A surface scraping device for a vibratory-roller compaction drum includes linkage arms pivoted to the frame of the roller and an elongate blade and rollers carried by the linkage arms for engagement with the drum surface. A spring connected between each linkage arm and the frame biases the rollers and blade against the drum. The device functions to maintain the blade in scraping engagement with the drum surface even though the drum oscillates or vibrates about its axis.

6 Claims, 4 Drawing Figures
APPARATUS FOR SCRAPING COMPACTING DRUMS

BACKGROUND OF THE INVENTION

The present invention relates generally to apparatus for cleaning the drum of a rotary compaction roller, and particularly concerns apparatus for this purpose which is suited for use with rollers of the vibratory type.

In compacting adhesive materials, such as asphalt, with rotary rollers, it is important that the surface of the compaction drum be cleaned frequently, and preferably continuously, to prevent the material from building up on the drum. With purely rotary drum rollers, i.e., where the drum rotates about a fixed axis, this presents no serious problem. However, the same is not true of vibratory rollers, where the roller drum when vibrating is constantly in oscillatory motion relative to the frame.

To allow for oscillation of the drum, it has been the practice to position the cleaning device, typically a scraper blade rigidly attached to the roller frame, sufficiently far from the drum so that the drum surface will not continually knock against it during operation. Because the drum vibration amplitude is comparatively large, however, the spacing between the scraper blade and the surface of the drum is normally too wide for effective cleaning of the surface. Moreover, the drum usually bangs against the scraper frequently enough to create a bothersome noise, notwithstanding the wide spacing between it and the blade.

These and other objectionable features of the prior art are overcome by the present invention.

SUMMARY OF THE INVENTION

In accordance with the invention, apparatus for continuously cleaning the surface of a rotary compaction drum, and especially vibratory roller drums, includes one or more linkage arms pivoted at one end to the roller frame and provided adjacent the other end with a scraper blade, or blades, that adapts to engage and clean the drum surface. One or a plurality of rollers carried by the linkage arms ride on the drum, and are dimensioned relative to the scraper blade or blades such that both the rollers and the blades simultaneously bear against the drum surface. Effective scraping contact of the blades with the drum is maintained, though the drum oscillates about its axis of rotation, by a tension spring coupled between each linkage arm and the frame. The blades are therefore able to follow oscillatory movements of the drum.

In one embodiment, a single scraper blade is attached directly to the free ends of spaced linkage arms, and a roller is mounted on each arm intermediate to the blade and the pivoted end. An alternative arrangement utilizes a generally U-shaped member extending along the length of the drum and fixed at either end to a linkage arm. Two blades are secured to the U-shaped member, one to each leg, which has its open side facing the drum. The rollers are located interiorly of the U-shaped member and are paired circumferentially of the drum to maintain the blades in proper scraping relation to the drum surface.

As another feature of the invention, the blades may be flexible or slidably bolted to the supporting members, or both, to allow for wear and to facilitate adjustment.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference may be made to the following description of exemplary embodiments, taken in conjunction with the figures of the accompanying drawings, in which:

FIG. 1 is a side elevational view of one embodiment of roller drum scraping apparatus constructed in accordance with the invention, with parts broken away for clarity of illustration;

FIG. 2 is a front elevational view taken along the line 2--2 of FIG. 1 and looking in the direction of the arrows;

FIG. 3 is a side elevational view of another embodiment of the invention, also showing certain parts broken away for clarity; and

FIG. 4 is a partial vertical sectional view taken along the line 4--4 of FIG. 3 and looking in the direction of the arrows.

DESCRIPTION OF REPRESENTATIVE EMBODIMENTS

In the embodiment of the invention illustrated in FIGS. 1 and 2, a compaction roller drum 10 is depicted as being journaled at its ends in the frame 12 of the roller. Only one end of the drum is portrayed in this regard since the structure is essentially identical at both ends.

According to the invention, a linkage arm 14 is pivoted at one end to a suitable element 16 of the frame 12 so as to be movable about the pivot pin 18 towards and away from the rotational axis, indicated generally at 20, of the drum 10. A preferred construction of the linkage arm 14 includes two L-shaped members 22 (see FIG. 2) that are attached at their free ends to the rear flange 24 of an axially extending member 26 which projects toward the drum. Both L-shaped members 22 pivot about the pin 18. Bolted or otherwise fastened to the member 26 is a scraper blade 28 that is adapted to engage the compaction surface 30 of the drum. The inner end of the blade 28 may be appropriately chamfered (see FIG. 1) to enhance the scraping action of the blade.

Linkage arm 14 is further provided with a roller 32 at a point intermediate of its ends. As depicted in FIG. 2, the roller is journaled between the parallel legs of the L-shaped members 22, and is positioned thereon so that it can make rolling contact with the drum surface 30. It is a feature of the invention that the scraper blade 28 and roller 32 are dimensioned and mounted on the arm 14 to bear against the surface 30 simultaneously. They are resiliently maintained in this position by a tension spring 36 connected between the member 26 and the frame 12. Thus the blade 28 and roller 32 follow the drum 10 in its oscillatory motion within the frame 12, with the blade always being held in scraping position against the surface 30. Since the arm 14 follows the vibratory motion of the drum 10, the surface 30 is continuously cleaned by the blade 28 of materials which adhere thereto during compaction procedures.

It will be appreciated from consideration of FIG. 2 that the member 26 and blade 28 extend along the full length of the drum 10 and that, in the embodiment depicted, a second linkage arm of identical construction as the arm 14 is positioned adjacent the other end of the drum. That arm is also equipped with a roller and tension spring.
As a further feature of the invention, the link arms 14 optimally are positioned on the frame 12 so that the blade 28 is located below the horizontal centerline of the drum, i.e., below the axis 20. The blade 28 may of course be located at other areas of the drum if considerations of space or the like so require. Additionally, another complete similarly mounted scraping unit, including the arms 14, blade 28, rollers 32 and springs 34, is preferably provided on the other side of the line of contact of the drum 10 with the material to be compacted to ensure that the drum surface 30 is properly cleaned in both directions of travel.

In order to facilitate proper positioning of the blade 28 relative to the roller 32 and to account for wear, the blade may be adjustably mounted on the member 26. To this end, a plurality of bolts 36 and a backing strip 38 may be conveniently employed, with the blade 28 being formed with elongate slots 40 for receiving the bolts in an adjustable manner.

An alternative embodiment of the invention is portrayed in FIGS. 3 and 4, where like reference numerals indicate like parts. Again, only one end of the drum and scraper apparatus is illustrated, but it will be understood that substantially identical structure, save for any necessary reversal of parts, is also provided at the other end.

In this embodiment, link arms 14a are located at opposite ends of the drum 10, and are pivoted thereto, as by a clevis 44 and pin 46, to a suitable element of the roller frame 12. The arms are resiliently coupled to the frame 12 at their free ends by tension springs 34. Pivotedly carried by the arms 14a, through pins 48, is a generally U-shaped member 50 overlying the full length of the drum (see FIG. 4) with its open side facing the drum surface 30. Spaced end plates 52 at each end of the member 50 receive the pins 48.

The points of connection of the U-shaped member 50 to the arms 14a preferably lie in the vertical plane passing through the rotational axis 20 of the roller, the U-shaped member being symmetrical in cross section about those points (see FIG. 3). Paired rollers 32 mounted interiorly of the U-shaped member 50 on cross members 54 (see FIG. 4) and spaced one on either side of the plane of symmetry of the member, ride on the surface 30 and maintain the U-shaped member 50 centered about the pivot pins 48. Several sets of the paired rollers 32 may be positioned along the drum, as indicated in FIG. 4.

Attached to each leg of the U-shaped member 50 is an axially extending scraper blade 28 which, as before, may be adjustable relative to the member 50 by means of bolts 36 and slots 40. The blades 28 are so positioned that both they and the rollers 32 simultaneously bear against the surface under the action of the springs 34. Effective scraping of the surface 30 is afforded in both rotational directions by this two-blade construction.

For simplicity, the scraping apparatus of FIGS. 3 and 4 preferably is arranged to straddle the axis of rotation 20 of the drum at the highest point on the drum circumference, but other circumferential locations may be adopted as well.

If desired, the blades 28 may be constituted by flexible members so that they will deflect slightly when brought into contact with the drum surface. This not only further ensures that the blades will always make scraping engagement with the drum but also affords still greater compensation for wear.

It will be understood by those skilled in the art that the above-described embodiments are intended to be merely exemplary, in that they are susceptible of modification and variation without departing from the inventive concepts disclosed. All such variations and modifications, therefore, are intended to be included within the spirit and scope of the invention as defined in the appended claims.

We claim:

1. Apparatus for scraping the surface of a rotary compaction drum mounted on a frame, comprising:
   at least two linkage arms pivotally secured at one end to the frame for pivotal movement towards and away from the drum axis, said arms being arranged in parallel and spaced axially along the drum surface;
   at least one scraper blade supported by the linkage arms for movement therewith towards and away from the drum axis and adapted to scrape the drum surface, said blade being an axially extending blade attached to the free ends of the linkage arms; and
   means for urging the scraper blade into scraping engagement with the drum surface when the rollers engage the drum surface; and
   means for urging the scraper blade into scraping engagement with the drum surface and the associated rollers into rolling contact with the drum surface.

2. Apparatus according to claim 1 wherein the scraper blade comprises a flexible member.

3. Apparatus for scraping the surface of a rotary compaction drum mounted on a frame, comprising:
   a pair of linkage arms pivotally secured at one end to the frame for pivotal movement towards and away from the drum axis, said arms being arranged in parallel and positioned one adjacent each end of the drum;
   a generally U-shaped member extending axially along the drum between the pair of linkage arms and having its open side facing the drum surface, the U-shaped member being pivotally secured at its ends to the linkage arms for movement therewith towards and away from the drum axis;
   a scraper blade attached to each leg of the U-shaped member and adapted to scrape the drum surface;
   a plurality of rollers mounted on the interior of the U-shaped member and adapted to make rolling contact with the drum surface, the scraper blades and rollers being dimensioned to place the scraper blades in scraping engagement with the drum surface when the rollers engage the drum surface; and
   means for urging the scraper blades into scraping engagement with the drum surface and the rollers into rolling contact with the drum surface.

4. Apparatus according to claim 3 further comprising spring means for resiliently urging the scraper blades and rollers toward the drum surface.
5. Apparatus according to claim 3 further comprising slidable means for attaching the blades to the legs of the U-shaped member to allow adjustment of each blade position to ensure that the blades are in scraping engagement with the drum surface when the rollers are in rolling contact with the drum surface.

6. Apparatus according to claim 3 wherein the scraper blades comprise flexible members.

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