

(No Model.)

2 Sheets—Sheet 1.

C. EDGERTON.

PROCESS OF AND APPARATUS FOR CONTINUOUSLY FILTERING AND
PRESSING GARBAGE.

No. 603,945.

Patented May 10, 1898.

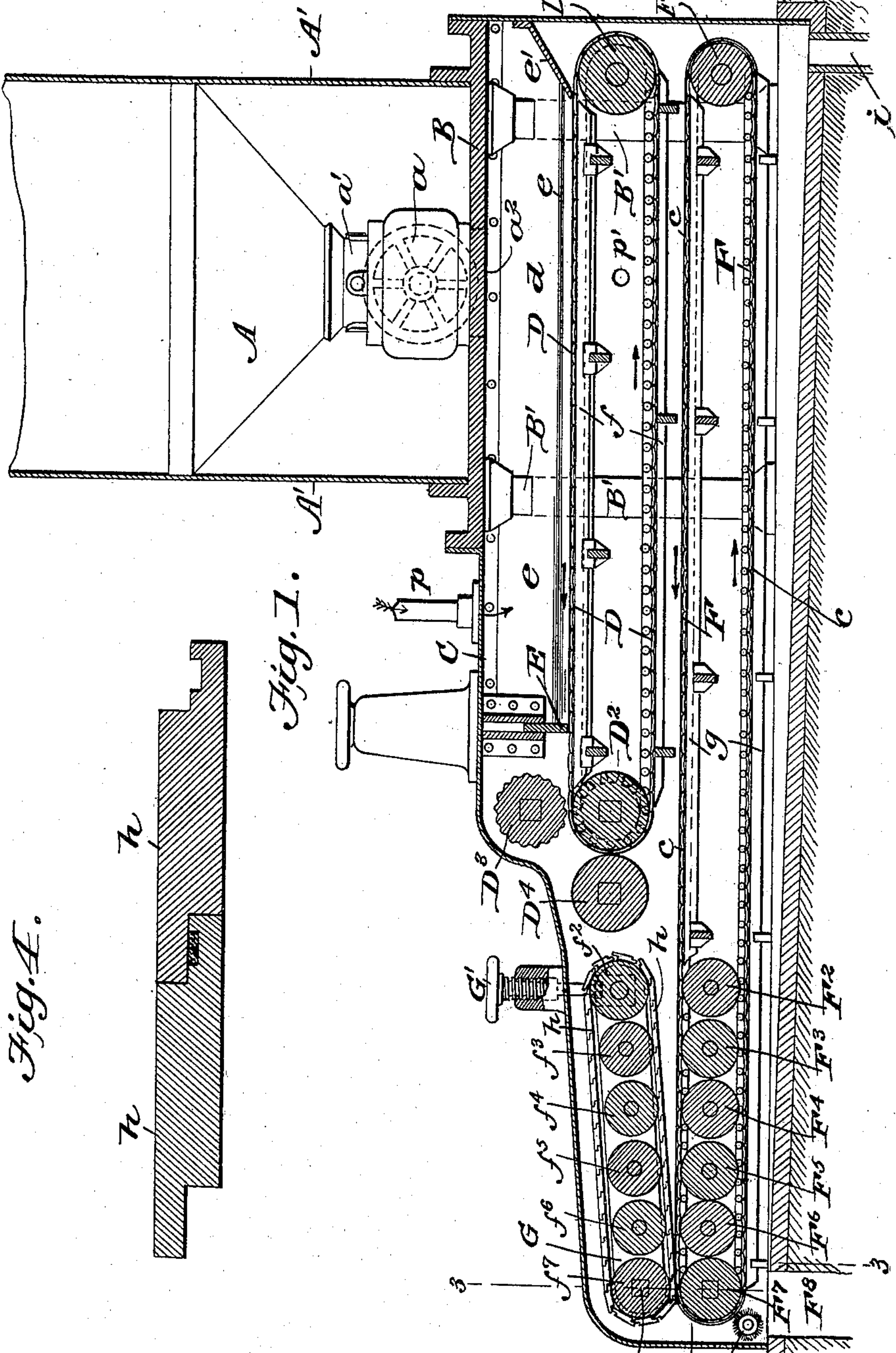


Fig. 1.

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Fig. 2.

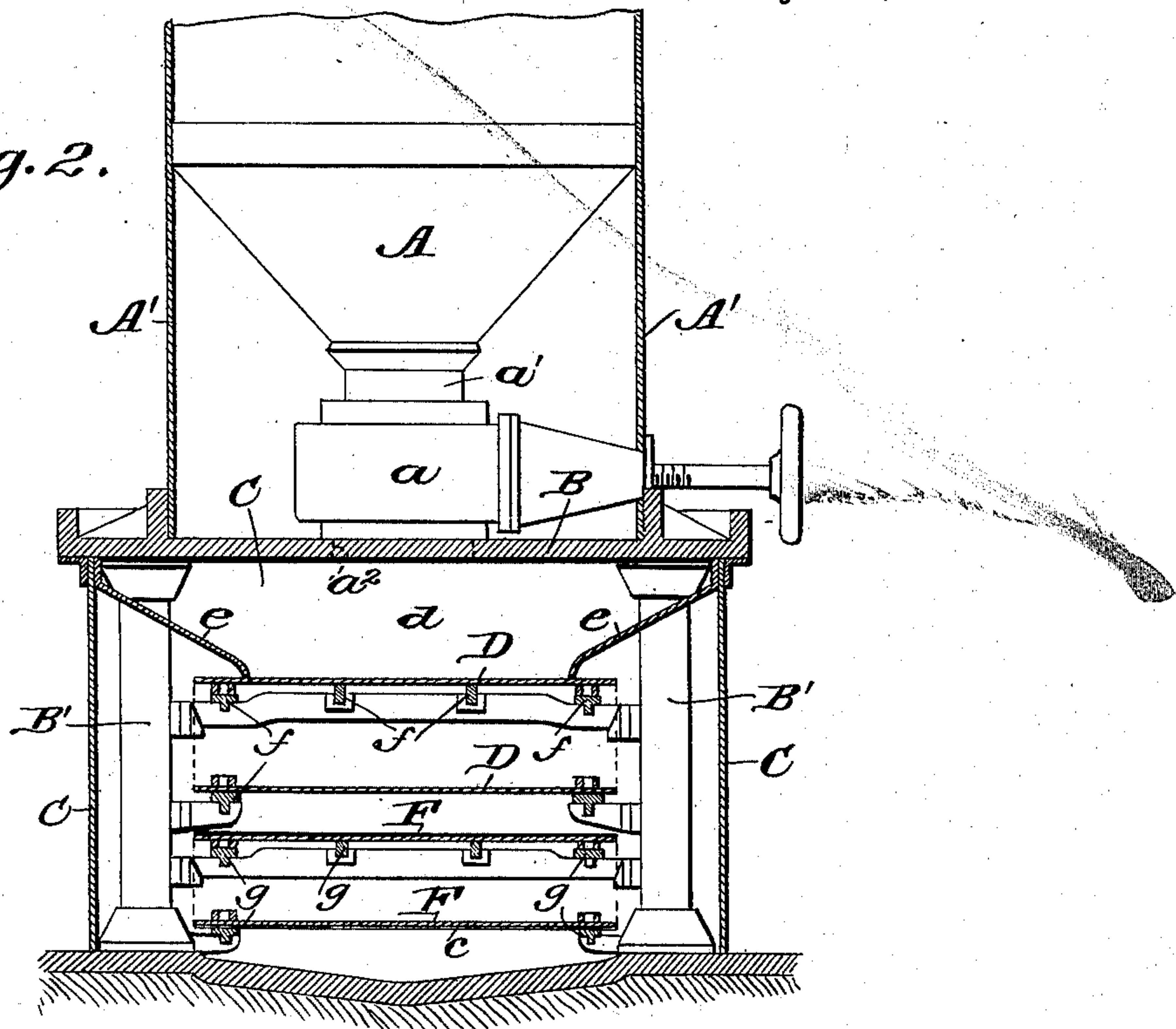
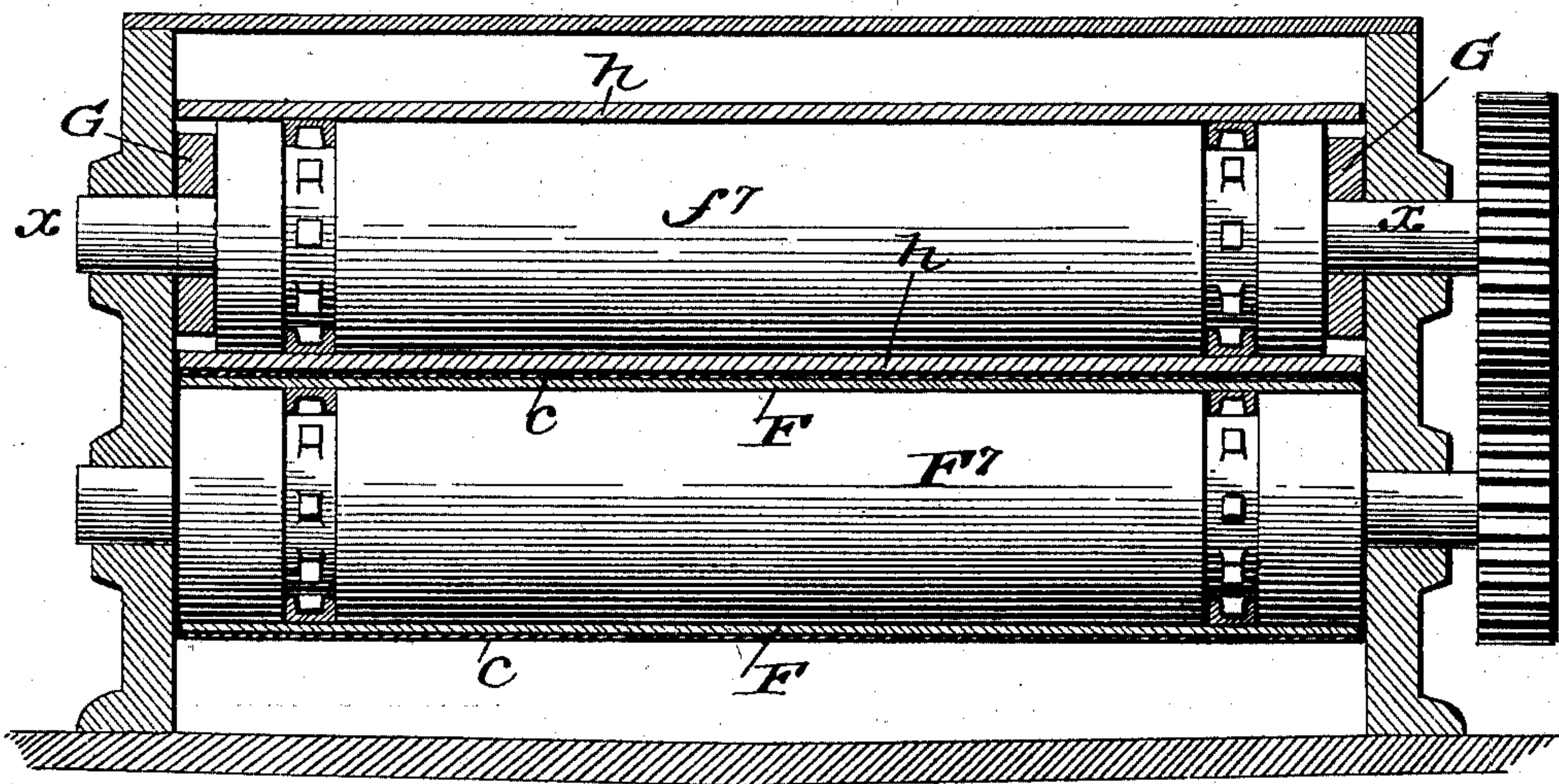


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES EDGERTON, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF AND APPARATUS FOR CONTINUOUSLY FILTERING AND PRESSING GARBAGE.

SPECIFICATION forming part of Letters Patent No. 603,945, dated May 10, 1898.

Application filed October 21, 1897. Serial No. 655,923. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDGERTON, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Processes of and Apparatus for Continuously Filtering and Pressing Garbage, of which the following is a specification.

In the ordinary method of rendering or reducing kitchen-garbage or like material the material is first cooked by steam and the oils and liquid matters are then in a second operation separated by pressing in hoops or in cloths and racks in the open air. This method is very tedious, very nasty, and unsanitary on account of the sloppy nature of the materials, and the filtering devices are torn up by bones, broken crockery and glassware, and other hard substances. The operation is also intermittent, expensive, and in many ways unsatisfactory. It has been sought to press out the liquids from the cooked garbage by a supernatant cushion of steam in the tank in which it has previously been cooked or by a plunger and hydraulic pressure pressing the material in bulk. All of these processes have been found tedious, expensive, and unsanitary.

My invention comprises a continuous pressing out of the liquids from the cooked garbage by a supernatant body of steam while the garbage is in transit from the digesters to the squeezing-rolls and is being carried along on an endless traveling metal slatted belt within a hermetically-sealed casing.

It also consists in the special organization of devices for carrying out this process, as will be hereinafter fully described with reference to the drawings, in which—

Figure 1 is a vertical longitudinal section of the continuous garbage-filter, showing also the lower portion of one of the digesters in which the garbage is cooked. Fig. 2 is a vertical transverse section through the same. Fig. 3 is a vertical section on line 3 3, and Fig. 4 is a sectional detail of the belt *h*.

In the drawings, A represents the bottom portion of one of the digesters, in which the garbage is cooked by steam in the usual way. The digester shown is one of a series which may be multiplied to suit the demands of the

work to be done. Each digester is a vertical cylinder having a conical bottom provided with a discharge-pipe *a'* and a valve *a*, by which its contents may be passed through the opening *a*² into the subjacent casing C. The digesters A have a skirt portion A', which is an extension of their side walls, which skirt rests upon a cast-iron base-plate B, sustained upon pillars B' B' on a level with the top of the casing C and directly above the same.

Within the casing C there is arranged a horizontal carrier-belt D, passing around a roller D' at one end, and another one, D², at the other end, which latter is a driven roll and imparts motion to the belt. This belt (see Figs. 2 and 3) is constructed of transverse metal slats, with chain-links along the edges that engage with sprockets on the roller D². The edges of the belt bearing the chain-links are guided all along the belt upon guide-rails *f f*, and flanges *e e* are arranged along the sides of the casing and overlap the chain-links, so as to conduct the garbage to the middle of the belt and keep the links clean and unobstructed. At one end of this belt there is an overhanging flange or apron *e'*, that is connected with the casing, and at the other end there is a vertically-adjustable gate or scraper E, which both levels the garbage on the belt and also, in conjunction with the apron *e'* and flanges *e e*, makes, when the garbage is distributed on the upper surface of the belt D, a hermetically-closed or steam-tight chamber *d* between the belt D and the upper part of the casing. Into this chamber *d* steam is admitted through a pipe *p* or otherwise, and as the cooked garbage is received upon the belt D from the several digesters the pressure of the steam on the garbage lying on belt D will forcibly express by direct pneumatic action the principal part of the oils and liquids, which will flow down through the slatted belt. This belt D travels continuously in the direction of the arrow, and the process of pressing by the direct action of the steam on the traveling layer of garbage is made continuous, and, being conducted within a hermetically-sealed chamber, the odors and vapors are all kept perfectly housed and the operation is made very cleanly, sanitary, and expeditious.

As the garbage passes the gate E it enters between the roll D^2 and a superposed corrugated roll D^3 , whose action is to crush into fine particles all bones, pieces of crockery, glass, &c., the material then passing between a smooth roll D^4 and the roll D^2 , where a second pressing takes place after the comminution of the hard objects. If the garbage were passed directly to the rolls $D^2 D^3$ without the preliminary steam-pressing, the amount of liquid expressed at the moment of entrance between the rolls is so abundant and so violent in its issuance as to throw out the garbage with a backlash. This is entirely overcome by the preliminary steam-pressing, which extracts the greater part of the liquid and causes the garbage to become sufficiently matted together to feed well into the crushing-rolls.

As the partly-pressed garbage is discharged from the rolls $D^2 D^4$ it is delivered onto a long endless belt F, which runs from a point under the front end of the upper belt D to a point some distance beyond the crushing-rolls. This belt F passes around the roll F' at one end, just under the roll D' of the upper belt, and at its other end passes over a series of horizontal rolls $F^2 F^3 F^4 F^5 F^6 F^7$, which are journaled in stationary bearings. This belt F is formed of metal slats and chain-links, like the one above, and runs on guide-rails $g g$ within the casing; but it has also a covering c of burlap or other loose-meshed textile.

With the drippings expressed by steam from the belt D there falls through the slats of the upper belt a considerable portion of disintegrated organic matter which is caught upon the burlap cover of belt F and strained out, leaving only the clarified liquids to pass to the bottom of the casing C and be carried off in the drain i to be further treated for the separation of the oils and aqueous matters.

The smaller particles strained out by the burlap cover of belt F pass, as the belt travels, under the rolls $D^2 D^4$, where they are mingled with the more solid matters discharged from the rolls $D^2 D^4$, and these two products are then subjected to a final and exhaustive squeezing, as follows: Just above the rolls F^2 to F^7 there is a corresponding series of rolls f^2 to f^7 . These are all journaled in a pair of movable bars G, which are pivotally hung at one end x about the axis of the roller f^7 , and at the other end are raised and lowered by a screw and hand-wheel G' . The upper series of rollers have an endless metal slatted belt h traveling around them, and this series of rolls, with their belt h and journal-bars G, form, with the lower series of rolls F^2 to F^7 , a tapering throat, into which the semisolid garbage is delivered to be finally pressed. The taper of this throat is made adjustable, the upper series of rollers being adjusted like a movable jaw. As the semisolid garbage on belt F passes into this throat it is gradually subjected to an increasing compression as it

passes into the contracted or narrow portion of the throat, so that by the time it reaches the final rolls $F^7 f^7$, which are quite close together, it is pressed nearly to a solid form, which is dislodged by a revolving brush R, through an opening F^8 , and afterward dried and utilized for fertilizer.

In emphasizing the importance of my invention I would state that the character of the greases in ordinary city garbage is such that it congeals at a comparatively high temperature. After it is congealed it cannot be pressed out by any kind of pressure. A very important feature of my process and apparatus is that the entire operation of pressing is done at a higher temperature than would be possible at all to do in the open air.

There is another feature to which I wish to specially call attention, and that is the mode of constructing the series of rolls which apply the final pressure. It will be seen that the material as it passes between these series of rolls passes into a wedge-shaped throat made by the steel slatted conveyers, both above and below it, which steel slatted conveyers are held in position by the rolls, and as the material passes on the pressure is gradually increased, thus allowing sufficient time for the liquids to be pressed out, as in the ordinary method of intermittent pressing. The lower slatted conveyer, which carries the burlap or textile, is also made sufficiently open to allow the liquids to pass through readily and fall below and pass away in a drain provided for that purpose. It is equally essential that the upper slatted conveyer, which puts the pressure upon the top of the material, should be practically impervious to water—that is, the water or liquid should not possibly pass upward from the material, as they would if this conveyer were open. To avoid this, the slats of the upper conveyer are not only fitted very close by planing, but overlap each other, breaking joints, and are made with feathers or grooves in such position, as shown in Fig. 4, to receive an elastic filling and form what may be called "water-tight" packing. After the steam has passed through the slatted conveyer in the trunk or casing said steam is carried out at the side of the trunk below the belts, as at p' , and condensed. This is a feature of sanitary importance and also makes the apparatus work more rapidly and efficiently for the reason that it maintains a slight vacuum under the belt, which renders it necessary to maintain only a slight pressure above the material on the belt, the two agencies operating together to express the liquids.

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

1. The process of continuously filtering the liquids from the solids, in the treatment of slushy garbage materials, which consists in distributing the slushy material in a layer upon a traveling diaphragm, and applying a

hot gaseous pressure to the upper side of the layer of slushy material while it is in transit substantially as and for the purpose described.

2. An apparatus for continuously filtering garbage, comprising a hermetically-closed casing, an endless traveling belt having interstices through it, means for closing the edges of said belt tightly against the sides of the casing to retain a gaseous pressure above the belt when covered with slushy materials, and means for introducing and maintaining a cushion of gaseous medium above said belt to continuously express and filter out the liquids during the passage of the said slushy material substantially as and for the purpose described.

3. An apparatus for continuously filtering and pressing slushy material comprising a gas or steam tight casing, extending horizontally and having a plate B on its upper side a digester mounted on the top of the same and having a valved communication therewith, an endless metal slatted belt, and means for closing its edges tightly against the sides of the casing substantially as and for the purpose described.

4. A filtering and pressing device for slushy materials, comprising a horizontal and pervious filter-belt having a fibrous covering and

inclosing at one end a series of parallel rollers arranged horizontally, a corresponding series of parallel rollers arranged above the same and surrounded by an endless metal slatted belt, constructed with water-tight joints to prevent the upward penetration of liquids there- through a frame carrying said upper set of rollers, pivoted at one end and made adjustable at the other, substantially as and for the purpose described.

5. A filtering and pressing device for slushy materials, comprising a casing, an endless filtering-belt, and means for closing its edges against the sides of the casing, crushing-rolls at the end of the belt, a subjacent belt extending under and beyond the first-named belt and having a fibrous covering, and a series of parallel rollers at one end and an adjustable series of parallel rollers arranged above the first-named series and carrying an endless metal slatted belt, a frame for supporting the upper adjustable series of rolls pivoted at one end and made adjustable at the other substantially as and for the purpose described.

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Witnesses:

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FRANK H. SCATTERGOOD.