,
R. T. CAMPBELL.