United States Patent [19]

Dunlea, Jr.

[11] **3,721,183**

[45] **March 20, 1973**

[54] **METHOD OF DISPOSING BULK RUBBISH**

[76] Inventor: **John V. Dunlea, Jr.**, 2 Wellesley Avenue, Wellesley, Mass.

[22] Filed: **Nov. 8, 1971**

[21] Appl. No.: **196,822**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 888,268, Dec. 29, 1969, abandoned.

[52] **U.S. Cl.**.....**100/39,** 21/58, 21/DIG. 2, 100/74, 100/92, 100/95, 241/25

[51] **Int. Cl.**.....**A61l 11/00,** B30b 13/00

[58] **Field of Search** ....100/6, 39, 92, 95; 21/58, 101; 53/23, 24, 124 E, 124 CC

[56] **References Cited**

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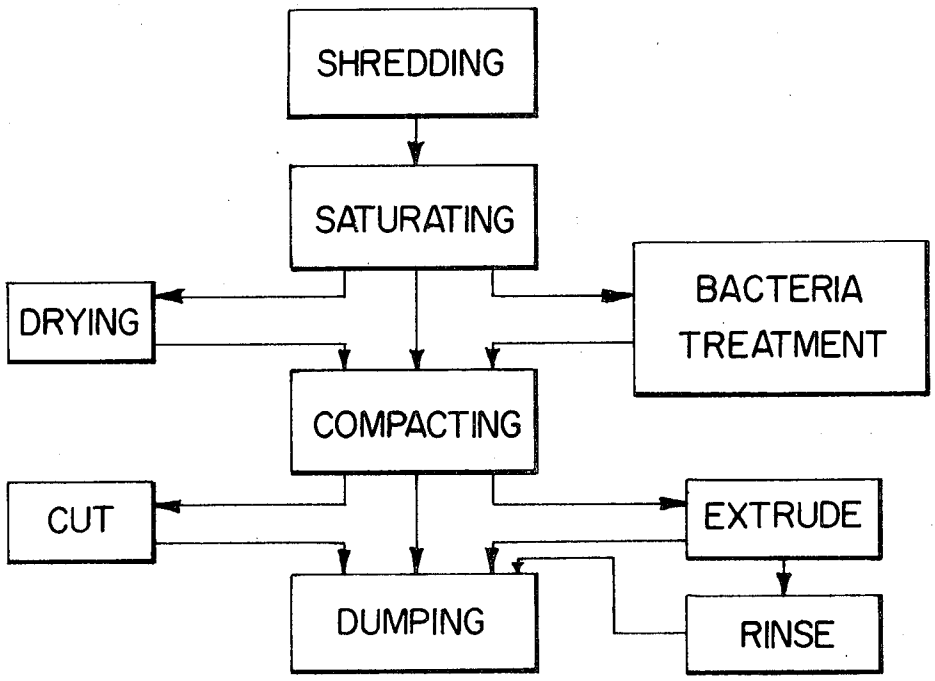
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Primary Examiner—Daniel Blum
Attorney—C. Yardley Chittick et al.

[57] **ABSTRACT**

Bulk rubbish is shredded, saturated with a binding agent, compacted on a continuously extruded or piecemeal basis, reduced in size, rinsed and disposed of either as land fill or dumped at sea. Further steps include treatment of the rubbish to kill bacteria, drying prior to compaction and cutting or chipping the compacted rubbish into small pieces.

1 Claim, 4 Drawing Figures



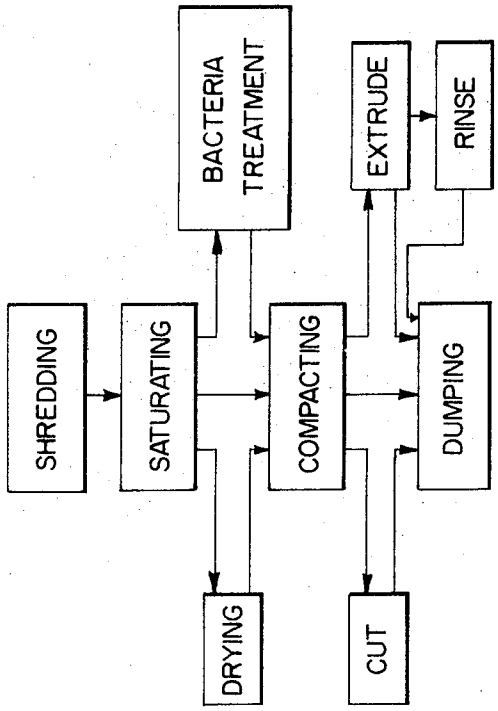


FIG. 1

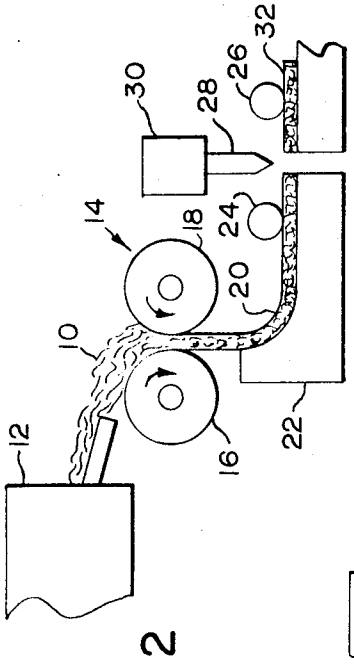


FIG. 2

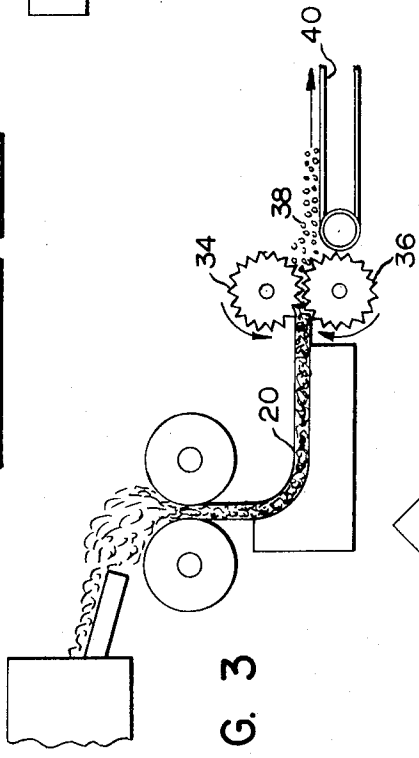


FIG. 3

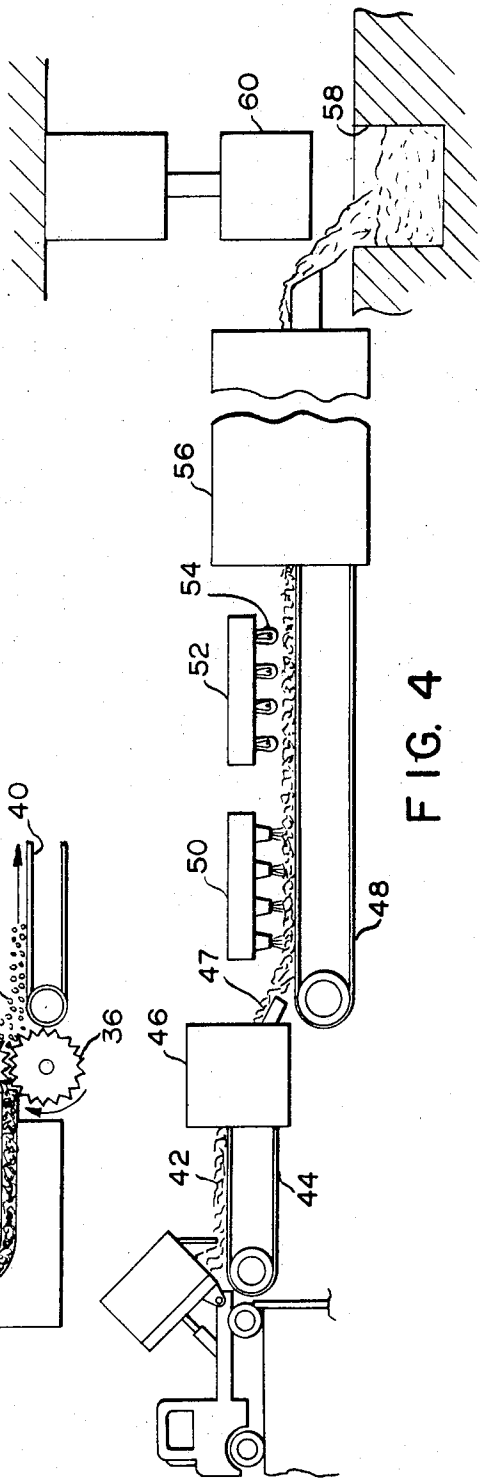


FIG. 4

INVENTOR.
JOHN V. DUNLEA, JR.
BY Morse, Altman & Oates
ATTORNEYS

METHOD OF DISPOSING BULK RUBBISH

CROSS-REFERENCE TO OTHER APPLICATION

This application is a continuation-in-part of my application Ser. No. 888,268, filed Dec. 29, 1969, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to rubbish disposal and more particularly is directed towards a new and improved method for disposing of bulk rubbish.

2. History of the Prior Art

In my U.S. Pat. No. 3,330,088 there is disclosed the method of disposing of bulk rubbish involving shredding, compacting into block form and coating after which the block is dumped into a body of water, such as the ocean. The present invention relates to improvements with respect to the foregoing patent and has for one of its objects the providing of a process for treating bulk rubbish so as to render it useful as sanitary land film. Another object of this invention is to provide methods and associated apparatus for treating bulk rubbish on a continuous basis and reforming it into a size and shape permitting convenient handling thereof.

SUMMARY OF THE INVENTION

This invention features a method and associated apparatus for treating bulk rubbish including in one embodiment the steps of shredding the rubbish, saturating it with a binder, drying the binder, irradiating the rubbish, compacting it by extrusion and cutting the extrusion into segments. In another embodiment the cutting step is substituted with a grinding step by which the extruded rubbish is reduced to chip form. The invention also features the step of treating the bulk rubbish as by radiation to kill bacteria and render the material inert.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a flow diagram illustrating the sequence of steps in the invention,

FIG. 2 is a fragmentary view in side elevation, somewhat schematic, illustrating apparatus used in one aspect of the invention,

FIG. 3 is a view similar to FIG. 2 showing a modification therof, and,

FIG. 4 is a somewhat schematic side elevation showing a further modification of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1 of the drawings there is illustrated a flow diagram setting forth steps of the invention in block form. Initially, raw bulk rubbish, which has been collected in the usual fashion and transported to the processing site, is shredded into particles of more or less uniform size, saturated with a binder, such as liquefied asphaltum or the like, compacted in volume as by extrusion, block pressing or the like, and then transported to a disposal site such as the ocean. The compacted rubbish can be rendered safe for landfill use without the need of exterior packaging by treatment of the rubbish prior to compaction, this treatment being adapted to kill any bacteria in the rubbish. Treatment may take the form of radiation as by ultra-violet lighting or by applying a substance to the rubbish such as a quatenary - ammonia compound or chlorophinal. Other chemicals or processes may also be used to treat the material so as to render it biostatic. Optionally, a drying step may be added between the saturation and the compaction stages and after compaction a rinsing step may be added to wash away residual particles which might otherwise tend to pollute the environment of the disposed site. A further optional step is to cut the compacted rubbish into pieces such as by grinding the material into particles or cutting extruded sections thereof into logs of predetermined length.

A preferred method of treating bulk rubbish would include the following steps; (a) continuously shredding all of the rubbish into particles of substantially uniform size, (b) continuously applying a liquid binder to the shredded rubbish, (c) continuously drying said binder, (d) continuously irradiating the rubbish with ultra-violet radiation, (e) continuously extruding the rubbish into a continuous compacted integrated mass, (f) continuously rinsing the compacted rubbish to wash away residual particles, (g) forming the compacted mass into discrete pieces of substantially uniform size, and (h) transporting the pieces to a disposal site.

Referring now particularly to FIG. 2 of the drawings there is illustrated a portion of an apparatus for carrying out certain defined steps of the invention. In FIG. 2 shredded rubbish **10** is delivered in a continuous form from a unit **12** which may be a drying oven, a bacteria treatment unit comprised of ultra-violet lamps or the like, or a saturation unit which applies a liquid binder such as asphaltum or the like to the shredded rubbish. In any event, the shredded rubbish **10** is delivered continuously into an extrusion stage **14** which, in the illustrated embodiment, is comprised of a pair of driving rollers **16** and **18** which compress the shredded rubbish into a highly compacted body of a selected cross-sectional configuration. For example, the rollers **16** and **18** may be configured to produce a continuous length of compacted rubbish **20** of the cylindrical configuration or the compacted rubbish may take the form of a mat as desired. In practice, the extruded rubbish **20** is forced down against a die block **22** which changes its direction of travel from the vertical to the horizontal and feed rolls **24** and **26** deliver the compacted rubbish **20** through a cutting station comprised of a knife **28** operated by suitable driving mechanism **30** and adapted to cut sections of the compacted rubbish **20** into individual logs or billets **32** of a selected length. The logs **32** may then be disposed of at sea and if biostatic may be used for land fill operations without contaminating the area.

Referring now to FIG. 3 of the drawings there is illustrated a modification of the invention and in this embodiment a compacted length of rubbish **20** is fed into the bite of a pair of grinding wheels **34** and **36** which reduced the compacted rubbish into chips **38** which are fed onto a conveyor **40** for delivery to a truck, barge or other conveying means. By reducing the compacted rubbish to chip form, handling of the material is facilitated since it may be shipped and stored as any other particulate bulk such as sand, gravel or the like. Thus no special handling equipment would be required for the material after it is reduced to chip form. The chip rubbish may be conveyed by barge or the like and

dumped at sea or may be hauled by truck or conveyor to a land fill site. When used as land fill it is desirable that the rubbish be treated to render it biostatic to prevent contamination of the locale.

The chip form of treated rubbish lends itself to various modes of transportation. By way of example, the chip rubbish may be converted into a slurry by mixing it with water, for example, and pumped through pipes to a disposal site which may be at sea or on land. Where the slurry is to be pumped to a land site for disposal, it is desirable to separate the liquid from the solids and this may be achieved by discharging the pipe onto a porous conveyer such as an open mesh screen belt through which the liquid can drain while the solid particles are transferred to their intended location.

Referring now to FIG. **4** of the drawings there is shown a further modification of the invention and in this embodiment raw bulk rubbish **42** is delivered onto a conveyer **44** for delivery to a shredding mechanism **46** which reduces the rubbish to shredded form indicated generally at **47**. The shredded rubbish is then deposited on a conveyer **48** which carries it first through a saturation station **50** which applies a suitable binder such as liquid asphaltum, epoxy or the like. From the saturation station **50** the material is then carried through a bacteria treatment station **52** which may include a plurality of ultra-violet lamps **54** or, alternatively, may be in the form of a spray station for applying anti-bacteria material to the rubbish so as to render it biostatic. In any event the treated and shredded rubbish is carried into an oven **56** for partial drying thereof prior to discharge into a cavity **58** for compaction by means of a hydraulically driven piston **60**. The rubbish is then compacted into the shape of the cavity and is then removed and delivered to a dump site or hauled for ocean disposal, as desired. Having been rendered biostatic, the compacted rubbish will not contaminate the environment in which it is deposited.

Having thus described the invention what I claim and desire to obtain by Letters Patent of the United States is:

1. The method of processing bulk mixed rubbish for disposal, comprising the sequential steps of

a. a continuously shredding all of said rubbish into particles of substantially uniform size,
b. continuously applying a liquid binder to the shredded rubbish,
c. continuously drying said binder,
d. continuously irradiating said rubbish with ultra-violet radiation,
e. continuously extruding said rubbish into a continuous compacted integrated mass,
f. continuously rinsing the compacted rubbish to wash away residual particles,
g. forming the compacted mass into discrete pieces of substantially uniform size, and,
h. transporting said pieces to a disposal site.

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