United States Patent

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[54] **METHOD OF HANDLING REFUSE**
6 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **61/35,** 100/100, 214/6
[51] **Int. Cl.** **E02d 3/08**
[50] **Field of Search** ..... 61/35; 100/100, 95, 229 A; 214/6 B

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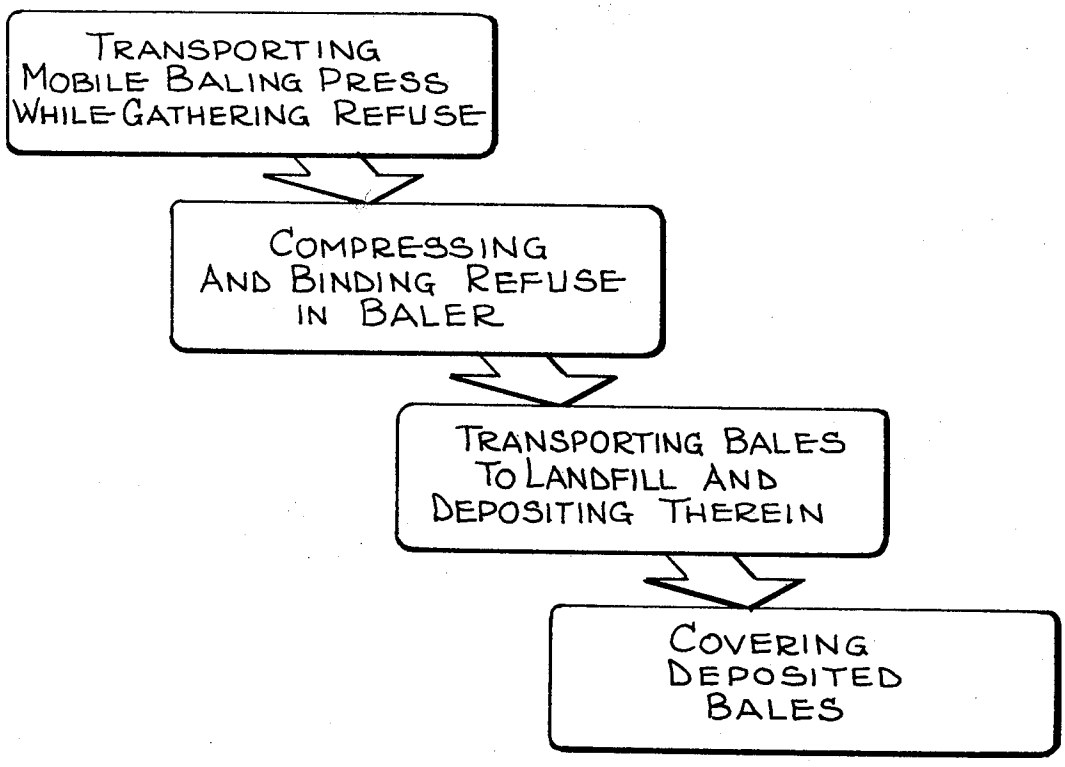
ABSTRACT: A method of handling refuse in which a mobile baling press is transported along a refuse collection route while refuse is gathered thereto from locations along the route, gathered refuse is compressed and bound in highly dense bales, bound bales are transported from the route to a sanitary landfill area and deposited therein, and are there covered over with dirt.



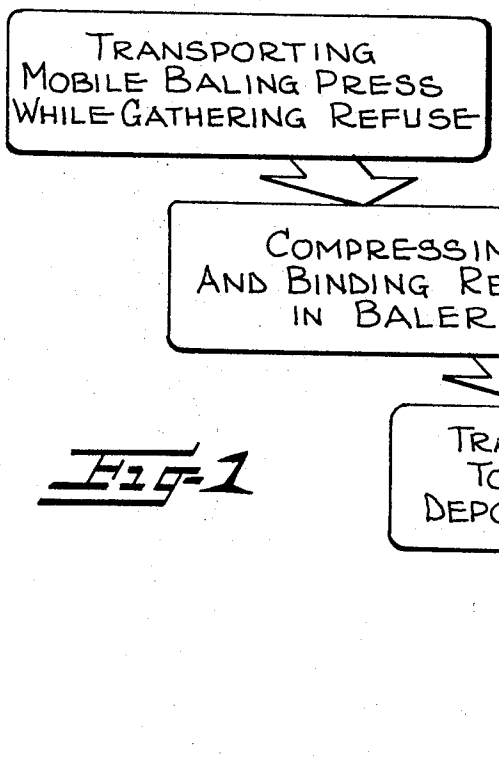


Fig-1

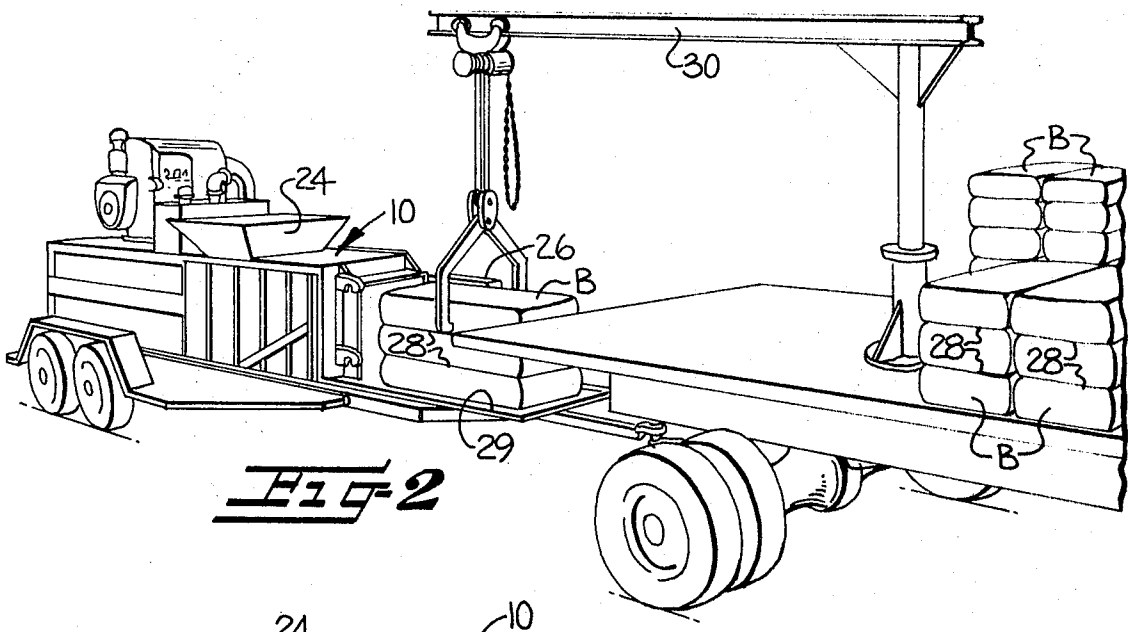


Fig-2

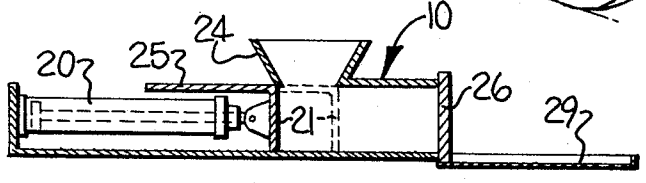


Fig-3

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METHOD OF HANDLING REFUSE

This invention relates to a method of handling residential refuse and the like.

The handling of refuse such as unreclaimable residential waste material or garbage has long been recognized as presenting a number of problems, particularly relating to pickup of the materials from a collection route, transport of the materials from the collection route to a disposal area, and disposal of the collection materials.

Pickup of the residential refuse materials is commonly made at a residence back door by a collector who dumps the contents of a residential can into a large carry barrel, collecting from several houses before returning to the street and dumping the carry barrel into a waiting transport truck, which usually is a compactor or packing truck. In making this transfer, the loose refuse is subject to scattering by the wind until such time as the refuse is contained in the truck.

Compactor or packing trucks are widely used and are effective in somewhat reducing the volume of collected refuse in that such trucks usually compress refuse in a ratio up to about 6 to 1 storing up to about six times the quantity of refuse as a conventional open bodied truck. However, compactor trucks must still leave the residential collection route at relatively frequent intervals, less than a full days working time, to transport collected refuse to a disposal area such as a sanitary landfill. Further, when a compactor truck is emptied, the moderately packed refuse promptly returns to a loose, open condition substantially the same as when collected along the route, giving rise to further handling problems regardless of the particular disposal method chosen.

Sanitary landfill disposal of refuse has the advantages of low initial cost, low upkeep and maintenance, and the reclamation of unusable land. When operated in conjunction with pickup and transportation as outlined above, a landfill has significant disadvantages, in that refuse must be recompacted into place in the landfill by crawler tractors or the like in order to attain compaction in a ratio of at least 6 to 1 and thereby reduce uneven settling of the landfill, is subject to being scattered by wind due to the loose condition of the refuse, and generates methane gas which causes odors and may catch fire.

Having in mind the above method heretofore used for the handling and disposal of residential refuse, it is an object of the present invention to accomplish disposal of such refuse while avoiding the problems which flow from the handling of loose refuse. In accomplishing this object of the present invention, residential refuse disposal operations are made more economical and more acceptable for health reasons, in that scattering of refuse is eliminated and the volume of refuse accommodated in a given sanitary landfill area is increased. Further, the transport of collected refuse material from routes and the handling of refuse material on the collection routes is facilitated, in that repeated trips by transport vehicles are eliminated and scattering of refuse along the collection route is substantially eliminated.

It is a further object of the present invention to derive particular benefits in handling residential refuse by transporting a mobile baling press along a refuse collection route, for the gathering of refuse materials from locations along the route to the press. In accordance with the method of the present invention, compression of the refuse materials early in the handling of the refuse materials by a collection service provides major advantages in the elimination of difficulties heretofore encountered on the routes, in subsequent transport of the refuse material to a disposal area, and in disposal of the materials by the landfill process.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which

FIG. 1 is a schematic flow diagram of the method in accordance with the present invention, illustrating the sequence of steps followed in practicing this invention;

FIG. 2 is a view of apparatus used in certain of the steps involved in practicing the method schematically shown in FIG. 1; and

FIG. 3 is an elevation view, in partial section, of a baling press portion of the apparatus shown in FIG. 2.

Referring now more particularly to the drawing, the method of the present invention may be understood from a schematically illustrated series of steps (FIG. 1). As there stated, the method of the present invention for handling residential refuse and the like comprises the steps of transporting a mobile baling press along a refuse collection route while gathering refuse from locations therealong to the press, compressing gathered refuse in the press, and binding the compressed refuse into highly dense bales, and then preferably collecting bound bales, transporting bound bales from the collection route to a disposal area and depositing the bound bales therein, and, in the instance of a sanitary landfill, covering the deposited bales of refuse over with earth. More details regarding these steps will become apparent hereinafter, as the present discussion proceeds with reference to the other Figures of the drawing.

It is particularly contemplated that the vehicles employed in practicing the method of the present invention include a mobile refuse baling press generally indicated at **10** (FIG. 2) which preferably is trailer mounted to be transported about a residential refuse collection route by being towed behind a suitable automotive vehicle, such as a flat bed truck **11**. Such a vehicular arrangement has particular advantages in furthering compliance with the vehicle safety requirements established by federal law, in movement of the vehicles at normal traffic speeds when required as in travel to and from the residential route area, and for temporary storage of the bound bales formed during a day's work.

While a suitable baling press **10** may take a number of different detail configurations, the baling press shown in FIGS. **2** and **3** is contemplated as particularly appropriate for the method of the present invention. As there shown, the baling press incorporates a hydraulic cylinder **20**, acting generally horizontally to displace a press plunger **21** relative to a stationary press frame. The plunger **21** moves beneath a refuse receiving hopper **24** between a retracted position (solid lines in FIG. 3) at which the hopper opens into the main body of the press and an extended position for the compression of refuse (phantom lines in FIG. 3 and beyond) and includes a rearwardly extending cover **25**. Displacement of the plunger **21** by operation of the hydraulic cylinder **20** compresses refuse material in the main body of the press between the plunger and an end door or closure member **26**, secured to the baling press frame adjacent one end thereof, while other refuse material is retained in the hopper **24** by the sliding cover **25**. Repeated reciprocation of plunger **21** admits refuse material from the hopper **24** into the main body of the press and packs the refuse material into a highly compressed bale.

In particular, the bulk of refuse admitted into the baling press is reduced by compression in a ratio of approximately 12:1. That is, 12 cubic yards of refuse as normally placed in refuse containers by householders are reduced to a volume of approximately 1 cubic yard. While in such a high density state, the compressed refuse is bound into a bale *B* by means of binding wire or tape **28** extending longitudinally about the bale, in a manner similar to binding of baled hay and the like, with the bound bale then being ejected from the baling press through the closure **26** onto a bale receiving platform **29**. As ejected from the baling press, a bound bale has density approximately 11 to 12 times greater than the material collected by workers from locations along the residential refuse collection route.

A bound bale *B* ejected from the baling press is then transferred to the flat bed truck through means of a crane **30**, mounted to overlie the rearward extremity of the truck bed and the platform **29**. A plurality of bound bales *B* are stacked on the truck bed, and collected during a course of a day's work, for subsequent delivery to a disposal area. The area available on the bed of the truck is sufficient to accommodate

a number of bales ordinarily produced during a day's work on a residential refuse collection route, such as for example **25** to **30** bales. Thus, it is not necessary for collectors working a route to interrupt a day's work for a delivery run to a sanitary landfill or other disposal area or for the transfer of collected refuse to a truck serving that function.

Alternatively, or in the event that the storage space available on vehicles moving with the mobile baling press becomes quickly occupied, bound bales may be transferred from the baling press platform **29** to the street, for subsequent pickup by a tender truck. Such a baling press tender truck would serve a number of baling press routes, collecting bound bales from along the streets for delivery to the sanitary landfill.

From observation of bound bales of refuse produced in accordance with the method of the present invention, it has been discovered that such bales stay in their highly dense condition for extended periods of time, even though exposed to weather conditions. Additionally, while in highly compressed or high dense state, the refuse does not give off odors such as are typical of loosely gathered refuse or attract rats and other vermin. Instead, the tightly bound bales of refuse are substantially inert in similarity to monolithic, unitary blocks of material.

These characteristics of the bound bales of refuse, while facilitating handling and transport along the collection route and during transfer to a disposal area, provide significant benefits in a sanitary landfill area. First, the avoidance of the aforementioned unattractive characteristics of loose refuse material, together with the avoidance of scattering of refuse, permits locating a sanitary landfill in areas where such land use would heretofore have been considered unacceptable. In particular, while land to be filled in residential areas has heretofore been considered unavailable for sanitary landfill purposes, the application of the method of the present invention permits use of such areas for sanitary landfill. This is further facilitated by the elimination from sanitary landfill procedures of the packing steps heretofore required.

It has heretofore been typical of sanitary landfill operations that loose refuse dumped in the sanitary landfill area from compactor trucks or the like must be compressed with crawler tractors, rubber tired tractors, or specially equipped sheep's foot compactors before the refuse is covered over with earth. By such compaction, the refuse is reduced in volume in a ratio of approximately 6 to 1 at a maximum. Such compaction requires operation of heavy equipment substantially continuously during each day, and still results in a landfill which must settle over a period of years before becoming useful for construction foundation purposes.

By way of contrast, a sanitary landfill area in which bound bales of refuse are deposited in accordance with the present invention requires the attention of only a relative light duty conventional tractor, for stacking the deposited bales and for covering over the bales with earth as the landfill is completed. The relatively high compaction of the refuse as delivered to the landfill avoids the necessity of using such an apparatus for compaction purposes and also permits quicker diversion of the landfill area to higher uses, such as construction. The more favorable characteristics of the bound bales of material as discussed hereinabove also permits delay of covering over of the bales, thereby making possible more efficient use of the cubic yards of earth available and required in the landfill area in that the baled refuse may be stacked in the landfill in orderly rows and layers rather than being merely tumbled into lower lying areas as is the case with loose refuse.

In the drawings and specification there has been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

I claim:

1. A method of handling residential refuse and the like comprising the steps of

transporting a mobile baling press along a residential refuse collection route while

gathering refuse to the press from residences along the collection route, while

compressing gathered refuse in the press into a highly dense bale and encircling the compressed bale with binding material, then

collecting bound bales,

transporting collected bales from the collection route to a sanitary landfill area, and

depositing bales in the sanitary landfill area and covering the deposited bales over with earth.

2. A refuse handling method in accordance with claim **1** wherein the step of compressing refuse includes compacting the refuse into a volume of about one-twelfth that occupied by the refuse as gathered from locations along the collection route.

3. A refuse handling method according to claim **1** wherein the step of depositing bound bales in the sanitary landfill includes stacking the bound bales in orderly layers and rows so as to minimize the volume of covering earth required.

4. A refuse handling method in accordance with claim **1** wherein the collecting of bound bales continues until a substantial number of bales are accumulated before the collected bales are transported to the sanitary landfill area.

5. A refuse handling method in accordance with claim **4** wherein the step of collecting bound bales includes storing collected bales on a vehicle towing the mobile baling press while continuing said transporting of the press so that departure of the press from the collection route at frequent intervals is avoided in that the step of transporting bound bales to the disposal area proceeds only at intervals required to produce a plurality of bales.

6. A refuse handling method in accordance with claim **4** wherein the step of transporting bound bales to the disposal area proceeds independently of and simultaneously with the step of transporting the mobile baling press.