(No Model.)

2 Sheets—Sheet 1.

# G. M. NEWHALL.

## DISSOLVING AND STRAINING SUGAR.

No. 334,972. Patented Jan. 26, 1886.

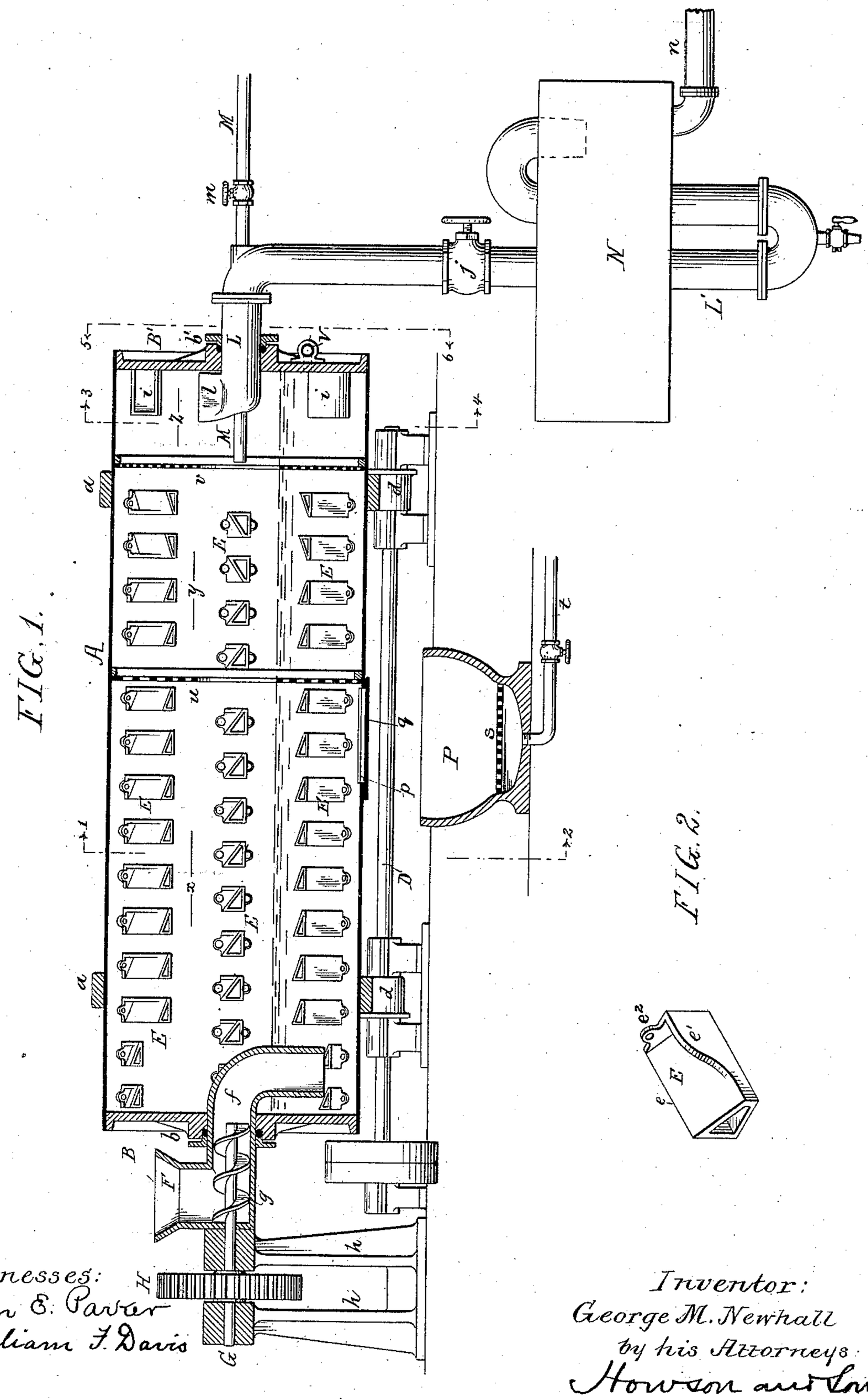

FIG. 1.



FIG. 2.

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Howson and Sons

(No Model.) 2 Sheets—Sheet 2.

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FIG. 4.

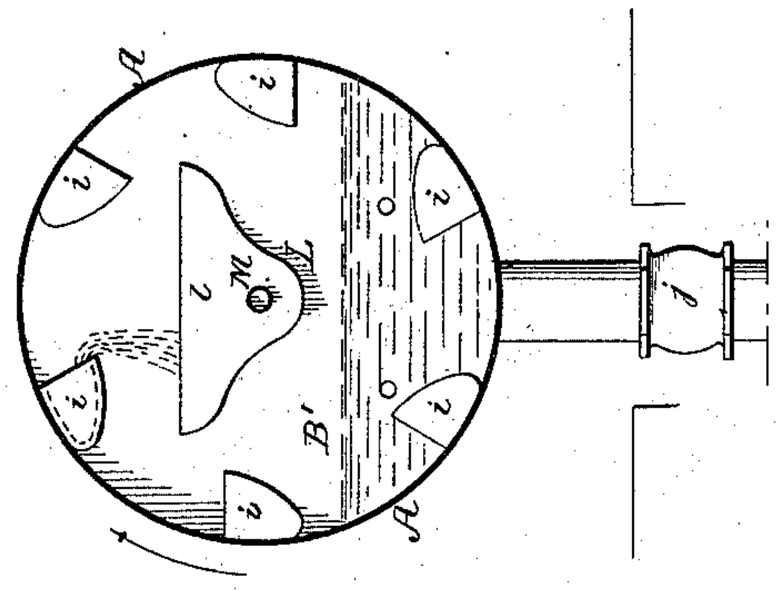



FIG. 3.

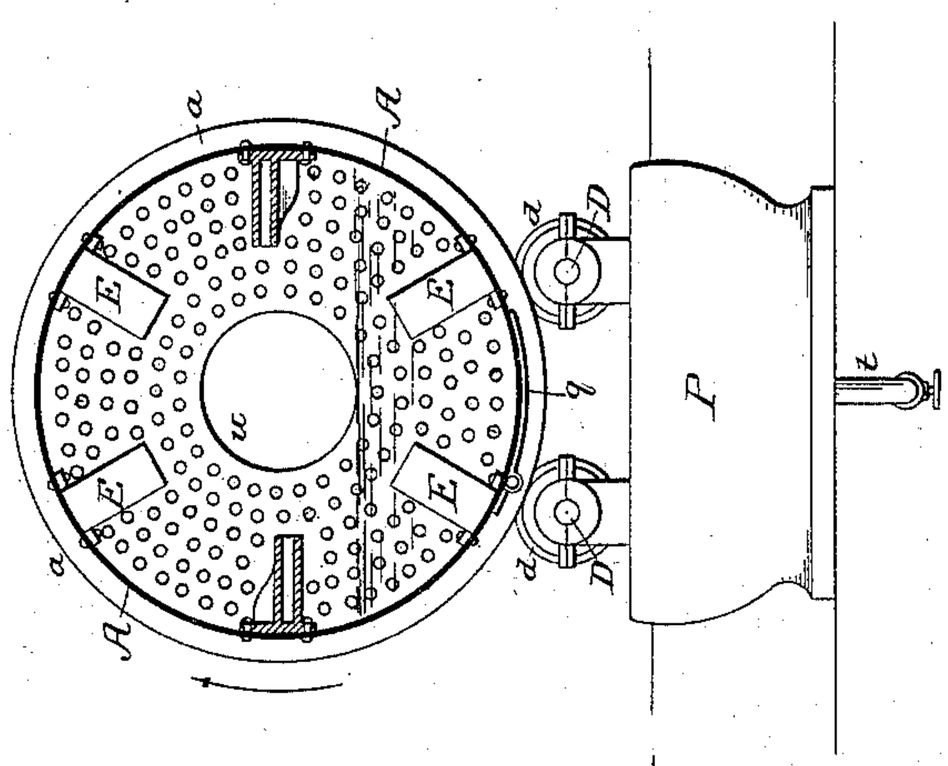
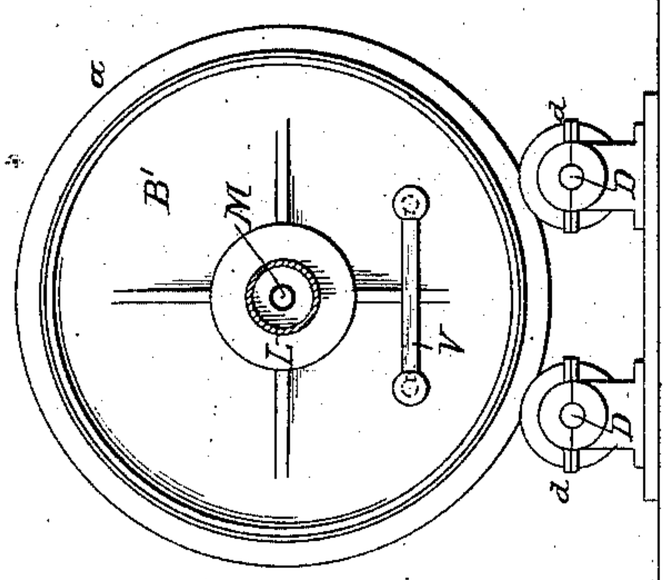



FIG. 5.




Witnesses:
John E. Parker
William F Davis

Inventor:
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# UNITED STATES PATENT OFFICE.

GEORGE M. NEWHALL, OF PHILADELPHIA, PENNSYLVANIA.

## DISSOLVING AND STRAINING SUGAR.

SPECIFICATION forming part of Letters Patent No. 334,972, dated January 26, 1886.

Application filed October 26, 1885. Serial No. 180,939. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE M. NEWHALL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Dissolving and Straining Sugar and Like Substances, of which the following is a specification.

The main feature of my invention consists of a continuous process of dissolving sugar and like substances, as hereinafter fully set forth and claimed.

In present methods of liquefying sugar and like substances, a supply of the material is introduced into a vessel, subjected to a dissolving process, and the liquid then drawn off, and after that a new supply of raw material is introduced, and so on, the sugar or other substance being thus treated tediously in batches.

My improved process consists in introducing the material into a vessel at one end continuously, liquefying it in its progress through the vessel, and drawing the liquid off continuously at the other end of the vessel, as hereinafter described.

In the accompanying drawings, Figure 1 is a longitudinal section of an improved mixer and dissolver in which my process may be carried out. Fig. 2 is a perspective view of one of the blades of the mixer. Fig. 3 is a transverse section on the line 1 2, Fig. 1. Fig. 4 is a transverse section on the line 3 4, Fig. 1; and Fig. 5 is a transverse section on the line 5 6, Fig. 1.

A is a drum having two rings, *a a*, secured to its periphery, and mounted on rollers *d d* on shafts D D, either or both of which may be driven so as to rotate the drum A. The drum is preferably arranged horizontally or nearly horizontally, and the drum A is capped at both ends with heads B B′—the head B at the inlet and B′ at the outlet end.

Attached to the interior of the drum A are a number of inwardly-projecting blades, E, the detailed construction of which will be described hereinafter. The interior of the drum A is in the present instance divided into three compartments, *x y z*, separated by screens or perforated bulk-heads *u v*, each of which has a central man-hole for the easy access to each compartment, when desired. The perforations in the first screen, *u*, are larger than the ones in the screen or partition *v*, for a reason hereinafter explained. The liquid contents of the drum are maintained at the level shown by dotted lines in Fig. 1, which can be easily gaged by the glass V, Figs. 1 and 5. The head B of the drum is provided with a central packing-box, *b*, which surrounds the tubular neck *f* of a supply-hopper, F, this neck after entering the drum turning downward, as shown in Fig. 1, in order to trap the steam and prevent it from escaping. In this neck *f* of the hopper is a feed-screw, *g*, on a shaft, G, which has its bearings in the frame *h h*, and which is driven by the wheel H. As the material to be dissolved is introduced, along with water or other dissolving medium, into the hopper, the screw *g* feeds it through the neck *f* into the first compartment, *x*, of the drum A, below the level of the material already in the drum. The head B′ is also provided with a stuffing-box, *b′*, surrounding an outlet-pipe, L. On the interior of this head are cast or otherwise secured a number of buckets, *i*, of the form shown in Figs. 1 and 4. As these buckets revolve with the drum, they carry up the liquefied material from the bottom of the drum and empty it into the hopper *l* of the outlet L, which is formed in the manner shown in Fig. 4, in order to collect all the liquid that drips from the buckets.

Passing through the pipe L is a steam-pipe, M, which supplies steam to the drum A, for the purpose of hastening the solution of the material acted upon, although steam is not necessary for solution. The supply of steam can be regulated by a suitable valve, *m*, Fig. 1. The blades are made hollow, as shown in Fig. 2, and open at their outer ends, each of a triangular form, with a comparatively sharp edge, *e*, uppermost, and having a flange, *e′*, for strength and to form a pocket, and lugs $e^2$, for securing the blades to the drum. The drum revolves in the direction of the arrow, Fig. 3, and as the blades pass through the partly-liquefied material the hollow portions of the blades fill, and the pockets formed by the flanges *e′* raise the undissolved material, while the edges *e* cut through and the inclined faces of the blades gradually push the mass forward. The tendency of the mass is to press

against the perforated partition *u*, so that the material as it becomes melted or liquefied passes through the screen, and any lumps that are small enough to pass through the openings enter the compartment *y*, where they are again agitated by the blades E. In this chamber a number of the blades are reversed, tending to force the material back against the partition *u* until thoroughly dissolved. The liquid then passes through the smaller perforations of the partition *v* into the compartment *z*, where it is carried up by the buckets *i* and emptied into the outlet-hopper *l*. It will thus be seen that the process of dissolving the sugar or like substance is a continuous one, the material being introduced at one end with the liquefying medium dissolved during its passage through the drum, and the liquid drawn off continuously from the other end of the drum.

In the process described in the patent granted to me July 7, 1885, No. 321,746, the sugar is not dissolved—only a magma was produced. The liquid passes from the hopper *l* into the pipe L, which empties into a tank, N, from which the contents are carried off by a pipe, *n*. The pipe L forms a trap, L′, to prevent the steam from escaping from the drum A through this pipe. I provide the drum A with a man-hole, *p*, closed by a hinged cap, *q*, Fig. 3.

When it is required to clean the drum, the valve *j* of the outlet-pipe L is closed, and water is admitted through the inlet-pipe *f*. After revolving the drum for a short time the man-hole *p* is opened and the water emptied into the receptacle P directly under the man-hole. The water is there strained through the screen *s* and carried off through the pipe *t*.

In clearing the drum of the material not dissolved after mixing, the cap *q* of the man-hole may be fastened back. While the drum is revolved the blades E force the material out of the drum, through the man-hole *p*, into the receptacle P, as above described.

In some machines only one screen or perforated partition need be used, while in others three or more may be employed, the number depending mainly upon the material acted upon. Plain blades may also be used in the construction of the machine, or blades of the form shown in my Patent No. 321,746, July 7, 1885, in which the blades are adjustable for retarding or quickening the movement of the mass acted upon, as therein described.

I claim as my invention—

1. The herein-described process of dissolving sugar and like substances, said process consisting in introducing the material into a vessel continuously at one end, liquefying it in its passage through the vessel, and drawing the liquid off continuously from the other end, substantially as set forth.

2. The process herein described of dissolving sugar and like substances, said process consisting in causing the material to pass through a vessel, and subjecting said material to agitation, liquefaction, and screening in its passage through the vessel, substantially as set forth.

3. The process herein described of dissolving sugar and like substances, said process consisting in subjecting the material to the agitating action of a revolving drum, and liquefying and screening the said material as it passes through the drum, substantially as specified.

4. A rotary drum provided with one or more transverse screens and inlet and outlet passages, substantially as set forth.

5. A rotary drum provided with one or more transverse screens, mixing-blades, and inlet and outlet passages, substantially as described.

6. The drum having compartments *x y z*, and screens *u* and *v*, the screen *v* having finer perforations than the screen *u*, substantially as and for the purpose set forth.

7. The combination of the drum, having inlet and outlet passages *f* L, with screens *u* and *v* and blades E, with inclined faces to feed the material against the screens and toward the outlet, substantially as described.

8. The combination of the rotary drum, having one or more transverse screens, and buckets *i*, attached to or forming part of the drum, with a hopper, *l*, for receiving the liquid as it falls from the buckets, substantially as set forth.

9. The combination of the drum having blades E with a hopper, F, neck *f*, turned down into the drum, and screw *g*, for feeding the material into the drum below the level of the fluid contents, substantially as described.

10. The drum having transverse screens and inlet and outlet passages, with a steam-pipe, M, substantially as and for the purpose described.

11. The combination of the rotary drum having a capped man-hole, *p*, with a receptacle, P, situated directly under the man-hole, substantially as set forth.

12. The hollow triangular blade E, having a cutting-edge, *e*, and flange *e′*, as and for the purpose described.

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

GEORGE M. NEWHALL.

Witnesses:
HENRY HOWSON,
HARRY SMITH.