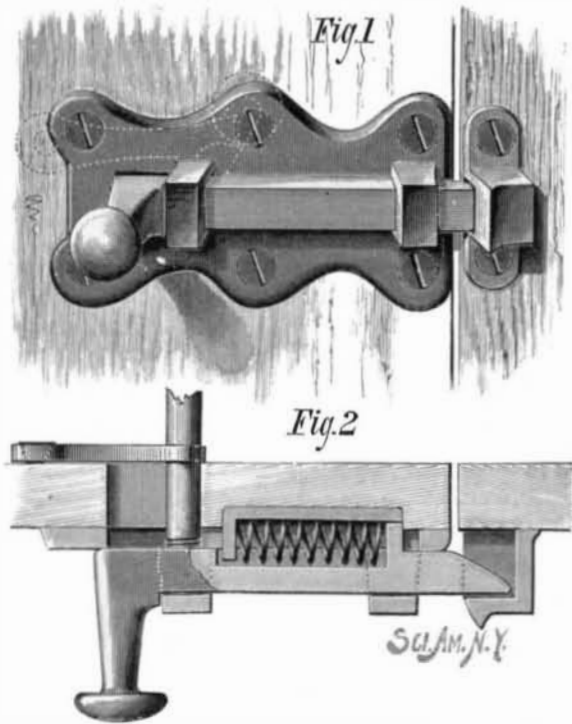


**AN IMPROVED DOOR BOLT.**

The accompanying engraving represents, in perspective and in section, an improved door bolt, recently patented by Mr. Thomas Hoesly, of New Glarus, Wis.

The principal features of this bolt will be understood by reference to the engraving. On the plate or body are cast two loops or guides for the bolt, and the plate is slotted under the bolt, and a lug projects into the slot and bears against a spring contained by a small casing riveted to the back of the plate. The end of the bolt is beveled, and its operation is similar to that of the ordinary door latch. Two handles are provided, one of which is of sufficient length to reach through the door, and a pawl or dog accompanies the



**HOESLY'S DOOR BOLT.**

bolt, which may be attached to the door with a single screw, and is to be used in locking the door. The bolt is very simple and strong, suitable for shops, out-buildings such as barns, stables, etc., and some of the doors of dwellings.

Further information may be obtained by addressing the inventor, as above.

**Chimney Flues.**

Messrs. W. H. Jackson & Co., of this city, whose long experience in treating refractory flues gives weight to their opinion, communicate to the *American Architect* the following useful information:

To secure a good draught the chimney should be of sufficient size, should be carried up above surrounding objects, should be as straight as possible throughout its length, and should be as smooth as possible inside, to avoid friction. As a draught is caused by unequal temperatures, the chimney should be so arranged as to avoid a rapid radiation of heat. If in an exterior wall there should be at least 8 inches of brickwork between the flue and the exterior surface. For country houses it is much better to have the chimneys run up through the interior, as the flue is more easily kept warm, and the heat that is radiated helps to warm the house. The most frequent cause of a "smoky chimney" is the insufficient size of the flue for the grate or fireplace connected therewith. The flue should not be less than one eighth the capacity of the square of the width and height of the grate or fireplace. That is, if the grate has a front opening 20 inches wide and 26 inches high, the flue should be 8 in. x 8 in.; or, with an opening 36 inches wide and 32 inches high, the flue should be 12 in. x 12 in.; and, to get the best result, the opening into the flue from the grate or fireplace should be of a less number of square inches than the square of the flue, and never larger, as no more air should

be admitted at the inlet than can be carried through the flue. Where there is more than one inlet to the same flue, the sum of all the inlets should not more than equal the size of the flue. A number of stoves may be connected with the same flue, one above another, if this rule is observed.

A square flue is better than a narrow one, as in two flues containing the same number of square inches the square flue would have the smallest amount of wall surface,

and consequently less friction for the ascending currents, and less absorption of heat by the walls. Chimneys should be closely built, having no cracks nor openings through which external air may be drawn to weaken the draught. If they could be made throughout their length as impervious to air as a tube of glass, with interior surface as smooth, one cause of smoky chimneys would be removed. A downward current of air is frequently caused by some contiguous object higher than the chimney, against which the wind strikes. This higher object may sometimes be quite a distance from the chimney, and still affect it badly. A good chimney top constructed to prevent a down draught will remedy this difficulty. Each grate or fireplace should have a flue to itself. Under very favorable conditions, two grates or fireplaces might be connected with the same flue, but it is not a good plan. We have known grates and fireplaces connected with two flues, where they have been built under a window for instance, and, owing to there being insufficient room for a flue of suitable size, a flue has been run up on each side of the window. This is a very bad plan, and never can work well; it requires too much heat to warm both flues, and if the room in which the grate or fireplace is situated should be pretty close, so that there was no other entrance for air, there is danger that it would circulate down one flue and up the other, forcing smoke out of the fireplace into the room.

**IMPROVED FURNACE FOR BURNING GARBAGE.**

The refuse matter and garbage of large cities is in the main composed of animal and vegetable offal of the kitchens; of the sweepings of warehouses, manufactories, saloons, groceries, public and private houses; of straw, sawdust, old bedding, tobacco stems, ashes, old boots, shoes, tin cans, bottles, rags, and feathers; dead cats, dogs, and other small animals; of the dust and sweepings of the streets, the condemned fruit, vegetables, meat, and fish of the markets, all of which compose a mass of the most obnoxious and unhealthy matter that can be deposited near human habitations.

The inventor of the furnace shown in the accompanying engravings aims to produce a change of form and of chemical nature and a great reduction in bulk of all such refuse and garbage within the limits of the city where it accumulates, without screening, separating, preparing, or mixing, without the expense of using other fuel, without any offensive odors being generated in the operation, and to produce an entirely unobjectionable residuum or product that may be made useful.

As a rule organic matter largely preponderates in the refuse, being as high in some instances as 94 per cent. There is always more than enough to generate sufficient heat to fuse the earthy or inorganic portion, which is mainly composed of sand, clay, and the alkalis from the coal and vegetable ashes, etc.

By producing a high degree of heat in the combustion of the organic portion of the refuse with a forced blast or forced draught, the non-combustible elements are fused, and form a vitreous slag, which is entirely inodorous and unobjectionable, and which may be utilized for many purposes.

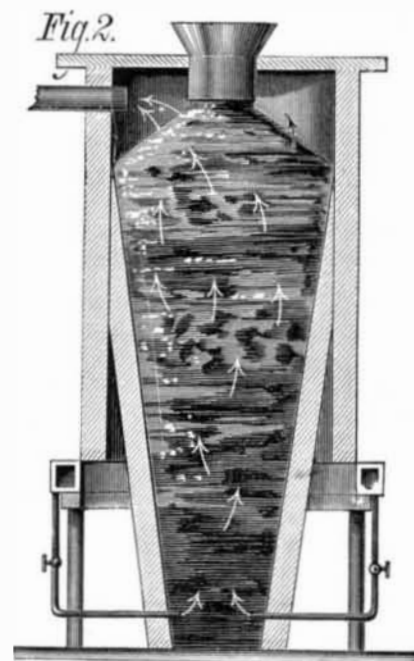
The upper section or cone of the consuming furnace is built

nace is closed with an iron plate, provided with a circular opening, through which the hopper enters the top of the furnace.

At the left in the larger engraving is seen an elevator, operated by a steam engine, for conveying the garbage and refuse to a platform, whence it is projected into the furnace by an inclined plane or chute.

Gas or smoke conductors convey the gas from the top of the furnace to the furnace of the boiler and to the heating oven, where it is used in heating air, which is conveyed through the iron pipes passing through the heating oven into a wind box, from which it enters the furnace at several points near the bottom by means of the tuyere pipes.

The consumption of the garbage is effected near the bottom



**SECTION OF FURNACE.**

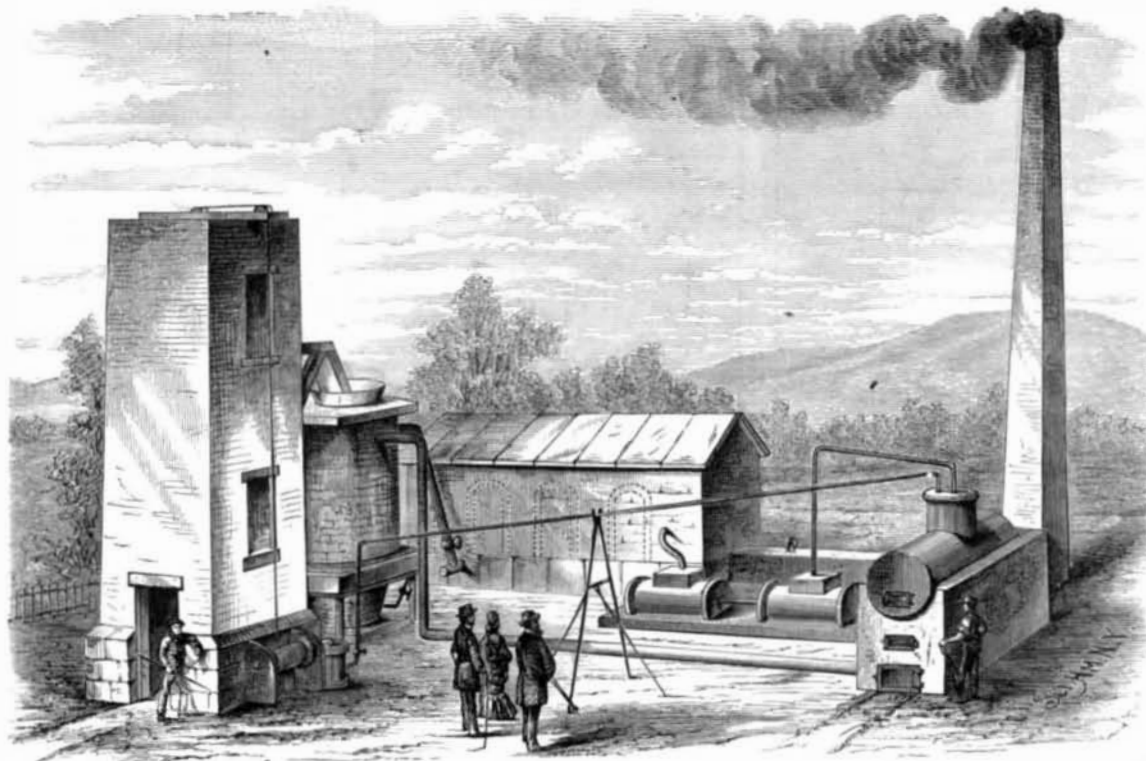
of the furnace, where the air is forced in, and is continued as long as the blast is applied, and while burning at the base it is continually sinking down at the top, so that it is necessary to keep filling all the time. The odoriferous gases and the hot products of such combustion are forced upward through the superimposed mass, and escape to the fires of the boiler and heating oven, and, being largely composed of carbonic oxide and the hydrocarbon gases distilled from the animal and vegetable offal of the garbage, are thoroughly consumed; and it is said that by this means not only are all the offensive odors destroyed, but the heat generated is utilized for making steam and heating the air used for blast.

The refuse in its descent through the high furnace is exposed to the drying action of the hot gases of distillation and the hot products of combustion, its temperature increasing in its descent the nearer it approaches the tuyeres, and becomes completely desiccated and combustible when it reaches the blast. The high heat in this way obtained by the combustion of the organic portion melts all of the inorganic portion, forming a vitreous slag or glass, which may be allowed to run continuously, or by closing the tap may be allowed to accumulate, and can be drawn off at intervals. If there is an adequate supply of clay and sand in the refuse to combine with the ashes, the slag will run hot and free. The combination of siliceous or alumina and an alkali in proper portions always yields a fusible, easy-running compound.

The molten slag, as it runs from the furnace, may be discharged into tanks of cold water, which will pulverize or granulate it, making it like fine sand, or as it pours over a runner, through which it flows, if struck with a forcible air or steam blast it will be spun into fine thread-like wool.

The furnace once lighted and started may be kept running day and night continuously for days, months, or years, if desired; but if it becomes necessary to stop at any time, the tuyere pipes may be removed and the holes all stopped with clay, so as to entirely shut off the supply of air, and it will then hold in fire for many days, and will be in readiness to start again at any time the pipes are replaced and the blast turned on.

This furnace is the invention of Mr. Henry R. Foote, of Stamford, Conn.



**Fig. 1.—FOOTE'S FURNACE FOR BURNING GARBAGE.**

of boiler iron, and lined with fire brick resting upon an iron plate, which is supported by iron columns.

The hearth is made of fire brick, and is in the form of an inverted cone, being smaller at the bottom and larger at the top, as shown in Fig. 2.

The sides of the hearth are perforated near the bottom with arches for the tuyeres or blast pipes, and also in front for the special blast pipe and the tapping hole. The top of the fur-