Jan. 27, 1953 G. V. WOODY 2,626,720

CAR SHAKER

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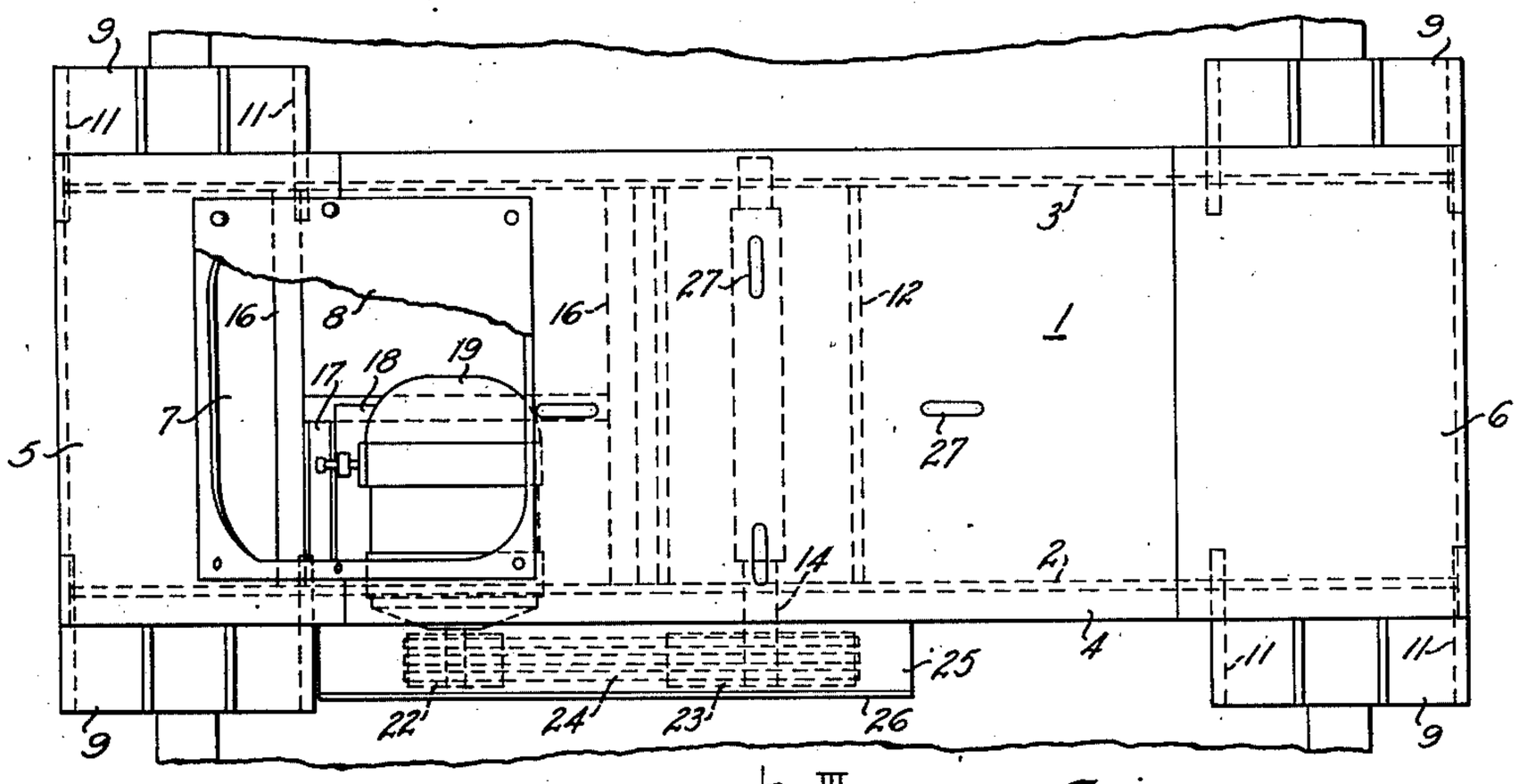

Fig. 2

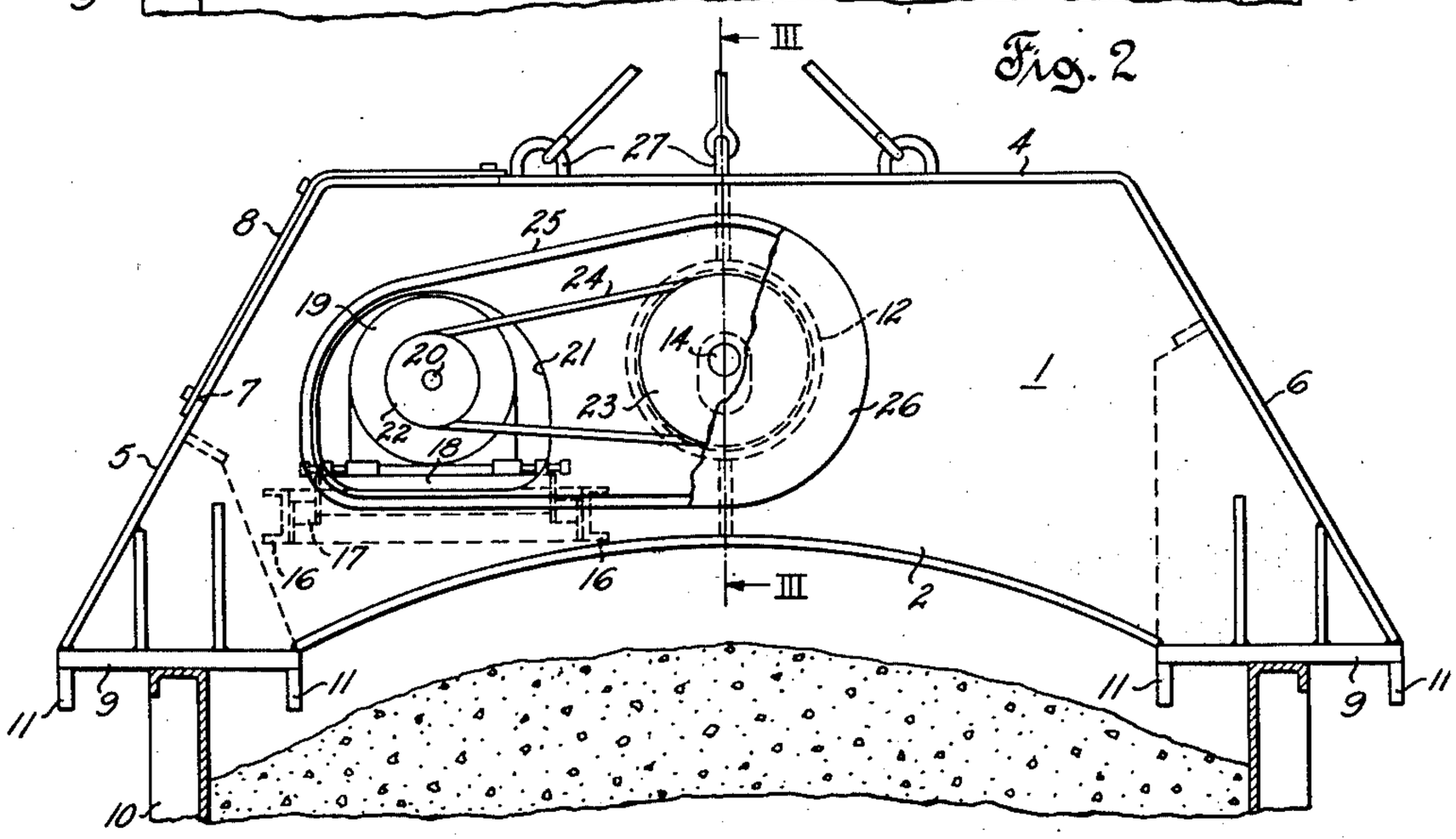

Fig. 1

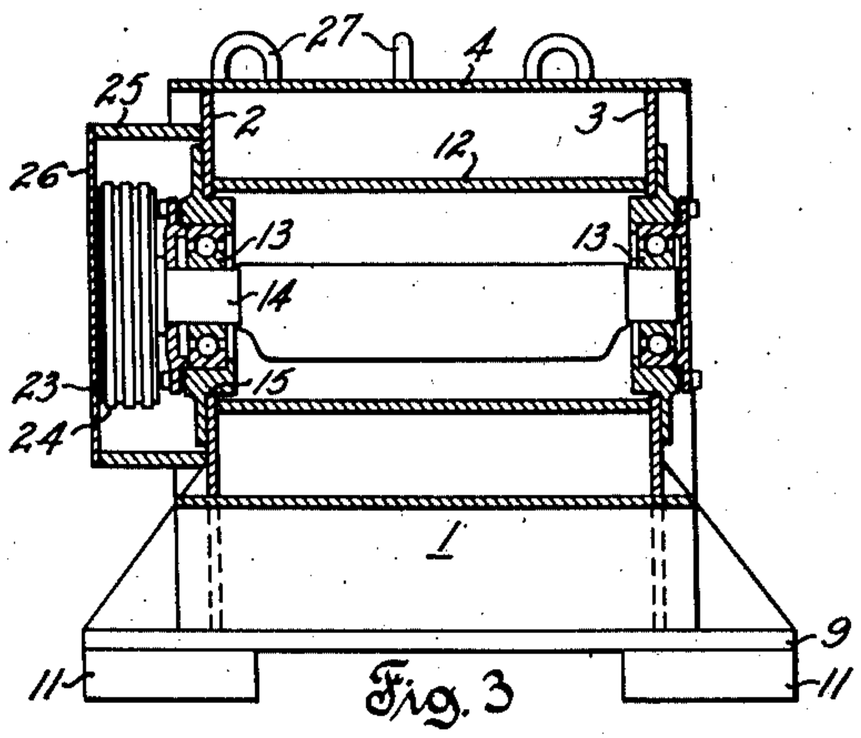

Fig. 3

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1 Claim. (Cl. 214—44)

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This invention relates to apparatus for vibrating objects, principally for the purpose of agitating materials in containers by shaking the container for the purpose of emptying the container, or the like.

The invention is embodied, for example, in a device for shaking the body of a hopper-bottom railroad car such as is used generally in the carrying of coal, to cause the coal to run freely out of the bottom openings, dislodging jammed, frozen and packed coal, etc.

It has previously been proposed to shake car bodies for the same purpose by applying vibrating forces to the car bottom or sides, for example, by allowing a heavy vibrator to rest upon the tops of the car sides, vibrating the body by communication of the movement of the vibrator to the car sides, and by impact where the motion is sufficient to cause interrupted contact.

One type of previously known car shaker employs an unbalanced rotor journaled in the frame of the vibrator to cause movement of the vibrator by the forces of inertia. The driving of the rotor however poses certain problems. If an electrical motor is used, it must be supported and connected in driving relation to the rotor. In previous devices the motor was mounted resiliently on and carried by a base frame resiliently supported from the vibrator frame so as to be transportable with the vibrator, as when the device is lifted from and lowered into contact with a car body to be shaken. The motor, being in the open, was not protected from the dust and dirt necessarily present in connection with coal handling.

The present invention unifies, compacts and protects the mechanism by giving the vibrator the form of a shell-like box frame with feet at its ends for contacting an object, such as a car body, to be vibrated, the mechanism and driving motor being both placed within the shell where they are protected on all sides and the top from dust, dirt and falling bodies. The power transmission means for connecting the motor to the rotor may be outside the main shell, for accessibility, and may readily be housed in by an auxiliary housing mounted on the outside of the shell or box frame. The motor mounting is resilient to protect the motor from severe shocks and excessive vibration in operation; and the power transmission mechanism is flexible to permit movement of the shell or frame relative to the motor.

The following is a description of the best mode of applying the invention to the construction of a car shaker. Reference is made to the accompanying drawing, in which like reference characters indicate to the same or similar parts throughout the several views and in which:

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Fig. 1 is a side view of a car shaker according to the invention resting on a car body, the car body being fragmentarily shown in cross section;

Fig. 2 is a top view of the device of Fig. 1 with a motor access cover partially removed; and

Fig. 3 is a cross section of the shaker, taken on the line III—III of Fig. 1.

A box frame 1 of more or less arch like form is constructed preferably of structural steel plates welded together. Frame 1 is, for example, formed of a pair of side plates 2 and 3, respectively, rigidly connected in laterally spaced relation by top plate 4 and end plates 5 and 6, plates 4, 5, and 6 being shown as formed of a single bent plate. An opening such as 7 may be provided for a reason set forth hereinbelow, the opening 7 being normally closed by a removable motor access cover 8 so that the space within the frame 1 is closed on ends, sides and top in normal use.

At each end of box frame 1, structural steel feet, shoes or pads 9 are welded to serve as supports adapted to rest on the object to be vibrated, such as car body sides 10, and flanges 11 may be provided to prevent dislodgment of the feet 9 from the car sides 10 in operation. The flanges 11 may be quite widely separated to adapt the feet 9 for engagement with the sides of car bodies of the full range of car widths encountered in practice.

Intermediate the ends of the frame 1 a tubular member 12 is welded and in bearings 13, suitably secured to side plates 2 and 3, is journaled a rotor which is unbalanced about the axis of rotation established by the bearings 13. The shaft 14 of the rotor is encased within the tubular member 12. The rotor is conventional in design and may be of any suitable known construction. Its driving shaft 14 extends through a suitable opening 15 in a side plate 2.

Intermediate the tubular member 12 and end plate 5 a pair of beams 16 span the internal cavity of frame 1; and, connected therewith as by resilient rubber springs 17, is a motor base 18 on which a conventional electrical motor 19 is mounted. The motor 19 is freely vibratable with its base on springs 17, relative to frame 1.

The shaft 20 of motor 19 projects through an opening 21 in the side plate 2. On this shaft is a grooved pulley 22 which with grooved pulley 23 and V-belts 24 forms a flexible rotary power transmission means through which the unbalanced rotor is rotated.

Auxiliary housing 25 is secured on plate 2 and may be provided with a removable door piece 26 for access to the belt drive.

Eyes 27 are provided on frame 1 for convenience in handling the device by a power hoist. Rotation of rotor shaft 14 by motor 19 at a speed above a critical speed determined by the natural frequency of vibration of the frame 1 and its appurtenances on the support furnished by the car sides 10 will result in a tendency of frame 1 to gyrate about a center of gyration determined by well known mass distance relationships. The result will be a communication of forces to the car sides 10 which will result in their vibration with a resulting agitation of the car contents. The motor 19 is protected from excessive jarring and impact by its resilient connection with the frame. The natural tendency of the motor to remain still will result in there being only a very small motor movement in space.

It will be seen that the motor 19 is housed inside the frame making the device compact and well protected, and that no working parts of the vibrating mechanism rotor are outside the frame 1, with the exception of a driven pulley which is readily protected by the small auxiliary housing. The frame therefore shields the motor and vibrating mechanism from damage, dust and dirt; and the whole device presents a good appearance as a simple solid shape with no protuberances exposed to damage or liable in themselves to endanger operating personnel.

It will be understood that the specific device described and illustrated is by way of example only and that the invention is not limited to the particular features of such a specific embodiment, but includes such modifications and equivalents

as may readily occur to persons skilled in the art within the scope of the appended claim.

It is claimed and desired to secure by Letters Patent:

Apparatus of the class described comprising: an arch like hollow structure having side plates rigidly connected and spaced by top and end plates; a tubular member rigidly connected at its opposite ends to and transversely connecting said side plates intermediate their ends, rigid beams extending transversely between, and rigidly interconnecting said side plates intermediate said tubular member and one said end plate; motor means mounted and enclosed within said hollow structure below the top of said side walls and resiliently supported for vibrational movement relative thereto by resilient connection with said beams; an unbalanced rotor journaled for rotation in said tubular member; generally parallel rotatable shafts on said motor and rotor, respectively, extending through suitable openings in one of said side plates; rotary power transmission means outside of said frame, supported by and connecting said shafts in driving and driven relation.

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