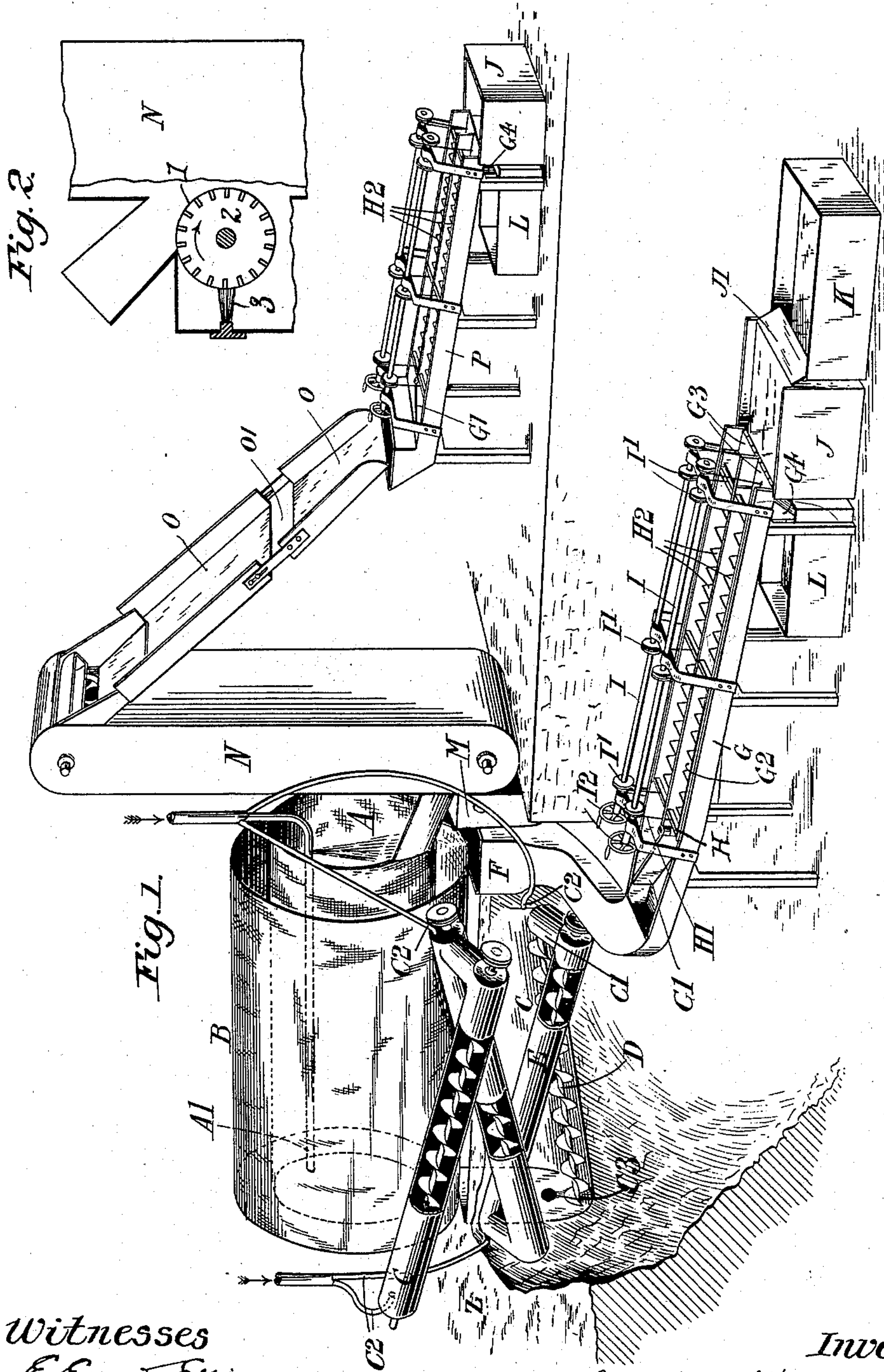


(No Model.)

J. C. W. STANLEY.
MEANS FOR TREATING REFUSE OF CITIES.

No. 565,577.

Patented Aug. 11, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN CHARLES WILLIAM STANLEY, OF LONDON, ENGLAND.

MEANS FOR TREATING REFUSE OF CITIES.

SPECIFICATION forming part of Letters Patent No. 565,577, dated August 11, 1896.

Application filed January 3, 1894. Serial No. 495,539. (No model.) Patented in England February 1, 1893, No. 2,247; in France January 9, 1894, No. 235,388; in Belgium January 9, 1894, No. 108,011; in Canada September 10, 1894, No. 47,002, and in Austria October 5, 1894, No. 44/5,320.

To all whom it may concern:

Be it known that I, JOHN CHARLES WILLIAM STANLEY, a subject of the Queen of England, residing at London, England, have invented certain new and useful Improvements in Means for Treating the Refuse of Cities, (for which I have obtained Letters Patent in the following foreign countries: Great Britain, No. 2,247, dated February 1, 1893; France, No. 235,388, dated January 9, 1894; Belgium, No. 108,011, dated January 9, 1894; Austria, No. 44/5,320, dated October 5, 1894, and Canada, No. 47,002, dated September 10, 1894,) of which the following is a specification.

The object of this invention is the manufacture or production of block fuel, gas, and other useful products from house-dust (or what is known as "dust-bin" refuse) or other similar refuse which contains a large quantity of unburnt pieces of coal, cinder, vegetable matter, and sand, the separation of the non-combustible material, and for the recovery of the carbon for use under steam-boilers. This house-dust is to be subdivided into its component parts, for which purpose the machinery described in Letters Patent No. 455,802, granted June 2, 1891, is suitable, which eliminates all the waste paper, &c., from the carbon matter, and the vegetable matter can be collected separately, also the vegetable charcoal obtained by burning boxes, mats, and the like. After subdivision by this sifting process I take that portion of the materials resulting from the process which will pass through a mesh of suitable size, say, conveniently, one and one-half inches, and deal with it in the following manner, which will be best understood by reference to the accompanying drawings, which represent diagrammatically apparatus suitable for carrying this invention into effect, although modifications may be made without departing from the spirit of the invention.

Figure 1 is a general perspective view of an entire plant, showing the construction of parts and their relative arrangement, all when in operation or use. Fig. 2 is a detail side view representing the magnetizing device.

The materials after having been subjected to the several successive steps of the process

described in the former Letters Patent No. 455,802, up to the point where they are delivered to the washing apparatus T of such former Letters Patent, are delivered into a circular revolving screen or sieve A, having a mesh, say, of about three-eighths of an inch, the said material consisting, chiefly, of small pieces of coal, cinder, and ashes, and the said sieve A is inclosed by an outer concentric sieve B, having a finer mesh, say of one-eighth of an inch. The screen A may be fitted with a water-pipe A¹, extending throughout its length and perforated on the under side so as to deliver a large volume of water to assist in separating and washing the material as it enters and passes along the screens A and B, the water falling through them into the chamber C.

The materials delivered into the first sieve consist of coal, coke, cinder, sand, glass, bits of cabbage-leaves, and other similar materials. Of these only such as will pass through the three-eighths mesh reach the outer sieve B, through the fine mesh of which the finest particles of all, say sand, powdered glass, and powdered coal, coke, &c., fall into the chamber or receptacle C. This chamber has a slanting bottom, as shown, and a worm-conveyer D, which raises the materials to the higher end of the chamber, whence they pass by the downwardly-sloping chute or passage C¹ to a second chute E, similar in all respects to C, but, as indicated in Fig. 1, sloping in the opposite direction, so that the lowest point of chamber E is nearly level with the highest point of the chamber C, the difference being due to the inclination of the passage C¹. There are as many of these chambers as are found necessary. In Fig. 1 four are shown, each of them being, if necessary, provided with the worm-conveyer and a water-supply C², while the chamber C has an outlet or overflow C³. The fine materials passing through the sieve B are immediately upon their arrival in the chamber C separated, the heavy material falling into the worm-conveyer D, and, being drawn along, is met by the stream of water which carries along with it, in an opposite direction, all mud and vegetable matter, these latter passing out at the

overflow C³, to be dealt with as may be found desirable.

As will be seen from Fig. 1, the bottom of the first chamber C is considerably below the ground-level Z, while the bottom of the last chamber is considerably above that level. This also allows of the last chamber delivering its charge of sand or sharp grit at such a height that it may conveniently fall into a cart, trolley, or the like, to be conveyed away for building purposes, such as making mortar, concrete, and the like.

It is desirable to have several of the chambers and worm-conveyers partly to effect the necessary raising of the materials from the lower to the higher level, but mainly to thoroughly cleanse from mud and light material.

The tailings from the sieve B fall into a chute or hopper F, leading to the washer G, preferably formed double, with a valve or sluice G¹ at its upper end, so that either of the two channels of the washer may be used, this allowing of the emptying of one while the other is in use. The washer G may be constructed as indicated in Fig. 1, from which it will be seen that an outer trough or casing G² contains an inner frame H, which, by chains or equivalent H¹, passing over pulleys I¹, secured upon the shaft I, which may be revolved by the hand-wheel I², or other suitable means, can be raised out of the trough G². The frame H carries a number of partition boards or plates H², which normally lie at the bottom of the trough G²; but when the frame H is raised by turning the shaft I they are lifted up out of the trough and its contents. These materials having already passed through a three-eighth-inch mesh (the stones, glass, crockery, nails, and other non-combustible materials) collect against the partition-plates H² in the bottom of the trough G², water being admitted in sufficient quantity to the chute F or the upper portion of the washer G, which, in conjunction with the angle at which the washer lies, carries forward the lighter materials, which consist of coal, cinder, wood, &c.

The materials carried along by the stream of water escape from the end of the trough G into the tank J, where further separation takes place, those pieces which are capable of floating, such as coke and cinder, rising to the surface, while the heavier materials sink to the bottom. The water and floating matters escape over the edge or channel J¹ of the tank J into the second tank K, in which they are collected, the water escaping through any suitable outlet, so as to leave the coke, &c., behind it in the tank.

When the spaces between the plates H² of the trough G² are full, the sluice G¹ is turned so as to direct the water into the other channel of the washer G and the shaft I is revolved, raising the frame H and plates H² out of the trough G² and at the same time, by another pulley and chain, raising the sluice or valve G³ so as to close the end of the trough G² and

prevent the contents from escaping into the tank J and at the same time unclosing an opening in the bottom of the trough, so that the contents may be directed into the chute G⁴ and so into the tank L. The contents of the respective tanks J, K, and L may be removed in any convenient manner.

The tailings from the sieve A pass over a magnetizing-machine M, Fig. 1, which removes from the tailings any particles of iron or steel which may be present therein, and thence the said tailings pass to the bottom of the bucket-elevator N, from the top of which they are delivered to the separating-chute O, in which is a break O¹, (the proportions of which can be adjusted,) through which the garbage and sticky materials will fall, while the heavy materials—such as coal, coke, crockery-stones, and the like—sliding down the steeply-inclined chute will jump the break O¹ and escaping by the end of the chute will enter the head of a second washer P, whose construction and operation are substantially the same as already described in relation to the washer G.

The magnetizing-machine M, above referred to, is located at the bottom of the elevator N, as shown in Fig. 1, and between the latter and the said sieve A, and said machine merely consists of a series of magnets 1, mounted in or on a drum 2 and so located and rotated as to attract and temporarily seize the particles of steel or iron moving toward the said elevator N. A brush 3 detaches the metal particles from the magnets, so that these particles may fall into a receptacle placed in proper position to receive them.

The water from the various tanks I prefer to pass through any of the known forms of filter-presses, precipitating-tanks, or through fine gauze or sifting devices (not shown herein) for the purpose of removing from the water the particles of hair, wool-dust, (from house-sweeping,) sawdust, wood, and charcoal and the like which it may contain. These matters may be pressed into solid cakes, which when dry may be retorted and the gas collected, the remaining ash, which will contain potash, being used for manure or treated for the recovery of the potash-salts.

It will thus be seen that the unburned coals from tanks J, the burned coals or cinders floated from the top of tanks K, mixed coals and cinders from the bottom of tanks K, and the washed sand and grit from chamber C are the products of the separation, and the said tanks above mentioned, together with the chamber C, designate the points of separation of these products from the whole mass. Some of the uses for which these products are suitable will be the unburned fuel for the manufacture of gas, the floated cinder for the manufacture of water-gas, the mixed coal and cinder may be sifted, the tailings being of a suitable size for making water-gas, and the other portion for the manufacture of block-fuel.

As all the above are carbon, either as unburned coal or cinder, they can, if desired, be used for gas and block-fuel making, which latter is prepared by reducing the material to a uniform size by grinding and adding pitch or other suitable binding agent. These blocks can be used for domestic fires. As there is a quantity of gas in the material composing these blocks it may be found desirable to recover this gas by retorting the block-fuel and so produce coke and coal-gas. The coke can be sold or used as carbon for the manufacture of water-gas, which gas can be used in gas-engines or illuminating when treated by the system now in operation for this purpose. The water-gas apparatus may be worked in connection with the other plant, the materials being delivered to the gas-making apparatus.

I have described the sieves A and B as rotating, and I prefer this form of sieve. However, it will be seen that the same or a very similar effect could be obtained with flat sieves, which I can use if I choose.

I claim—

1. In an apparatus for treating city refuse matters, the combination of concentric sieves of different meshes, a series of inclined chambers beneath the sieves, relatively reversed to each other and successively increasing in height, an elevator N adjacent to the inner ends of the sieves, a passage leading from the

inner sieve to the lower end of said elevator, an intermediate magnetizing device over which the materials from said sieve are caused to pass, an inclined separating-chute formed with a break in its length and leading from the upper end of said elevator, and a washing apparatus into which said chute empties, said washer having a number of transverse partition-boards adapted to be raised or lifted, substantially in the manner and for the purpose hereinbefore set forth.

2. In an apparatus for treating city refuse matters, the combination with the concentric sieves and water-spraying devices therein, of the chute or hopper leading from the end of the outer sieve, and the washing apparatus, comprising two longitudinal channels, and a frame fitting in each and provided with a number of partition-boards, together with the shafts and pulleys and lifting-chains, whereby the said frames are elevated or raised, substantially in the manner shown and for the purpose described.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

JOHN CHARLES WILLIAM STANLEY.

Witnesses:

ALFRED J. BOULT,
HARRY B. BRIDGE.