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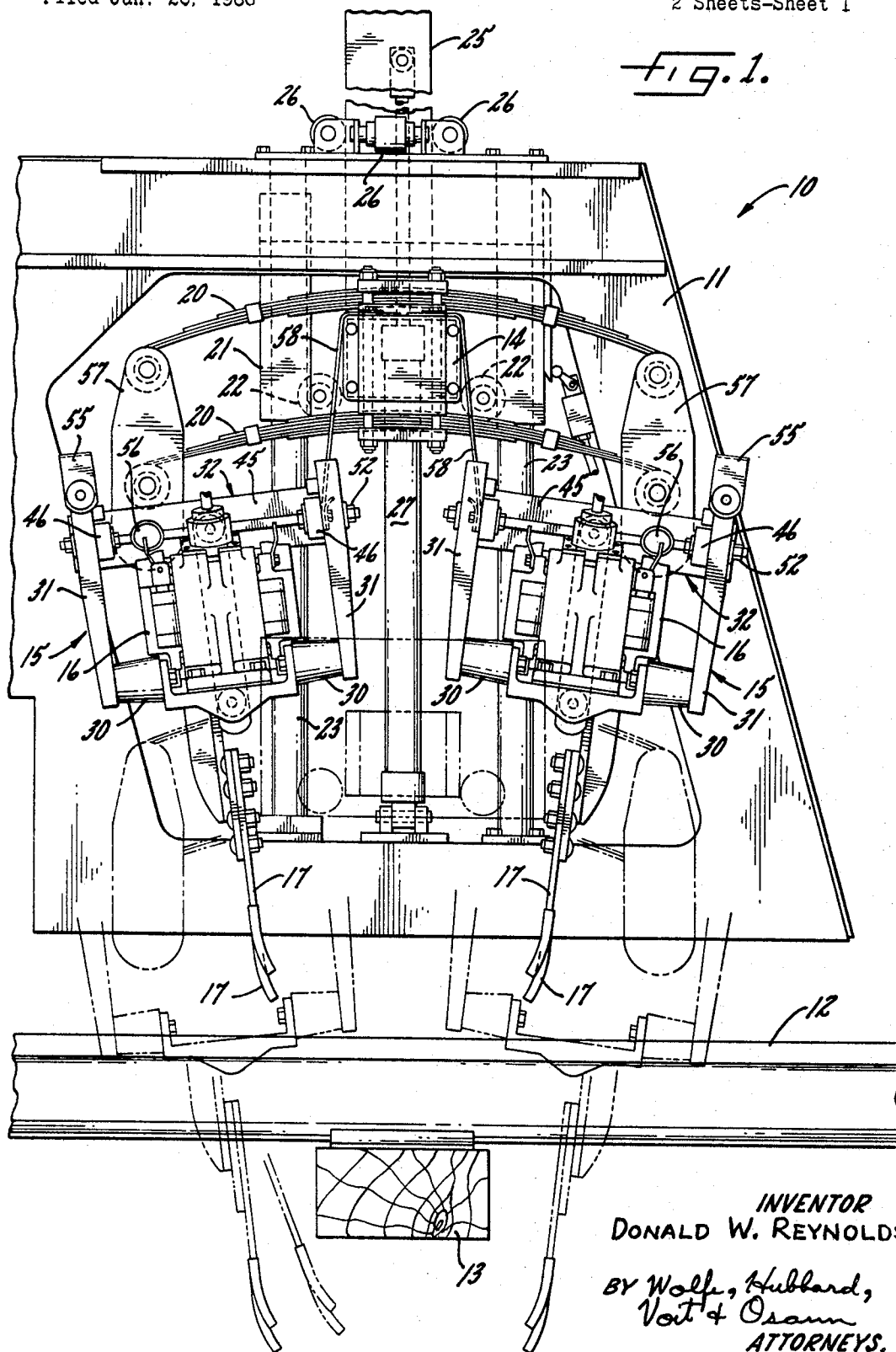
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TAMPER BLADE SUSPENSION ASSEMBLY

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2 Sheets-Sheet 1

Fig. 1.



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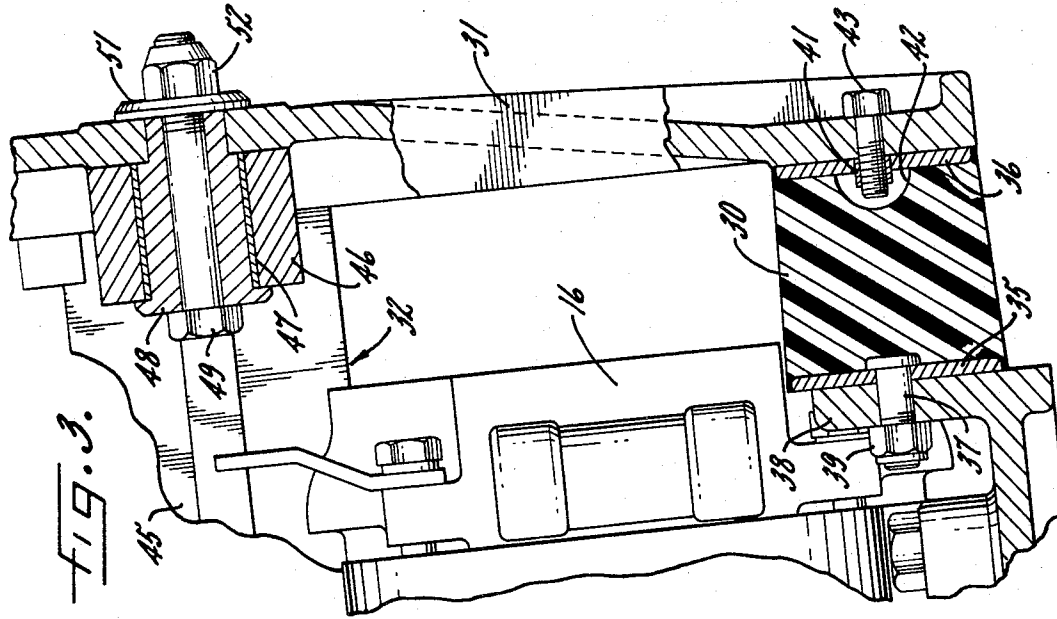
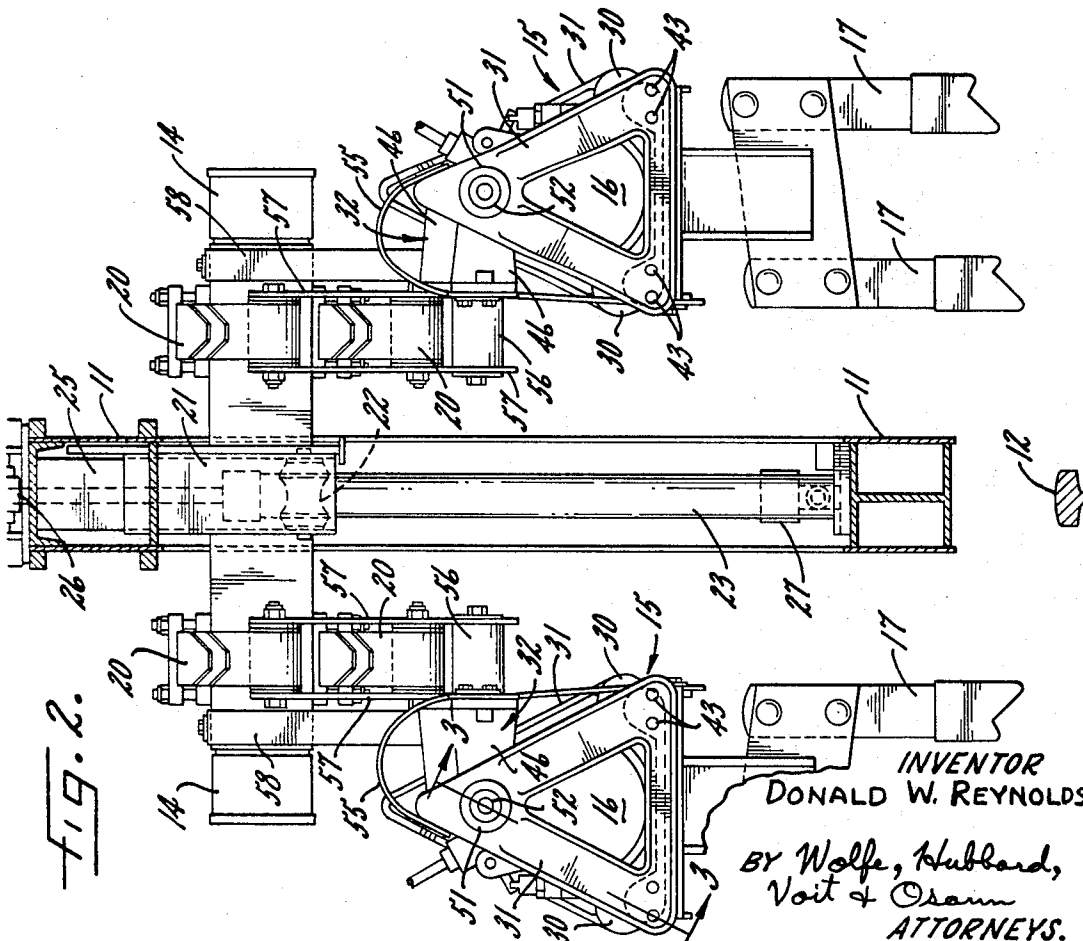
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TAMPER BLADE SUSPENSION ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

A vibration motor support for railroad track ballast tamping machines in which the motor is held for controlled movement by a plurality of resilient cylindrical bodies having their ends anchored between the motor and sandwiching end members, the bodies being disposed with their ends on lines at right angles to the plane of the motor tamping blade.

Description of the invention

This invention relates to railroad track ballast tamping machines and concerns, more particularly, a support assembly for vibratory tamping units in such machines.

An early form of high production, semi-automatic tamper using vibratory tamper units is shown in U.S. Patent No. 2,482,111, issued Sept. 20, 1949 to the assignee of the present application. In machines of this kind, the tamper units are pivoted for controlled movement into the ballast as the crosshead on which they are mounted is lowered. It is therefore necessary to mount the tamper units in fixed relationship with their pivot points as well as to mechanically insulate the units so that their vibration is neither dampened nor transmitted back through the crosshead and the remainder of the machine.

In the machine shown in the above-identified patent and its successors to date, the tamper units were fixed to the support assemblies of the machines through tightly extended belts or straps. The straps provided both positional stability to the units as well as vibration insulation. As heavier and more powerful motors came into use, the conflicting design considerations inherent in the flexible strap support assemblies became difficult to reconcile. A heavier motor requires a more rigid support, but if the supporting straps are tightened or made shorter and stronger, the insulating properties of the support are reduced. At the same time, it is desirable to soften the tamper unit support to obtain better mechanical insulation for the more powerful motor, and a softened support reduces the positional control of the unit.

Accordingly, it is the primary object of the invention to provide an improved vibratory tamping unit support assembly that combines effective mechanical insulation with good positional control of the unit. The invention thus permits the use of heavy, powerful vibration motors in ballast tamping machines, and insures that a maximum amount of vibration motor energy is transmitted through the tamping blade to the ballast.

Another object is to provide a support assembly of the above character which facilitates serving by simplifying the removal and replacement of the energy absorbing elements of the assembly which are subject to fatigue and eventual failure.

It is also an object to provide a support assembly as characterized above that is economical to manufacture, assemble and maintain in proper adjustment.

Other objects and advantages will become apparent upon reading the following description and upon reference to the drawings, in which:

FIGURE 1 is a fragmentary side elevation of a tamping machine embodying the invention;

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FIG. 2 is a fragmentary front elevation, partially in section, of the machine portion shown in FIG. 1; and

FIG. 3 is an enlarged fragmentary section taken approximately along the line 3-3 in FIG. 2.

While the invention will be described in connection with a preferred embodiment, it will be understood that I do not intend to limit the invention to that embodiment. On the contrary, I intend to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

Turning first to FIG. 1, there is shown a portion of an on-track tamper 10 having a frame 11 adapted to travel along a railroad track that includes a rail 12 mounted on a tie 13. The frame 11 supports a vertically movable crosshead 14 (see also FIG. 2) which mounts a plurality of tamping units 15 adapted to tamp the ballast anchoring the tie 13. In the illustrated construction, there are four tamping units 15 on the crosshead, each including an electrically driven vibration motor 16 to which pairs of depending tamping blades 17 are rigidly fixed.

The tamping units 15 are mounted at the ends of fore-and-aft extending springs 20 whose midportions are clamped to the crosshead 14. The crosshead 14 includes a central body 21 journalling grooved rollers 22 which ride on a pair of vertical shafts 23 fixed in the tamper frame 11. The crosshead body 21 includes a box-like center post 25 that rides within a set of rollers 26 mounted on the frame 11. The grooved rollers 22 keep the crosshead 14 from twisting, and the rollers 26 prevent tilting of the crosshead. An actuator 27 extending between the frame 11 and the crosshead post 25 serves to control up and down movement of the crosshead.

In the preferred machine, a second crosshead supporting four tamping units 15 is similarly arranged on the frame 11 over the other rail of the track. In operation, the vibration motors 16 are energized and the crossheads are lowered bringing the tamping blades 17 into contact with the ballast. The blades are disposed at right angles to the eccentrically weighted motor shafts so that the rigid motor and blade assembly vibrates substantially in the plane of the blades, giving the tips of the blades 17 a rapid, short stroke, working action. The tamping units include support assemblies which allow the motors to swing and tilt so that the vibrating blades, because of their configuration and angle of entry into the ballast, work their way under the tie 13 and toward the rail 12 so as to most effectively tamp the tie. This general arrangement of parts is similar to that shown and described in U.S. Patent No. 2,899,909, issued Aug. 18, 1959 to the assignee of the present application.

In accordance with the invention, the support assembly for each tamping unit 15 includes a plurality of resilient bodies arranged to control the position of the vibrating motor 16 as well as mechanically insulate the motor from the remainder of the machine. Preferably, the resilient bodies of each unit 15 take the form of four generally cylindrical blocks 30 of elastomeric material having one of their ends anchored to a corner of the motor 16 and their other ends anchored to an end member 31. A pair of end members 31 sandwich each of the motors 16 between them and each one of the end members 31 is preferably triangular in form. A single resilient block 30 is anchored at each lower corner of an end member 31, and the upper corner of the triangular end member is pivoted on a bracket 32. The triangular shape of the end members 31 provides a lightweight, rigid structure of sufficient size to support the corners of the motor 16 without being so bulky as to inhibit swinging movement of the motors on the bracket 32.

Supporting the motors 16 at their four corners assures maximum positional control of the vibrating motor and

blade assembly. The blocks 30 are preferably disposed with their anchored ends lying along lines substantially at right angles to the plane of vibration. Thus, the vibration tends to bend the blocks, loading them in shear, rather than in straight compression and tension. This makes maximum use of the resilience of the elastomeric material, providing good vibrational insulation without unduly restricting and dampening the vibration of the motor. The substantially cylindrical configuration of the blocks 30 avoids edges along which stress concentrations can build to cause premature fatigue failure.

As a feature of the invention, the blocks 30 are formed and mounted to facilitate rapid and convenient replacement. Circular metal plates 35 and 36 are embedded and fixed in opposite ends of each block (see FIG. 3). An outwardly extending bolt 37 is anchored through the plate 35 so as to extend through a hole in a flange 38 formed at the corner of each motor 16. A nut 39 fitted on the bolt 37 holds the plate 35 solidly against the adjacent flange 38, thus anchoring one end of the block 30 to the motor. A pair of internally threaded sleeves 41, only one of which is shown in FIG. 3, are anchored in the plate 36 and the block 30 is recessed at 42 around the inner end of the sleeves. A pair of screws 43 pass through holes in the end member 31 into threaded engagement with the sleeves 41, drawing the plate 36 solidly against the end member to anchor the opposite end of the block 30.

To remove a block 30 when replacement is necessary, the screws 43 and the nut 39 are removed, thus permitting sufficient clearance to be obtained to allow the block 30 to be grasped and the bolt 37 pulled from the motor flange 38. A new block can then be inserted and secured in place without disturbing the remaining portions of the tamping unit assembly.

To permit free swinging of the motor 16, the bracket 32 is open-centered, consisting of a back bar 45 and a pair of opposed ears 46 on which the end members 31 are pivoted. Each ear 46 embraces a sleeve bearing 47 (see FIG. 3) supported by a stud 48 anchored on the end member 31 by a bolt 49, a washer 51 and a nut 52. The axes of the bearings 47 in the ears of each bracket 32 are, of course, aligned so that the end members 31, and the motor and blade assembly they support, swing freely toward the rail 12. Preferably, a flexible strap 55 is extended between each bracket 32 and one of the end members it supports so as to limit the swinging movement.

To allow tilting movement of the tamping blades 17, the brackets 32 are pivoted on studs 56 secured to the lower ends of pairs of hanger plates 57. The plates 57, in turn, are secured to the ends of the springs 20. In the illustrated arrangement, a desired initial angle of the tamping blades 17 is established by pivoting the brackets 32 to one side of their centers of gravity and arresting downward movement of the heavy ends by flexible straps 58 extended between the crosshead 14 and the brackets. This allows the blades 17 to tilt under the tie 13 during the tamping operation.

It can be seen that there has been provided a support

assembly for vibratory tamping units which combines effective mechanical insulation of the vibration together with good positional control of the motor and tamping blade assembly. Thus, heavy, more powerful vibration motors can be utilized effectively. Servicing of the support assembly is greatly simplified by the ease with which the energy absorbing elements of the assembly, that is, the resilient elastomeric blocks 30, can be replaced individually when this is required. Those familiar with this art will appreciate that the above described structure is economical to manufacture, assemble and maintain in proper adjustment.

I claim as my invention:

1. In a tamping machine having a vibration motor carrying a depending tamping blade, a support assembly for said motor comprising, in combination, a pair of end members disposed with said motor between them, a plurality of resilient bodies fitted between said end members and said motor, each of said bodies having one end anchored to said motor and the other end anchored to one of said end members, said end anchoring of said bodies avoiding looseness between said motor and said end members so that mechanical insulation of the motor results from the resilience of the bodies, and a bracket pivotally supporting said end members for swinging movement of the end members, motor and blade.

2. The combination of claim 1 in which said end members are triangular and disposed to sandwich said motor between straight sides of said triangular shapes, and said plurality of bodies consists of four such bodies positioned between the ends of said straight sides and four corners of said motor.

3. The combination of claim 1 in which said bodies comprise generally cylindrical blocks of elastomeric material having fixed on the ends thereof threaded securing members, and said combination includes threaded locking members cooperating with said securing members to anchor the blocks to both the motor and the end pieces.

4. The combination of claim 1 in which said motor vibrates substantially in the plane of said blade, and said resilient bodies have their anchored ends lying along lines substantially at right angles to the plane of said blade.

5. The combination of claim 1 in which the combination includes a hanger pivotally supporting said bracket for rotation about a first axis, and said bracket pivotally supports each of said end members for rotation about a common axis disposed at right angles to said first axis.

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