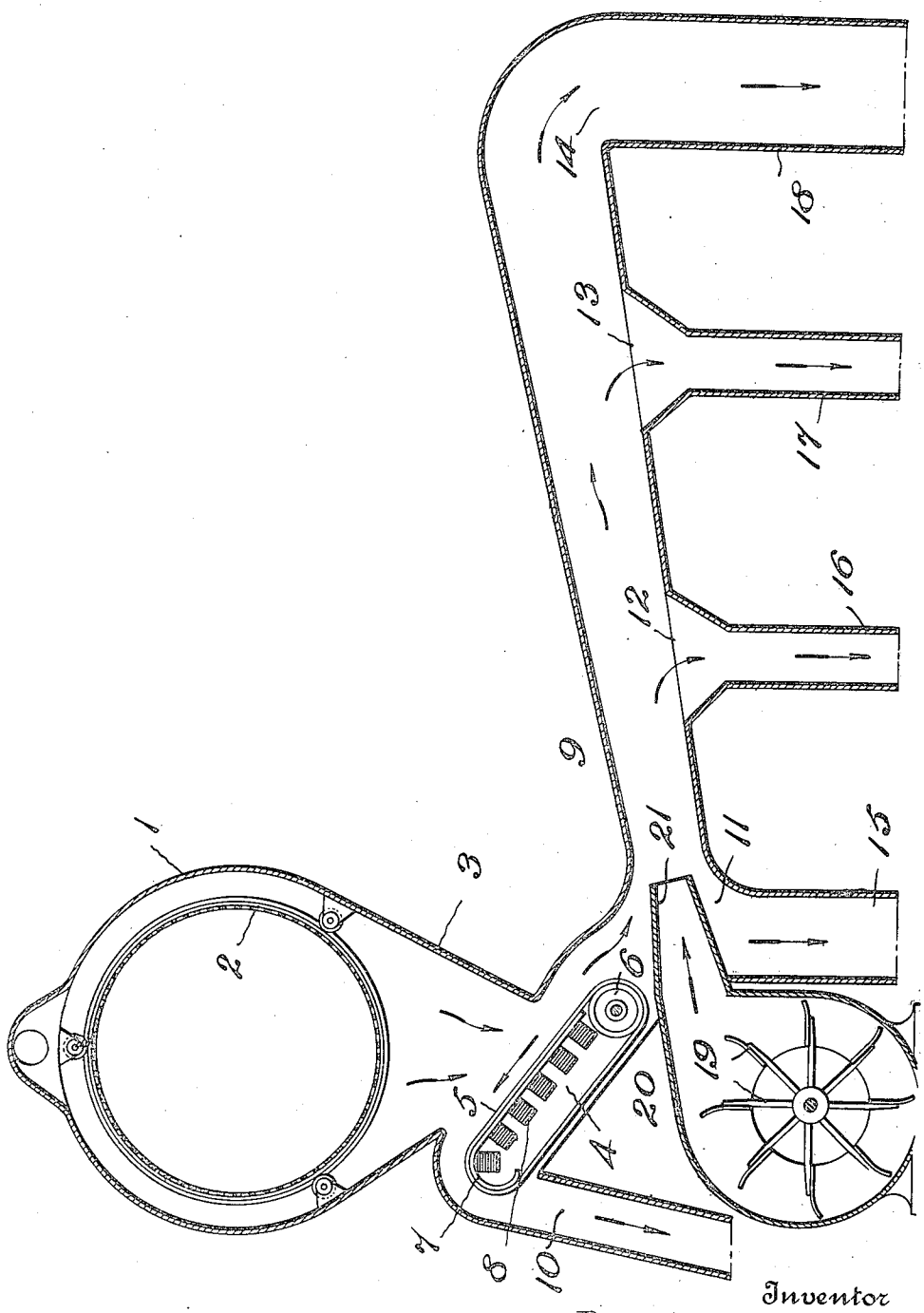
D. R. BRYAN.

APPARATUS FOR SEPARATING AND RECOVERING DOMESTIC REFUSE.

APPLICATION FILED NOV. 21, 1916.

1,290,895.

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Inventor

D. R. Bryan,

By his Attorney

Geo. A. Byrne.

UNITED STATES PATENT OFFICE.

DANIEL R. BRYAN, OF CHATHAM, NEW JERSEY.

APPARATUS FOR SEPARATING AND RECOVERING DOMESTIC REFUSE.

1,290,895. Specification of Letters Patent. Patented Jan. 14, 1919.

Application filed November 21, 1916. Serial No. 132,520.

To all whom it may concern:

Be it known that I, DANIEL R. BRYAN, a citizen of the United States, residing at Chatham, county of Morris, State of New Jersey, have invented certain new and useful Improvements in Apparatus for Separating and Recovering Domestic Refuse; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains, to make and use the same.

The present invention has relation to an improvement upon the type of apparatus for separating and recovering the ingredients of domestic refuse disclosed in my copending application, filed January 5th, 1916, Serial No. 70,377, and has for its general object to separate and recover all of the magnetic as well as other particles of material that have been first acted upon by a preliminary sizing means. And to this end the invention resides in arranging a magnetic separator below a screen so that mixed material falling through the openings of the screen will fall on and be acted upon by the magnetic separator to have the metallic particles removed therefrom; and in arranging a pneumatic classifying conduit below the magnetic separator so as to receive the non-magnetic particles of the material, for separating and recovering the component parts thereof according to their specific gravities,

Other objects will appear and be better understood from that embodiment of my invention of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof, in which the figure shows a sectional view of an apparatus constructed in accordance with my invention.

In my copending application, Serial No. 70,377, above referred to, was disclosed a complete apparatus wherein not only the residue of sized material that passed from the discharge end of the screen was separated and recovered, but substantially all the metallic particles were recovered from the sized portions of the material that passed through the graduated openings of the screen.

In the present invention, however, it is my purpose not only to recover substantially all of the metallic particles that pass through the graduated openings of the screen at the different discharge stages, but, to also more completely separate and recover the remaining portion of the mixed material after the metallic particles have been removed therefrom.

Referring to the construction in detail 1 designates a casing having mounted to rotate therein a revoluble screen 2, which receives *en masse* mixed material such as that which makes up the refuse of cities, consisting mostly of ashes, cinders, metallic particles, paper, rags, etc.

The screen is herein shown in cross section, and it is to be noted that it is of the ordinary cylindrical type, wherein are provided graduated openings from the receiving end to the discharge end thereof and said openings constitute a plurality of discharge stages, having associated therewith several hoppers, only one of which is shown and designated at 3.

As shown, the hopper is formed with a discharge opening or outlet which is inclined to the horizontal and is preferably permanently open to the space therebelow.

Mounted within the space below and opposite to the opening or outlet of hopper 3 is a magnetic separator 4, which consists of an endless belt 5, having its upper flight inclined to the horizontal and substantially parallel to the discharge outlet of the hopper, said belt being disposed in the path of the material falling from the screen as indicated by the arrows. The belt is mounted to travel on a pulley 6, and the frame or casing 7 of the electro-magnets 8 which are adapted to be constantly energized from a suitable source. Any suitable means may be employed for driving the belt.

As will be seen the plane of the top flight of belt 5 and of the discharge opening of the hopper is such that the material which is discharged from the hopper falls toward belt 5 over which it may move by gravitation unless restrained by the magnetic action, the belt traveling in a direction opposed to gravity. This enables the magnetic particles of material to be restrained from gravitation and permits the remainder to move onward toward the classifying structure, indicated generally at 9, the movement being by gravity, aided more or less by the fluid currents, as presently explained. The metallic particles or material which is retained on the belt through the magnetic ac-

tion, is moved in the opposite direction to a point at the upper end of a chute 10, at which time the belt is free from the magnetic effect and the particles or material drop into the chute and pass to a suitable collection receptacle.

The pneumatic classifying conduit is provided for receiving that part of the material from the magnetic separator that has had the magnetic particles removed therefrom, and which consists mostly of small pieces of paper, rags, cinders, coal, ashes and the like, which I have found, if further separated, to be of great commercial value.

The classifier 9 is located in sequence to the magnetic separator, consisting of an elongated conduit which preferably is inclined to the horizontal in the direction opposite that of belt 5, this conduit having a plurality of openings 11, 12, 13 and 14 at suitable points in the direction of length of the conduit, these openings being in open communication with chutes 15, 16, 17 and 18, the openings being in the lower wall of the conduit so that material may gravitate into the chutes. The material from the chutes may be conveyed to suitable accumulating receptacles not shown.

The classifying action is provided mainly by fluid currents introduced into the conduit in suitable manner, as by the action of a rotary fan 19, the casing 20 of which is provided with a nozzle 21 having a discharge outlet adapted to direct the air in the direction of length of the conduit, the nozzle preferably extending into the path of the gravitating material (practically beyond the entrance to chute 15) and being adapted to carry the material which may be brought into its influence in the direction of length of the chute, classification taking place in accordance with the specific gravities.

As will be seen, the discharge outlet of the nozzle is spaced some distance from the discharge opening of the hopper, the material rejected by the magnetic separator passing through a passageway in reaching the direct zone of action of the air from the fluid-pressure means. Obviously, this passageway will be subjected to a drawing or suction action through the location of the nozzle relative to the conduit and the more or less injector-like construction produced. This action in this passageway not only aids in preventing clogging of the material at this point but, in addition, tends to provide a partial separation of the rejected material, especially where the latter includes paper scraps or material of light specific gravity. As the material drops from the screen, the effect of this drawing action is placed on these light particles, tending to divert them from the direct dropping course taken by the heavier material, so that to this extent, at least, partial separation is provided, these lighter particles or scraps more readily passing into the direct zone of action of the fluid currents. Obviously, those particles which are too heavy to be influenced in this way will drop downward and pass onward by gravity toward the direct zone of action. And this drawing action will, of course, be effective within the passageway during such gravitation of the rejected material.

The operation of the apparatus is as follows:

Material to be separated and which has had a preliminary sizing, for instance, by having passed through the openings of the screen, falls on the magnetic separator and has the magnetizable or metal particles removed therefrom. After passing over the magnetic separator the material is then directed into the neck of the conduit and is acted upon by the air blast, and directed upwardly to be separated according to the specific gravity of its components. Heavy particles of the material not affected by the air blast will gravitate through the opening 11 into the chute 15 and be carried off to a suitable accumulating receptacle. The other particles affected by the air blast will move upwardly through the chute until they will according to their specific gravities, fall through the openings 12, 13 and 14 and be conveyed off through the respective chutes 16, 17 and 18 to suitable accumulating receptacles.

It is obvious that those skilled in the art may vary the details of construction and arrangement of parts without departing from the spirit of my invention and therefore I do not want to be limited to such features, except as may be required by the claims.

What I claim is:—

1. In apparatus for separating and classifying heterogeneous refuse material, and in combination, a source of material supply, magnetic separator means in the path of travel of refuse material passed from the supply, said separator means being operative to deliver material in directions opposite material gravitation, whereby material rejected by such means is free to pass the separator means by gravitation, and classifying means including an air current operative on the material rejected by the separator means.

2. In apparatus for separating and classifying heterogeneous material, and in combination, a source of material supply, magnetic separator means in the path of travel of refuse material passed from the supply, said separator means being operative in directions inclined to the horizontal with the separator means operative to move the selected material in directions opposed to gravity, whereby material rejected by such means is free to pass the separator means by

gravitation, and classifying means including an air current operative on the material rejected by the separator means.

3. In apparatus for separating and classifying heterogeneous refuse material, and in combination, a source of material supply, magnetic separating means located in the path of refuse material discharged from said supply and having an operating face extending substantially parallel to and spaced from said supply, said means being movable to separate selected material by movements in directions opposed to gravitation, and means in the path of movement of the material rejected by the separating means and including an air current for classifying the material so rejected.

4. In apparatus for separating and classifying heterogeneous refuse material, and in combination, a source of material supply, magnetic separating means located in the path of material discharged from said supply and adapted to reject the non-magnetic material, classifying means in sequence to the separating means, and including fluid-pressure means having a discharge outlet and adapted to create fluid currents in the direction of classifying action, and means whereby said fluid currents will be rendered active on the rejected material to partially separate the latter in advance of reaching the discharge outlet of the fluid-pressure means.

5. In apparatus for separating and classifying heterogeneous refuse material, and in combination, means for feeding material, magnetic separating means located in the path of material discharged from said means and adapted to reject the non-magnetic material, classifying means in sequence to the separating means, and including fluid-pressure means having a discharge outlet and adapted to create fluid currents in the direction of classifying action, and a passageway for rejected material leading to the classifying means and in open communication with the direct zone of action of the fluid-pressure means, whereby fluid currents will be induced in such passageway to provide partial separation of the material to facilitate classification.

In testimony whereof, I affix my signature.

DANIEL R. BRYAN.

Witnesses:

WILLIAM TRIES, Jr.,

CHARLES T. YOUNG.