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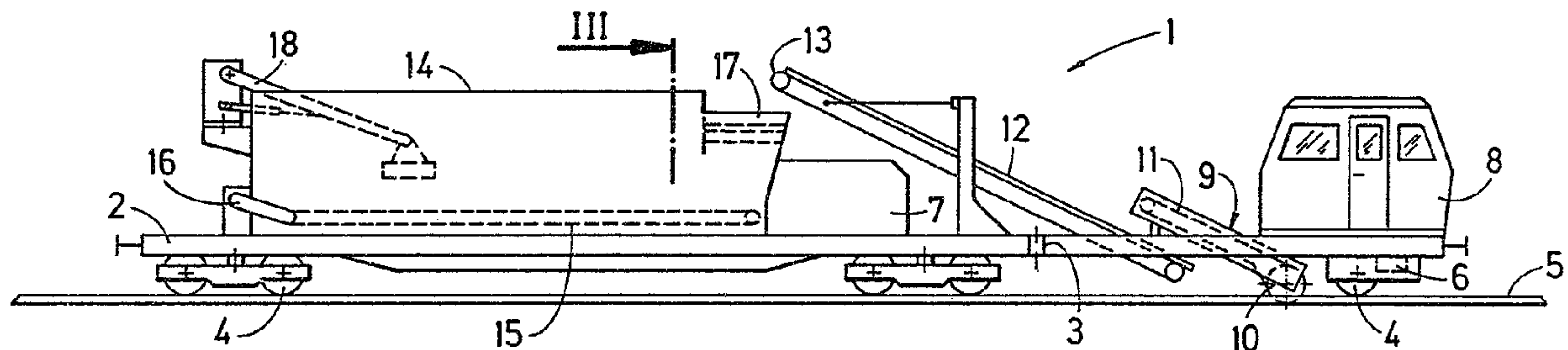
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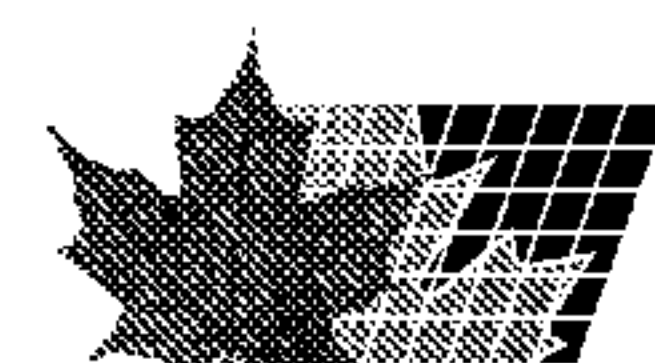
(54) Titre : MACHINE DE RAMASSAGE ET DE STOCKAGE CONTINUUS DES ELEMENTS DETACHES DE FIXATION
DES RAILS

(54) Title: MACHINE FOR CONTINUOUSLY COLLECTING AND STORING DETACHED RAIL FASTENING ELEMENTS



(57) Abrégé/Abstract:

A machine for continuously collecting and storing detached rail fastening elements lying on a railroad track, comprises a machine frame supported on undercarriages for mobility along the track, a device for continuously collecting the rail fastening elements from the track, the device being vertically adjustably mounted on the machine frame, an inclined conveyor arrangement mounted on the machine frame and having a lower end adjacent the collecting device and arranged to receive the collected rail fastening elements therefrom, and a higher discharge end, and a container mounted on the machine frame below the higher discharge end and arranged to receive the discharged rail fastening elements, the container having two side walls extending in the direction of the longitudinal extension of the machine frame and a bottom constituted by a conveyor band driven by an adjustable-speed drive.



MACHINE FOR CONTINUOUSLY COLLECTING AND STORING
DETACHED RAIL FASTENING ELEMENTS

Abstract of the Disclosure

A machine for continuously collecting and storing detached rail fastening elements lying on a railroad track, comprises a machine frame supported on undercarriages for mobility along the track, a device for continuously collecting the rail fastening elements from the track, the device being vertically adjustably mounted on the machine frame, an inclined conveyor arrangement mounted on the machine frame and having a lower end adjacent the collecting device and arranged to receive the collected rail fastening elements therefrom, and a higher discharge end, and a container mounted on the machine frame below the higher discharge end and arranged to receive the discharged rail fastening elements, the container having two side walls extending in the direction of the longitudinal extension of the machine frame and a bottom constituted by a conveyor band driven by an adjustable-speed drive.

BACKGROUND OF THE INVENTION1. Field of the Invention

The present invention relates to a machine for continuously collecting detached rail fastening elements from a track on which they lie, either on the ballast bed or the ties, and for storing the collected rail fastening elements.

2. Description of the Prior Art

U. S. patent No. 3,731,455, dated May 8, 1973, discloses a machine for collecting and storing detached rail fastening elements. The machine is incorporated into a track renewal train including a series of coupled machine frames and comprises an elongated machine frame and a succession of receptacles mounted on the underside thereof. A conveyor band extends thereabove in the direction of the longitudinal extension of the machine frame and deflecting elements are mounted in the range of the receptacles and are operable to deflect rail fastening elements from the conveyor band into selected receptacles. An inclined conveyor is arranged at one end of the elongated machine frame and has a lower input end below two transverse conveyor bands arranged at the two rails, respectively. Each transverse conveyor band carries a magnet to attract the rail fastening elements lying on the track adjacent the rails whereby the elements are conveyed to the input end of the inclined conveyor which conveys them to the longitudinally extending conveyor band. A crane is mounted on rails extending along the machine frame for removing full receptacles and replacing them with empty receptacles. Since

the storage capacity of the receptacles mounted on the underside of the machine frame is small, a frequent and time-consuming replacement of receptacles is required.

U. S. patent No. 4,576,538, dated March 18, 1986, discloses a box car for storing bulk material and comprising a container having two side walls and a bottom constituted by a conveyor band extending in the direction of the longitudinal extension of the container. An inclined delivery conveyor is associated with the bottom conveyor band at an end thereof leading in the conveying direction. A train of such box cars may be coupled to a ballast cleaning machine, for example, to collect and store the waste separated from the cleaned ballast, the higher discharge end of each inclined delivery container being arranged above each succeeding box car. This arrangement makes it possible to convey the waste accumulating in the rearmost box car by means of the bottom conveyor band and the inclined delivery container forwardly from car to car to the leading box car.

SUMMARY OF THE INVENTION

It is the primary object of this invention to provide a machine for continuously collecting and storing detached rail fastening elements with a high storage capacity for the elements so as to avoid frequent and time-consuming manipulation of storage containers.

The above and other objects are accomplished according to the invention with a machine which comprises a machine frame supported on undercarriages for mobility along the track and

extending longitudinally in the direction of the track, a device for continuously collecting the rail fastening elements from the track, the device being vertically adjustably mounted on the machine frame, drive means for vertically adjusting the collecting device, an inclined conveyor arrangement mounted on the machine frame and extending in the direction of the longitudinal extension of the machine frame, the conveyor arrangement having a lower input end adjacent the collecting device and arranged to receive the collected rail fastening elements therefrom, and a higher discharge end, and a container mounted on the machine frame below the higher discharge end and arranged to receive the discharged rail fastening elements, the container having two side walls extending in the direction of the longitudinal extension of the machine frame and a bottom constituted by a conveyor band extending in the direction of the longitudinal extension of the machine frame and being driven by an adjustable-speed drive.

With such a machine it has become possible for the first time to store the detached rail fastening elements collected during a whole day of operations without any interruption due to the required manipulation of storage containers. It is particularly advantageous that no retrofitting work is needed for conveying the rail fastening elements discharged into the container at one end thereof to the opposite end so that the container may be completely filled. The discharge end of the conveyor arrangement remains stationary at the one container end, which simplifies the structure of the conveyor arrangement. This multiplies the storage capacity of the

machine and does away with the manipulation and transport of the small receptacles used heretofore.

According to a preferred feature of the present invention, the machine further comprises a damping device mounted between the discharge end of the conveyor arrangement and the bottom conveyor band for absorbing the impact of the discharged rail fastening elements on the bottom conveyor band. Such a structurally simple device will protect the bottom conveyor band from the damaging impact of the rail fastening elements while enabling the discharge end of the conveyor arrangement to be arranged higher above the bottom conveyor band to enable a higher filling level of the container to be achieved.

The damping device preferably comprises a damping plate connected to the container and having an elastic impact surface, the damping plate having two parts enclosing an angle with each other and extending symmetrically with respect to a vertical plane extending in the direction of the longitudinal extension of the machine frame, or a plurality of damping devices extending parallel to each other. This will provide not only effective damping but will also transversely distribute the discharged rail fastening elements in the container so that it will be filled uniformly across its width. This beneficial effect will be further enhanced with at least two damping devices, the damping devices extending in the direction of the longitudinal extension of the machine frame adjacent each other in a direction transverse to the longitudinal extension, and the adjacent damping devices being so spaced from each other and the container side walls,

respectively, as to define openings therebetween to permit free passage of the discharged rail fastenings therethrough.

The storage capacity of the container will be optimally utilized and a constant filling level will be assured if the machine further comprises a substantially vertical leveling element connected to the container adjacent the discharge end of the conveyor arrangement and extending transversely to the longitudinal extension of the machine frame, the leveling element having a lower edge spaced from the bottom conveyor band a distance corresponding to a desired level of the rail fastening elements stored in the container.

The container may be readily and completely emptied and the stored rail fastening elements may be removed to another car, for example, if the machine further comprises another inclined conveyor band mounted on the machine frame, the other inclined conveyor band having a lower input end below an output end of the bottom conveyor band at an end thereof opposite the discharge end of the conveyor arrangement.

A large capacity will be obtained with a machine frame comprised of two parts, the two parts being linked together, one of the machine frame parts supporting the collecting device, the conveyor arrangement and an operator's cab, and the other machine frame part supporting the container. The link between the two machine parts will enable such a long machine to travel in sharp curves. If the one machine frame part has a drive to constitute a self-propelled machine, and the other machine frame part constitutes a box car coupled thereto, the box car may be uncoupled when full and replaced

by an empty box car. The full box car may be moved to another site.

BRIEF DESCRIPTION OF DRAWING

The above and other objects, advantages and feature of the invention will become more apparent from the following description of certain now preferred embodiments thereof, taken with the accompanying, somewhat schematic drawing wherein

FIG. 1 is a side elevation showing one embodiment of a machine for collecting and storing detached rail fastening elements;

FIG. 2 is a like view of another embodiment of the machine, wherein the container for storing the collected rail fastening elements constitutes an independent box car which may be uncoupled;

FIG. 3 is a cross section along line III of FIG. 1, illustrating the damping devices in the container; and

FIG. 4 is a longitudinal section along line IV of FIG. 3, showing the damping devices and leveling element in the container.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawing and first to FIG. 1, there is shown machine 1 for continuously collecting and storing

detached rail fastening elements 43 lying on railroad track 5, i.e. either on the ballast bed supporting the track or on the track ties. The machine comprises elongated machine frame 2 supported on undercarriages 4 for mobility along track 5 and extending longitudinally in the direction of the track. The illustrated machine frame is comprised of two parts, the two parts being linked together at pivot 3. Machine frame 2 carries central power plant 7 providing energy to drive 6 propelling the machine along the track and to the other operating drives of the machine. One of the machine frame parts supports operator's cab 8 and device 9 for continuously collecting rail fastening elements 43, the collecting device being arranged between the operator's cab and coupling pivot 3. It further supports inclined conveyor arrangement 12 extending in the direction of the longitudinal extension of machine frame 2. Cab 8 holds a central control panel enabling an operator in the cab to operate the machine. Collecting device 9 is vertically adjustably mounted on the machine frame and comprises magnetic drums 10 mounted at the lower end of the collecting device and rotatable about axes extending transversely to the direction of the longitudinal extension of the machine frame, and respective conveyor bands 11 associated with each rotatable magnetic drum. The collecting device is vertically adjustable by suitable drive means. Conveyor arrangement 12 has a lower input end adjacent collecting device 9 and arranged to receive the collected rail fastening elements therefrom, and higher discharge end 13. The other machine frame part supports container 14 having an end below higher discharge end 13 and arranged to receive the discharged rail fastening elements from conveyor arrangement 12. Container 14 has two side walls extending in the direction of

the longitudinal extension of the machine frame and a bottom constituted by conveyor band 15 extending substantially across the entire width of the container and in the direction of the longitudinal extension of the machine frame and being driven by steplessly adjustable-speed drive 16. The machine further comprises damping device 17 mounted between discharge end 13 of conveyor arrangement 12 and bottom conveyor band 15 for absorbing the impact of discharged rail fastening elements 43 on the bottom conveyor band. A preferred damping device will be described in detail hereinafter in connection with FIGS. 3 and 4. Magnetic crane 18 is mounted at an end of container 14 opposite to discharge end 13 of conveyor arrangement 12. The crane is rotatable about, and vertically adjustable along, a vertical axis for picking up and removing stored fastening elements from container 14.

In the machine illustrated in FIG. 2, the one machine frame part has drive 25 to constitute self-propelled machine 21, and the other machine frame part constitutes box car 22 coupled thereto. Machine 21 supports collecting device 19 (similar to device 9), conveyor arrangement 20 having discharge end 37 (similar to arrangement 12), operator's cab 23 (similar to cab 8) and central power plant 24 (similar to power plant 7). Undercarriages 26 support the machine frame parts for mobility along track 36. The box car has container 27 whose bottom is constituted by conveyor band 28 driven by drive 29 (similar to container 14, bottom conveyor band 15 and drive 16). As shown, the machine further comprises another inclined conveyor band 30 mounted on machine frame 31 of box car 22, the other inclined conveyor band having a lower input end below an output end of the bottom conveyor band at an end

thereof opposite discharge end 37 of conveyor arrangement 20. Conveyor band 30 is pivotal about a vertical axis on machine frame 31 and is driven by drive 32. Flat-bed car 33 is coupled to box car 22 and supports a series of spike pulling machines 34 which are arranged sequentially on track 35 extending in a longitudinal direction for mobility along track 35 on car 33 and may be lowered onto track 36 by a vertically adjustable ramp hinged to an end of car 33.

As shown in FIG. 3, the preferred damping device comprises a plurality of damping plates 17 (designated 38 in the embodiment of FIG. 2) extending parallel to each other. The damping plates have an elastic impact surface and are shaped like peaked roofs, with two parts enclosing an angle with each other and extending symmetrically with respect to a vertical plane extending in the direction of the longitudinal extension of the machine frame. The damping plates extend in the direction of the longitudinal extension of the machine frame adjacent each other in a direction transverse to the longitudinal extension, and lower edges 41 of adjacent damping plates 17 are so spaced from each other and the container side walls, respectively, as to define openings 42 therebetween to permit free passage of the discharged rail fastenings therethrough. The illustrated machine further comprises substantially vertical leveling element 39 connected to the container by the damping plates adjacent the discharge end of the conveyor arrangement and extending transversely to the longitudinal extension of the machine frame, one end of the damping plates being affixed to an end wall of the container and an opposite end thereof to the leveling element. The leveling element has lower edge 40 spaced from the bottom

conveyor band a distance corresponding to a desired level of the rail fastening elements stored in the container. This is best shown in FIG. 4 showing lower edge 40 of leveling element 39 to extend to a lower level than lower edges 41 of damping plates 17. The elastic surface of the damping plates may be constituted by a rubber layer which will absorb the shock of rail fastening elements 43 thrown off discharge end 13 of conveyor arrangement 12 and thus soften their fall into container 14.

In operation, machine 1 will be propelled continuously along track 5 and rotating magnetic drums 10 will continuously pick up detached ferrous rail fastening elements lying on the track in the path of the magnetic drums, and conveyor bands 11 will convey the collected fastening elements to conveyor arrangement 12. The rail fastening elements will be thrown off discharge end 13 of the conveyor arrangement into container 14, falling first on damping plates 17 and then through openings 42 onto bottom conveyor band 15, which is held at rest. When the upper level of the fastening elements in the container lies a little above lower edge 40 of leveling element 39 (see FIG. 4), drive 16 is actuated briefly to drive bottom conveyor band 15 so that the collected conical mound of fastening elements is leveled and moved a short distance downstream to make room for additional rail fastening elements being discharged into the container. This intermittent movement of the collected rail fastening elements in the direction of magnetic crane 18 is continued until container 14 has been filled. The stored rail fastening elements, including spikes, tie anchors, tie plates and the like, may be loaded into cars by crane 18, if desired.

The machine of FIG. 2 operates in the same manner, except that the unloading of the stored rail fastening elements from container 27 is effected by conveyor band 30.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A machine for continuously collecting and storing detached rail fastening elements lying on a railroad track, which comprises:

- (a) a machine frame supported on undercarriages for mobility along the track and extending longitudinally in the direction of the track,
- (b) a device for continuously collecting the rail fastening elements from the track, the device being vertically adjustably mounted on the machine frame,
- (c) drive means for vertically adjusting the collecting device,
- (d) an inclined conveyor arrangement mounted on the machine frame and extending in the direction of the longitudinal extension of the machine frame, the conveyor arrangement having a lower input end adjacent the collecting device and arranged to receive the collected rail fastening elements therefrom, and a higher discharge end,
- (e) a container mounted on the machine frame below the higher discharge end and arranged to receive the discharged rail fastening elements, the container having two side walls extending in the direction of the longitudinal extension of the machine frame and a bottom constituted by a conveyor band extending in the direction of the longitudinal extension of the machine

frame and being driven by an adjustable-speed drive,
and

- (f) a damping device mounted between the discharge end of the conveyor arrangement and the bottom conveyor band for absorbing the impact of the discharged rail fastening elements on the bottom conveyor band.

2. The machine of claim 1, wherein the damping device comprises a damping plate connected to the container and having an elastic impact surface, the damping plate having two parts extending at an angle with respect to each other and extending symmetrically with respect to a vertical plane extending in the direction of the longitudinal extension of the machine frame.

3. The machine of claim 1, comprising a plurality of said damping devices extending parallel to each other.

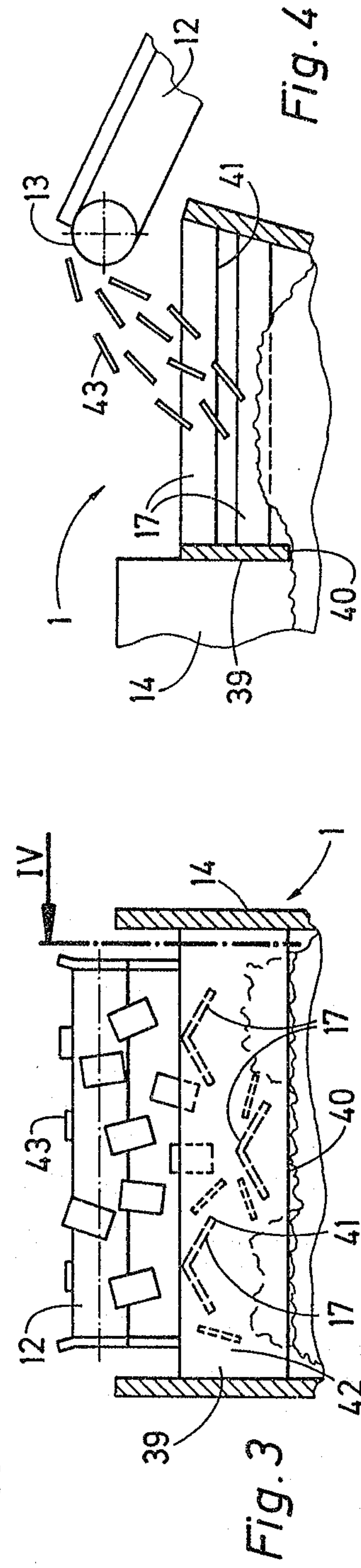
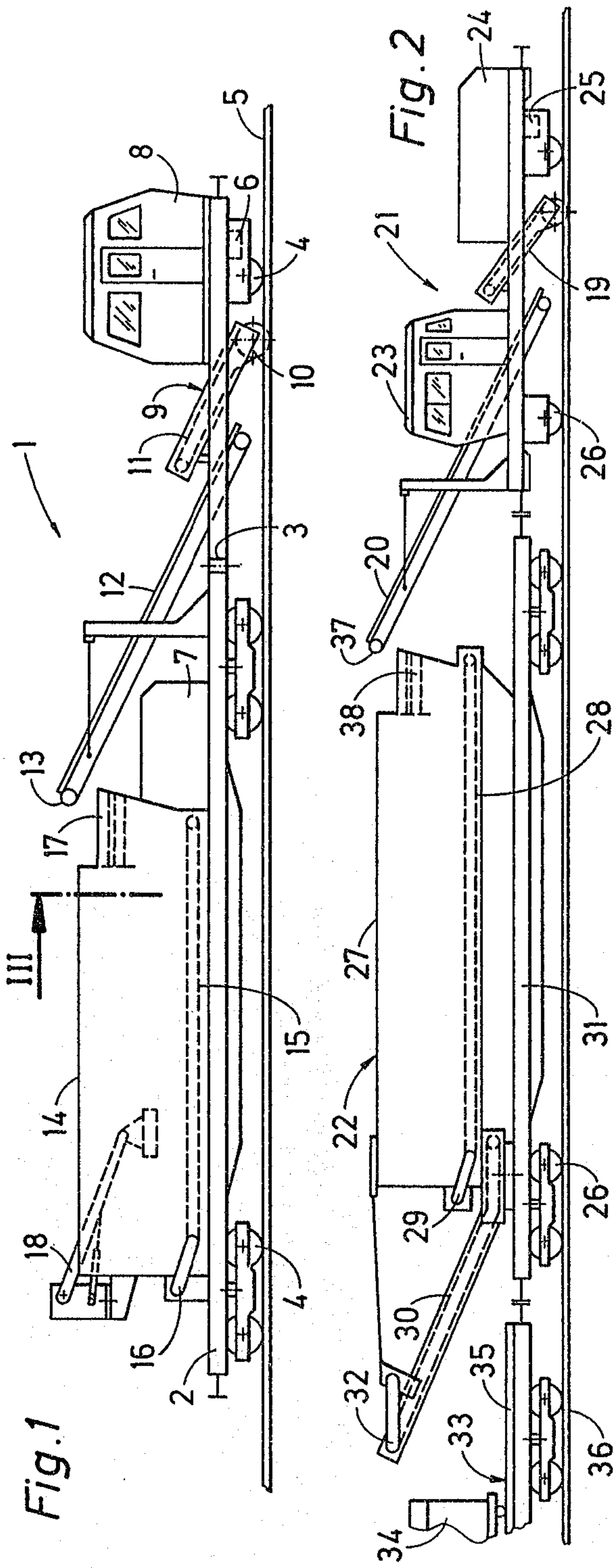
4. The machine of claim 1, comprising at least two of said damping devices, the damping devices extending in the direction of the longitudinal extension of the machine frame adjacent each other in a direction transverse to the longitudinal extension, and the adjacent damping devices being so spaced from each other and the container side walls, respectively, as to define openings therebetween to permit free passage of the discharged rail fastenings therethrough.

5. The machine of claim 1, further comprising a substantially vertical leveling element connected to the container adjacent the discharge end of the conveyor arrangement and extending transversely to the longitudinal extension of the machine frame, the leveling element having a lower edge spaced from the bottom conveyor band a distance corresponding to a desired level of the rail fastening elements stored in the container.

6. The machine of claim 1, further comprising another inclined conveyor band mounted on the machine frame, the other inclined conveyor band having a lower input end below an output end of the bottom conveyor band at an end thereof opposite the discharge end of the conveyor arrangement.

7. The machine of claim 1, wherein the machine frame is comprised of two parts, the two parts being linked together, one of the machine frame parts supporting the collecting device, the conveyor arrangement and an operator's cab, and the other machine frame part supporting the container.

8. the machine of claim 7, wherein the one machine frame part has a drive to constitute a self-propelled machine, and the other machine frame part constitutes a box car coupled thereto.



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