W. H. CLEMENT.

Evaporating Pan.

No. 9,316. Patented Oct. 12, 1852.

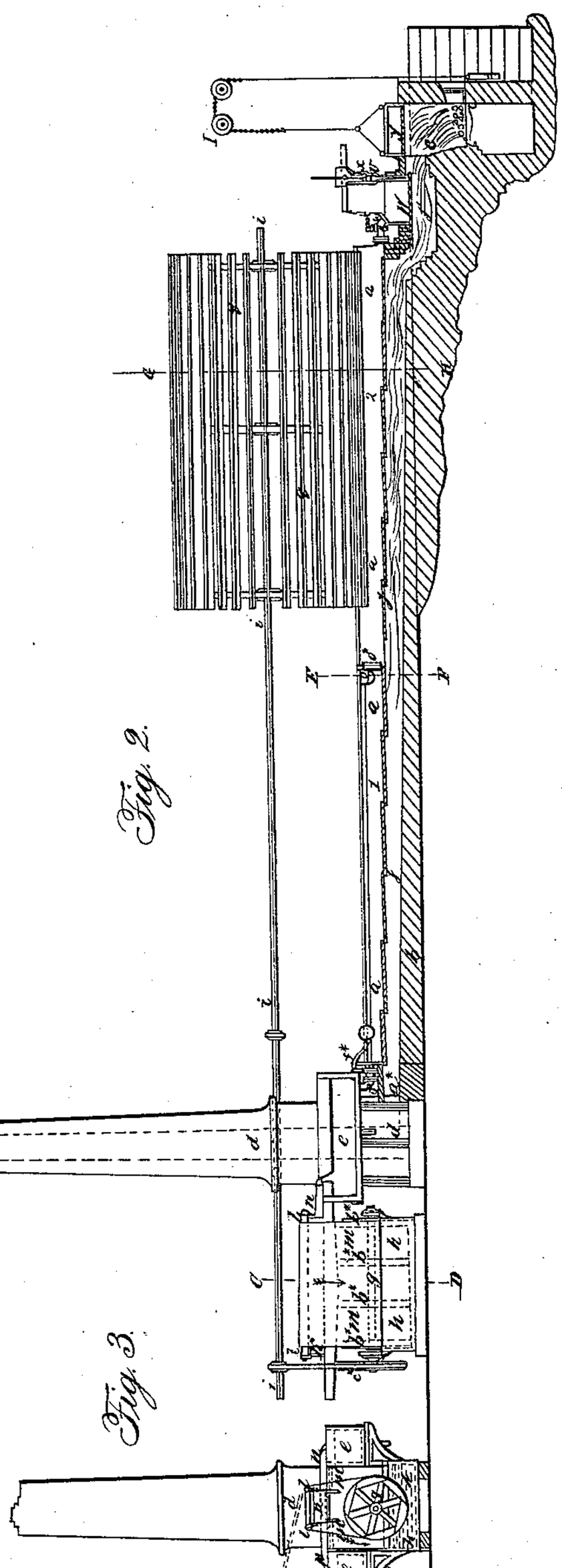


Fig. 2.

Fig. 3.

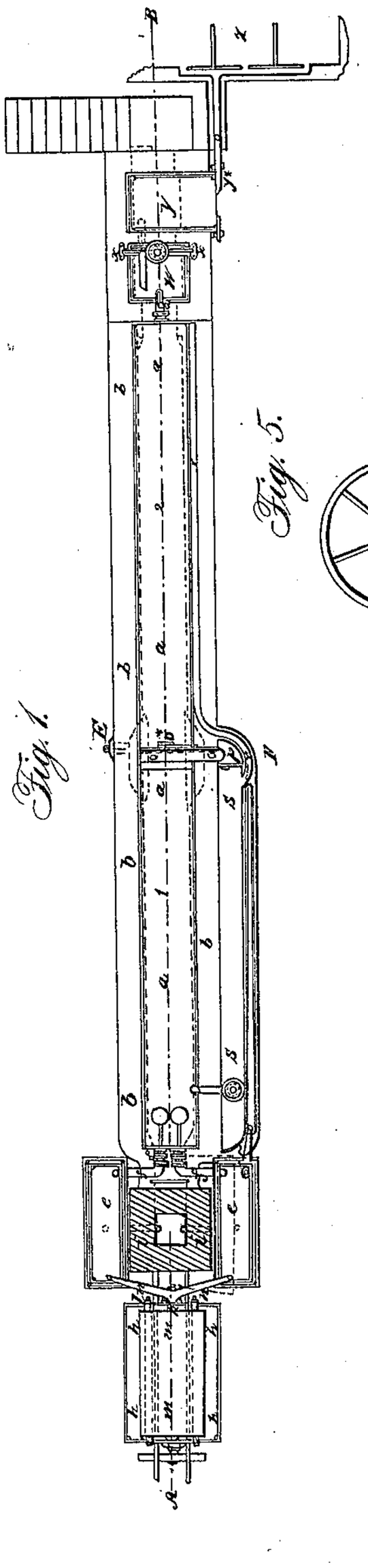


Fig. 1.

Fig. 5.

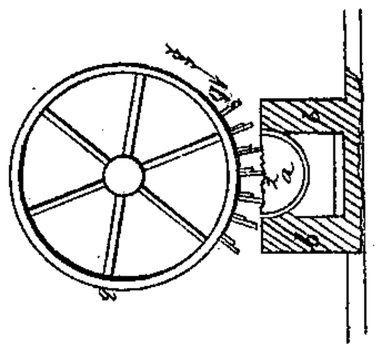
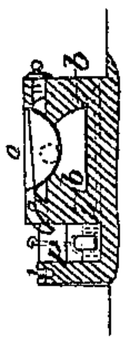


Fig. 4.



UNITED STATES PATENT OFFICE.

WM. H. CLEMENT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SCUMMING APPARATUS FOR SUGAR-PANS.

Specification forming part of Letters Patent No. **9,316**, dated October 12, 1852.

To all whom it may concern:

Be it known that I, WILLIAM H. CLEMENT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Apparatus for the Manufacture of Sugar; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a plan view; Fig. 2, a vertical section taken in the dotted line A B of Fig. 1, and Fig. 3 a transverse vertical section taken in the line C D of Fig. 5.

a a is an open boiler set in brick-work *b b*, (and beneath the boiler is a flue, *j*, extending along its whole length, and proceeding from the furnace at *c* to a chimney-shaft, *d*.) The draft in this flue is capable of being cut off when required, by means of a damper, *a**. (Shown in the drawings.) Into the tanks *e e* the charge of lime is thrown, and the cane-juice is run in after it has been separated by filtration from the feculencies which have passed with it from the mill employed for crushing the cane. The mode of effecting this filtration will be best seen by reference to Figs. 2 and 3.

g is a horizontal shaft mounted in bearings on the side of a water-tank, *h*. This shaft carries two or more disks, *b**, of wood, and on its outer end a pulley, *c**, is keyed, to which rotary motion is conveyed from the main-driving-shaft *i*, above the apparatus, by a band passing over a pulley on that shaft. Immediately above the shaft *g* is an open pan or vessel, *k*, which is provided on each side with a small roller, *l l*, mounted in brackets attached to the ends of the pan.

m m is an endless web of wire-cloth, which passes over the rollers *l l* and under the disks of shaft *g*.

n is a branch pipe communicating with the tanks *e e*, which are themselves, as before stated, in connection with the boiler *a*. The liquor of the crushed cane is run down a trough or channel from the mill onto the endless wire-cloth, which, by means of the band and pulleys of the shaft *g* and *i*, is caused to travel slowly in the direction of the arrow. As the liquor flows onto the cloth, it will percolate through it and fall into the tank *k* below, while the feculencies or refuse matters will be carried forward by the cloth and fall into the water-tank *h*. The object of having water in this tank is to cleanse the wire-cloth of any glutinous or other matters that might otherwise adhere to it and check the proper filtration of the liquor. While this operation is going on, the liquor flows from the tank *k* along the branch pipe *n* into the tanks *e e*, where it may, if required, be subjected to heat by turning pose. The liquor then passes along the pipes *f f* into the boiler *a*, the supply being regulated by sluice-cocks and floats *f* f**. In this steam into the jackets provided for that purboiler *a*, at about the middle of its length, is a partition and channel, which divides it into two, and above this partition a peculiarly-formed channel, *o*, is placed, for the purpose of taking off the scum which is thrown onto the surface in division 1 of the boiler by the action of the heat in the flue beneath. This channel *o*, which crosses the boiler *a*, presents a level edge to the liquor in division 1, and is made concave, running out through the side wall, *b*, to conduct the scum which falls into it into a tank, *p*. As the liquor flows into the boiler through the sluice-cocks at the other end, a current toward the channel *o* is created, which current brings with it the scum upon the surface and passes it over the level edge of the channel, whence it flows down into a tank intended to receive the refuse matters. It will be readily understood that according to the height of this level edge of the channel, which is, in fact, the skimmer, the sluice-cocks *f* f** must be adjusted so as to regulate the supply of liquid to the boiler. If the flow of the liquid should not be found sufficient to carry forward the scum as it rises on the surface into the channel *o*, a fan or blower may be employed to impel a current of air onto the surface of the liquid, and thus expedite the operation. Beneath that part of the boiler *a* where the partition crosses, the flue is widened, as shown by dots in the plan view, Fig. 1, in order to give a greater heat to the liquor and cause it to simmer from the sides of the boiler. The liquor in division 1 of the boiler, while being thus deprived, as above stated, of its scum and other refuse matters, runs through the sluice-cock *o** to the division 2 of the

boiler, where it is subjected to a greater heat by reason of the nearer proximity of the furnace, and also to a further skimming operation. Above this part of the boiler is a paddle-wheel, *q q*, which has the main driving-shaft *i* for its axle. This wheel is so adjusted that the float boards or paddles will (as they successively come round by the rotation of the wheel) dip into the liquor and push the scum before them to one side of boiler *a*, where it falls into a channel, *r*, made on the top of one of the side walls *b*.

The action of the wheel *q* will be best understood by reference to Fig. 5, which is a sectional elevation taken in the line G H of Figs. 1 and 2. The bed of channel *r* inclines toward the partition of the boiler, and there it is brought into communication with a tank, *s'*, which is intended as a receptacle for all matters swept out of the division 2 of the boiler by the wheel *q* when rotating in the direction of the arrow, Fig. 5. This tank *s* is provided with a small lift-pump, *t*, which, when the liquor has been allowed a sufficient time to settle, is actuated by means of gearing connected with the main driving-shaft *i*, and made to pump up the clear liquor into the division 1 of boiler *a*. The refuse in the tank *s*, after the clear liquor is pumped out, is run off by a sluice-cock into the refuse-tank *p*, before mentioned. If steam is used for heating these tanks *e e*, the waste steam may be conducted into the chimney-shaft, as shown, also *i** at Fig. 1. While the skimming process is being carried on in the division 2 of the boiler, the liquor is running through a cock, *u*, into a smaller boiler, *w*, where it is submitted to a still greater heat. This boiler is provided with a lift-pump, *v*, supported in a bearing, *x*, and having a spout turning vertically, for the purpose to be presently mentioned. This pump is worked by means of gearing connected with the main driving-shaft *i*, in order to pump up the liquor from boiler *w* and let it fall in a continuous stream, by which means the bubbles will be broken and an overflow of the liquid will be prevented.

The next operation is to transfer the liquor from the boiler *w* to an adjoining pan, *y*, which is placed immediately over the furnace-fire and rests at one end on the brick-work, but at the other end is supported by studs resting in brackets fixed in the wall of the furnace, so as to be capable of tilting when required. In order to convey the liquor from the boiler *w* into the tilt-pan *y*, the spout of pump *v* is turned over into the position shown by dots in the drawings, when it will throw a charge of liquor from the boiler into the pan *y*, where it is finally concentrated. The pan may be tilted by a chain attached to it and passing over a pulley or pulleys, as shown in the drawings, or by any other convenient means. When thus tilted, the charge of now concentrated liquor will run by a pipe into the coolers *z*, and the same movement which caused the tilting of the pan will bring down a damper over the ash-hole and stop the supply of air to the fire, by reason of the damper being attached to one end of the chain, which is secured at the other end to the tilt-pan, and forming thus a counterpoise thereto.

It will now be clearly understood that by this improved apparatus and mode of working the filtering, clarifying, and concentrating and cooling processes will be simultaneously carried on in a uniform and expeditious manner. As the requisite time for submitting the liquor to the heat of the fire will vary in almost every case, depending upon the quality of the liquor and other causes, I have not thought it necessary to enter into such minute particulars, as any workman competent to carry on the process in the ordinary way of manufacturing sugar will be able, by the usual tests, to ascertain the exact progress of the operation.

In conclusion, I wish it be understood that I claim as my invention and desire to secure by Letters Patent—

The application, in the manufacture of sugar, of rotating paddles or leaves for skimming or taking off the scum and gummous matters from the surface of the liquor.

WM. H. CLEMENT.

Witnesses:
SAML. SIMES,
JOHN C. AXE.