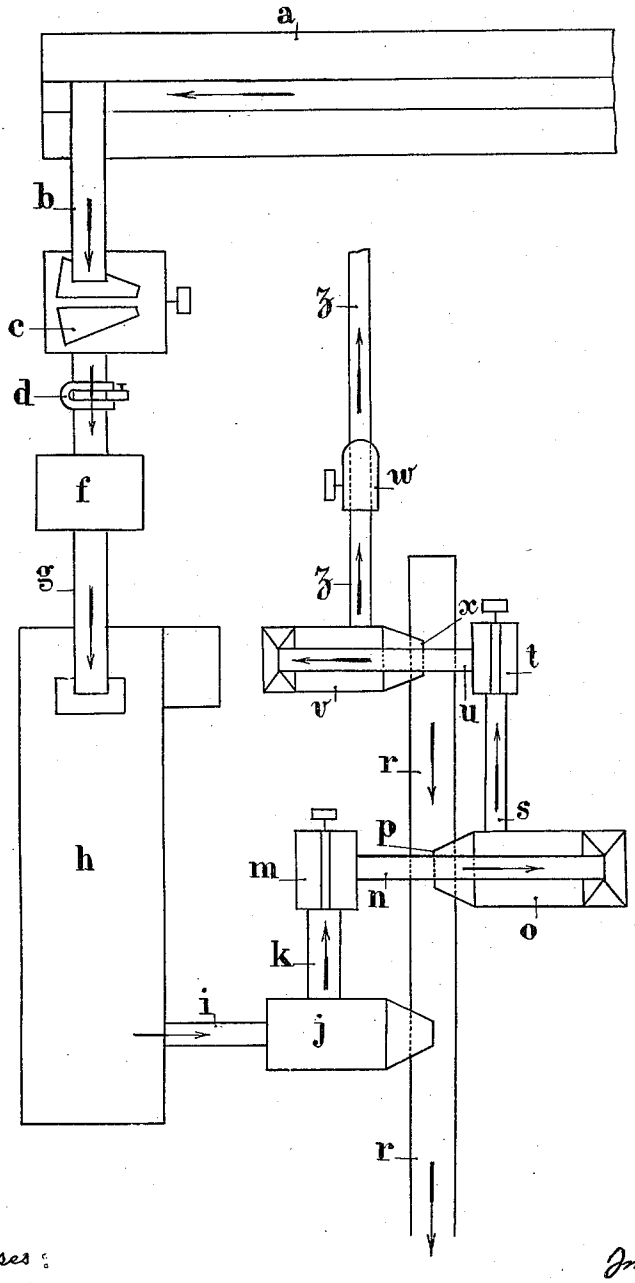
G. HIDOUX.

METHOD OF EXTRACTING OR SORTING COMBUSTIBLE MATTER FROM REFUSE.

APPLICATION FILED MAR. 19, 1914.

1,142,706. Patented June 8, 1915.



Witnesses:
B. H. Davis
C. D. Swett

Inventor,
Georges Hidoux
by F. Dittmar
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGES HIDOUX, OF PARIS, FRANCE.

METHOD OF EXTRACTING OR SORTING COMBUSTIBLE MATTER FROM REFUSE.

1,142,706. Specification of Letters Patent. Patented June 8, 1915.

Application filed March 19, 1914. Serial No. 825,370.

To all whom it may concern:

Be it known that I, GEORGES HIDOUX, engineer, citizen of the French Republic, residing at 9 Boulevard des Italiens, Paris, France, have invented a certain new and Improved Method of Extracting or Sorting Combustible Matter from Refuse; and I declare the following to be a full, clear, and exact description of the invention, such as to enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a method of and means for sorting or separating house refuse into combustible products and incombustible products.

A method actually in use for utilizing house refuse consists in separating by hand on sorting tables, the combustible matter (paper, rags, wood, vegetables, and so forth), from incombustible matter (broken glass, chinaware, stones and so forth). The former are dried, ground and agglomerated so as to form combustible agglomerates while the latter are transformed by special processes into artificial stones.

The invention relates to a method of mechanically sorting combustible and incombustible matter, intended to replace the process of sorting by hand which is imperfect, costly and unhealthy.

The invention is based on the following observations: Research has disclosed the fact that combustible matter (paper, rags, wood, vegetables), which is fibrous or resilient, leaves regularly when passing through a grinder having cylinders, either flattened or disaggregated into filaments or comparatively long thick pieces, and that on the contrary, the incombustible matter leaves the grinders in the shape of more or less large grains, the largest diameter of which is nearly always less than the distance between the cylinders and seldom more than that distance plus one third thereof, and never more than twice this distance. It follows that if the whole of the matter is gathered on a rocking flat sieve the meshes of which are wider than the distance between the cylinders and if this sieve is rocked then the separation of the combustible from incombustible matter will be effected, for the former will be thrown toward the edges of the sieve and the latter will pass through the meshes.

Therefore the process according to the invention, mainly consists, after having removed from the house refuse all objects of large dimensions not susceptible of being treated and after a disaggregation followed by an appropriate drying, in passing the said refuse through a grinder provided with cylinders and gathering it on a rocking flat sieve the linear dimensions of the meshes of which are about twice the distance between the cylinders of the grinder so as to effect, by means of this sieve the separation of the combustible matter which is flattened but not crushed by the cylinders from the incombustible matter reduced to granular form and which passes through the meshes is effected.

As it is possible that in practice, during the first operation according to the process, small bits of combustible matter may pass through the sieve together with the incombustible matter and that, consequently, the separation will not be perfect, then it will be necessary to effect one or more operations subsequently with cylinders brought nearer and nearer together and with sieves correspondingly finer and finer until the desired degree of separation is effected, a result which will certainly be attained because in these successive apparatus, the combustible and incombustible matter will be always flattened and crushed according to the same laws.

In the accompanying drawing, a commercially practicable method of carrying out the process is illustrated diagrammatically and by way of example.

The house refuse is discharged into a pit *a* where the sorting by hand takes place, that is to say, the removal of large objects which could not be treated. The refuse thus freed from large objects is carried away from the pit *a* by a conveyer *b* and taken to a conical separator *c* which insures the elimination of all the objects which are still cumbersome and are capable of obstructing the feeding hoppers of the following apparatus. This separator comprises two cones which rotate in opposite directions and possess a lineal speed higher at the base than at the point. Owing to this arrangement, objects which are too large are caused to slide along the faces of the cones and are eliminated in the known way. Next to the conical separator there is an electromagnetic separator *d* which retains all magnetizable objects; this magnetic separator *d* is followed by a (one or more) crusher *f* having a hammer and a

relatively large grate (four centimeters) permitting of the disaggregation of the house refuse. A conveyer *g* conveys the disaggregated refuse to the drying chamber *h* at the exit of which it is carried, by means of the conveyer *i* to the drum *j* which effects the elimination of those portions of the material which are too large to pass between the cylinders, these portions being returned to the crusher by a conveyer.

The remainder of the mixed combustible and incombustible matter is taken by a conveyer *k* to a reducing grinder *m* having grooved or smooth cylinders which are, for example, 10 mm. apart and in all cases less than the bars of the grate of the hammer crusher, *f* are apart. This reducing grinder effects the flattening of the combustible matter and the granulation of the incombustible matter. The whole of the matter leaving this grinder *m* is carried by a conveyer *n* onto a flat rocking sieve *o* the meshes of which are slightly larger than the distance the cylinders of the grinder *m* are apart, say 15 mm. The matter rejected by this sieve, that is to say, not having passed through the meshes, is entirely combustible matter. This is discharged at *p* onto the conveyer or general discharge collector *r* of combustible matter.

The matter which has passed through the meshes of the sieve *o* will be mostly incombustible matter but it may still contain a certain proportion of combustible matter in a divided state. This sifted product is carried by a conveyer *s* to a second grinder *t* having its cylinders less apart than before, say 3 mm. In this grinder *t* the matter is treated according to the same law, that is to say, there will be a rolling or flattening of the combustible matter and a finer grinding of the incombustible matter. The matter leaving this grinder is received by a conveyer *u* which carries it onto a second flat rocking sieve *v* which retains the combustible matter and allows the incombustible matter to pass through its meshes. The former are discharged at *x* into the general conveying collector *r* and the latter drop onto a discharge conveyer *z* of incombustible matter. The matter passed to the last sieve *v* may evidently contain a small quantity of combustible fibrous substances which are in the refuse in a pulverulent state before the treatment, these fibrous substances may be removed by suction or blowing by means of a fan shown at *w*.

In order not to complicate the drawing, the mechanical transmission for the operation of the various apparatus has been omitted. It is evident that this drawing shows an apparatus as an example; the distance which the cylinders of the grinders are apart may be altered and the number of the corresponding sieves may be modified according to needs. It is possible to group several cylinders the spacing of which may be adjustable and several sieves with meshes of different size, combined as desired, until the cylinders touch each other and until the finest sieve is used, the number of the successive purifying operations according to the quality of house refuse to be treated and to the sorting perfection which it is desired to obtain, provided the various operations are effected in the indicated order.

The invention is adapted to the sorting of house refuse into combustible matter and incombustible matter whatever the ulterior use of this matter may be.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A method of separating refuse consisting in hand sorting the refuse, eliminating material exceeding a predetermined size, subjecting the remainder to magnetic separation, and then so grinding the non-magnetizable material as to disintegrate the same and flatten the particles of combustible matter and then screening the ground mixture.

2. A method of separating refuse consisting in so grinding the material as to disintegrate the same then flattening the particles of combustible matter then drying and re-grinding the same and finally screening the ground mixture, as herein set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

GEORGES HIDOUX.

Witnesses:
C. BAUMAN,
CHAS. P. PRESSLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."