Sept. 19, 1961 F. PLASSER ET AL 3,000,327

TRACK TAMPING MACHINE

Original Filed Oct. 13, 1954 5 Sheets-Sheet 1

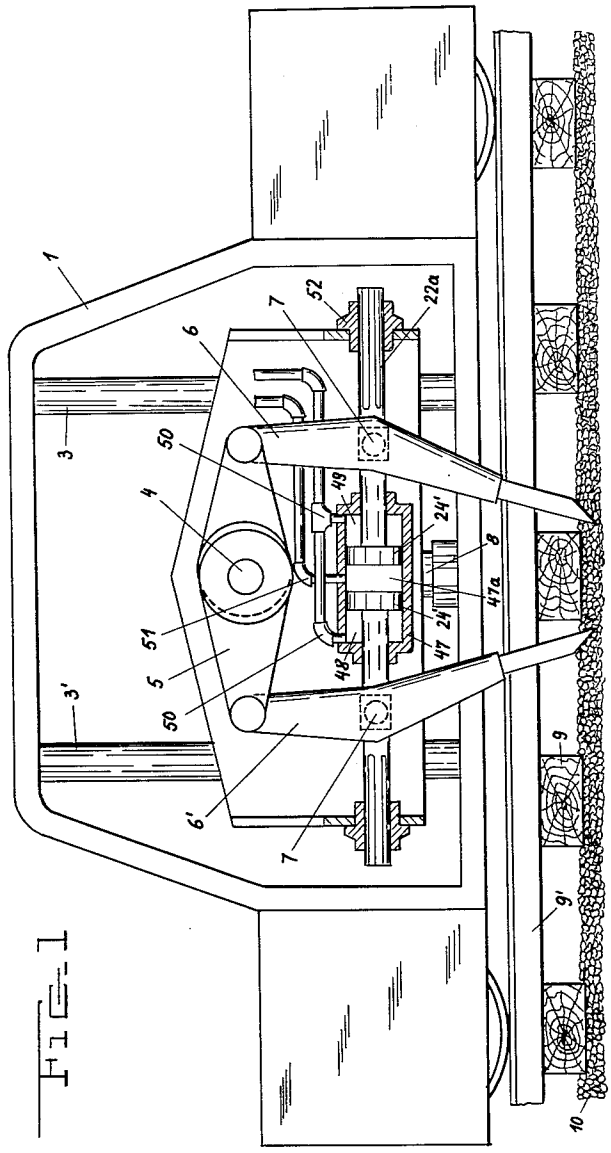

FIG. 1

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FIG. 3

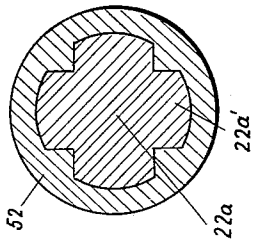

FIG. 2

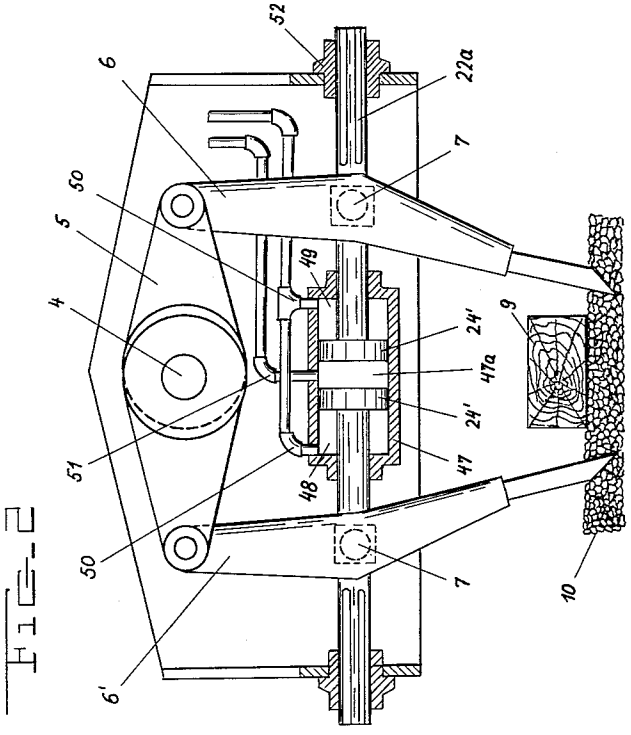

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Fig. 4

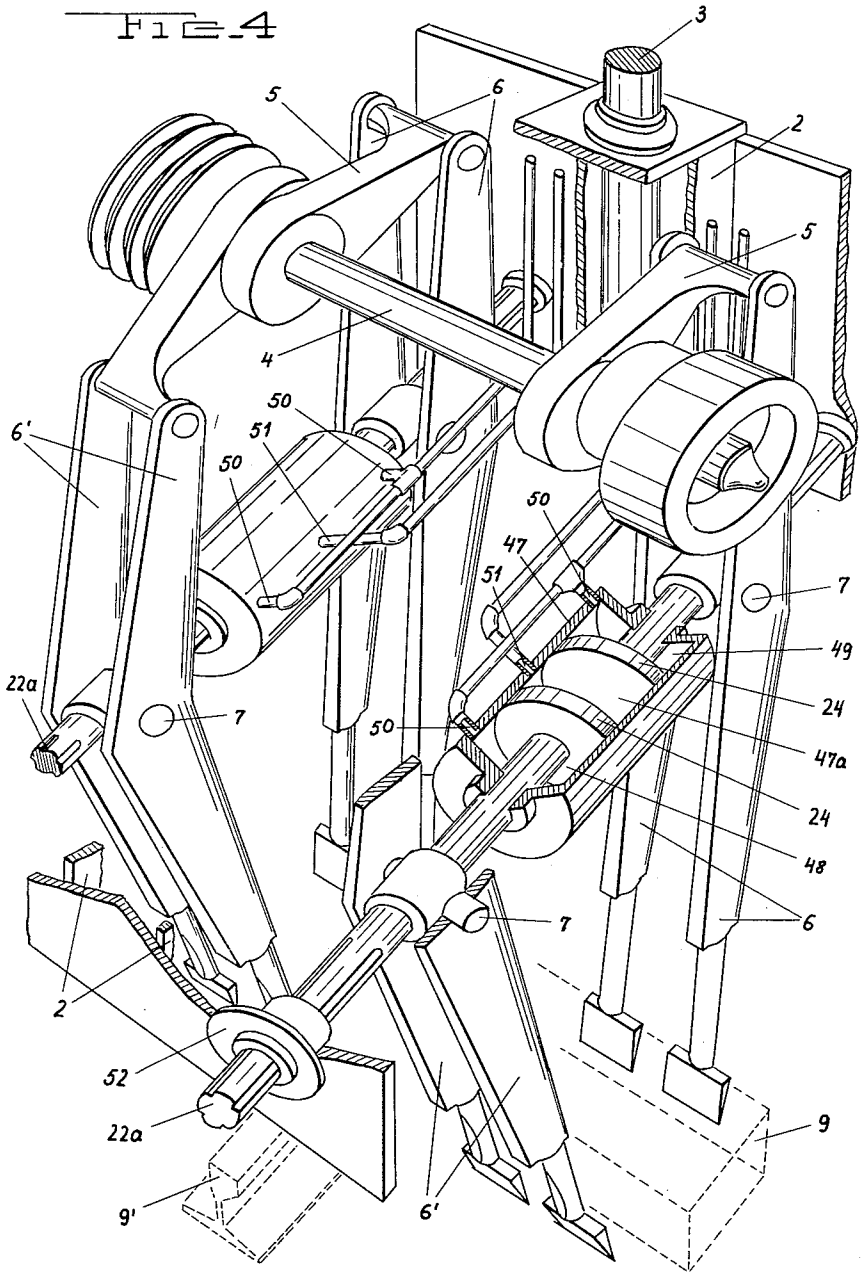

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FIG. 5

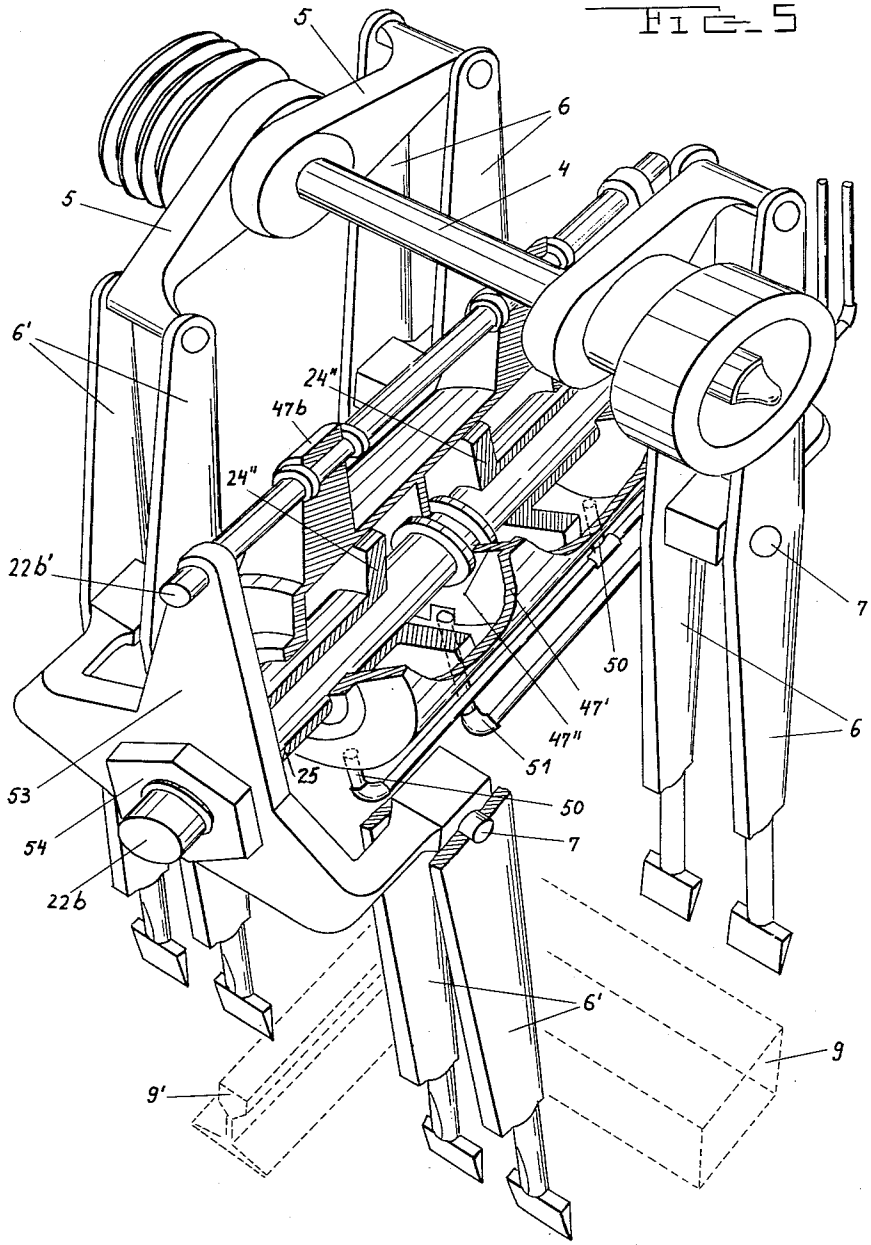

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Fig. 6

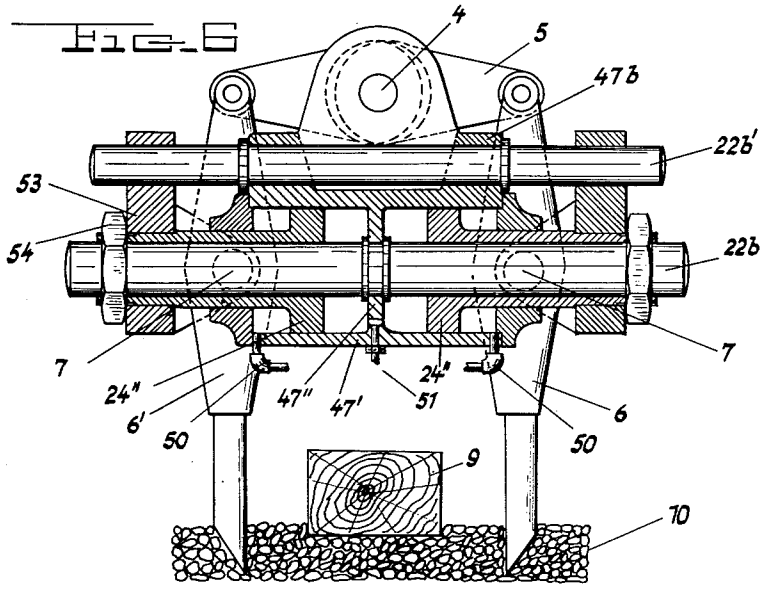
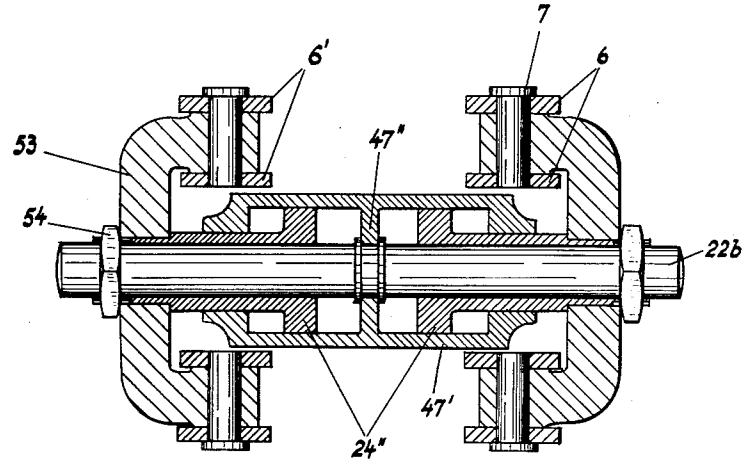


Fig. 7



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Patented Sept. 19, 1961

3,000,327

TRACK TAMPING MACHINE

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Original application Oct. 13, 1954, Ser. No. 462,086, now Patent No. 2,876,709, dated Mar. 10, 1959. Divided and this application June 11, 1958, Ser. No. 741,984
Claims priority, application Austria June 25, 1954
1 Claim. (Cl. 104—12)

The present invention relates to track tamping machines for packing ballast under railroad ties.

This is a division of our application Serial No. 462,086, filed October 13, 1954, now Patent No. 2,876,709, granted March 10, 1959.

Ballast tamping machines generally comprise several pairs of opposing tamping tools mounted on a vertically movable carrier to reciprocate in a direction substantially parallel to the track, a tamping tool mounting device common to at least one pair of tamping tools, each tamping tool being linked to the mounting device at its upper end, an eccentric shaft operatively connected to the mounting device for imparting a vibratory movement to the mounting device and the tamping tools linked thereto, and means for varying the distance between the tamping tools of each pair. The ballast is packed under a tie by placing the tie between pairs of tamping tools and forcing the tamping tools together while they are simultaneously vibrated.

It is known to effect the reciprocating movement of the opposing tamping tools, i.e. their approachment or closing as well as their opening, by hydraulic means, Known hydraulically-operated track tamping machines include a large number of movable parts which require constant service, lubrication, etc., as well as a considerable number of control valves, slides, etc., in the numerous pressure fluid conduits. This makes the operation of such machines excessively difficult, breakdowns are frequent and the manufacture of the machines is very expensive. In addition, there are structural difficulties in building the machines and they are extremely bulky.

It is the principal object of the present invention to provide a track tamping machine of the above type with a considerably simplified operating mechanism and greatly improved operational effectiveness.

It is a concomitant object of this invention to provide such a machine with a minimum of movable parts, thus reducing operation break-downs.

It is a more specific object of the invention to provide an improved mechanism for varying the distance of the opposing tamping tools.

In accordance with the invention, the distance varying mechanism for each pair of opposing tamping tools comprises a cylinder closed at both ends and fixedly mounted on the tamping tool carrier, two piston rods slidably mounted in a respective one of the cylinder ends and each rod carrying a piston on its inside, the two pistons dividing the cylinder into a center and two outer chambers, and means for applying pressure to the cylinder chambers. Each tamping tool is pivoted to a respective one of the piston rods at a position outside the fixed cylinder.

The above and other objects, features and advantages of the present invention will be more fully explained in the following description of two now preferred embodiments thereof taken in conjunction with the accompanying drawing wherein:

FIG. 1 is a side view of a ballast tamping machine incorporating one embodiment of the distance varying mechanism of the invention;

FIG. 2 is an enlarged side view of the distance varying mechanism of FIG. 1;

FIG. 3 shows a transverse cross section of a detail of FIG. 2;

FIG. 4 is a perspective view of the mechanism of FIG. 2, with the carrier partly broken away;

FIG. 5 is a perspective view of another embodiment of the invention;

FIG. 6 is a side view, partly in section, of the embodiment of FIG. 5; and

FIG. 7 is a transverse section of FIG. 6, taken along line VII—VII.

Referring now to the drawing, the same reference numerals are applied to like parts in all figures.

FIG. 1 shows a track tamping machine incorporating a tamping tool distance varying mechanism which comprises longitudinally reciprocable piston rods linked to each tamping tool intermediate its ends, the inner ends of two opposing rods being provided with a piston and the two pistons belonging to each pair of tamping tools gliding in a common, fixed cylinder which is closed at both ends, whereby the cylinder is divided into two outer chambers and one central chamber between the pistons. Such an arrangement considerably reduces the number of machine parts and is, therefore, particularly advantageous.

Hydraulic fluid pressure is applied to the outer cylinder chambers while hydraulic or pneumatic pressure may be applied to the central chamber. Hydraulic means is used for closing the tamping tools to effect the tamping operation, the respective piston rods being moved by applying hydraulic fluid to the outer cylinder chambers. The tamping tools are moved apart or opened by applying pressure to the central cylinder chamber, this pressure being provided preferably by a return spring or compressed air, as desired.

As shown in FIGS. 1 and 4, tamping tool carrier **2** is slidably supported on posts **3** and **3'**, which are mounted in carriage frame **1**. Eccentric shaft **4** is supported on carrier **2**, the shaft axis being parallel to ties **9** supporting track **9'** upon which the carriage travels. Upon rotation, shaft **4** imparts a reciprocating motion to tamping tool mounting arms **5**, the pairs of tamping tools **6** and **6'** being pivotably connected at their upper ends to the ends of mounting arms **5**. Intermediate their ends, the tamping tools are linked to a pivot pin **7**, which enables the spacing of opposing tamping tools to be adjusted in a manner described hereinafter. The lower ends of the tamping tools reach into the ballast **10** at each side of ties **9**. The ballast is packed under tie **9** when two opposing tamping tools are moved toward each other, thus exerting pressure on the rocks and pebbles therebetween, while the tools are simultaneously vibrated by rotation of eccentric shaft **4**. The tamping tool carrier **2** is vertically movable by adjustable support means **8** (not illustrated in detail), whereby the immersion depth of the tamping tools in the ballast may be changed. When the tamping at one tie is completed, the entire carrier is raised on standards **3**, **3'**, the carriage is moved along tracks **9'** to the next tie and the operation is repeated there. Tamping tools **6** and **6'** are connected at pivot **7** with piston rods **22***a* which are reciprocable in the direction of the track. Each rod **22***a* carries piston **24'** at its inner end, both pistons gliding in common cylinder **47** and thus dividing the cylinder into outer chambers **48** and **49** and central chamber **47***a*. When hydraulic pressure fluid is directed through conduits **50** into chambers **48** and **49**, pistons **24'** move toward each other and thus close tamping jaws **6**, **6'** to effect the tamping operation. However, when pressure fluid, preferably compressed air, is applied through conduit **51** to central chamber **47***a*, the pistons and the tamping tools are pushed apart. Conduits **50** and **51**

also serve to evacuate the pressureless displaced pressure fluid from the cylinder chambers.

As shown in the section of FIG. 3, the ends of each piston rod **22***a* are provided with ribs **22***a'* which glide in corresponding grooves in bushings **52** of tamping tool carrier **2**. This will prevent turning of the piston rods during operation, which would displace the tamping tools from their vertical tamping position.

The above-described embodiment of the invention may be further simplified by providing a single stationary cylinder for each unit of two pairs of opposing tamping tools, one such unit being arranged at each rail. Advantageously, a common guide rod may be provided for both pistons, the pistons being hollow and gliding along the guide rod with an axially hollow piston rod, both piston rods extending and being linked to the tamping tools outside the cylinder. This arrangement provides a very simple and efficient machine, wherein four tamping tools (two pairs) or even eight tools (four pairs), as illustrated, are actuated through a single cylinder.

FIGS. 5–7 illustrate the latter embodiment of the invention. As shown, each tamping tool is pivotably mounted at **7** on a strong yoke **53**. The yoke is mounted on the hollow rod **25** of annular piston **24''** and secured thereon by nut **54**. The hollow piston and piston rods are glidably mounted on guide rod **22***b* which is fixedly supported in the tamping tool carrier.

Cylinder **47'** may be supplied with a pressure fluid through conduits **50** and **51**, respectively, similar to the first-described embodiment. It is understood that a spring may be provided in the central cylinder chamber or compressed air may be supplied thereto instead of hydraulic fluid. To assure secure guidance of yoke **53**, which carries tamping tools **6** and **6'** pivotably connected to its ends (see FIGS. 5 and 7), a further guide rod **22***b'* is arranged parallel to and above guide rod **22***b*, this further guide rod preventing any pivotal movement of the yoke. The yoke is glidably mounted on guide rod **22***b'* with an upwardly extending lug. Guide rod **22***b* is supported by a center rib **47''** and the two end walls of cylinder **47'**. Further guide rod **22***b'* is supported in bearings **47***b* which are preferably cast in one piece.

Since the pressure fluid supply conduit system is conventional and is shown, for instance, in the parent application, this has not been further illustrated, forming no part of the present invention, apart from its combination with the claimed tamping tool distance varying mechanism.

While some preferred embodiments of the tamping tool distance varying mechanism have been described and illustrated in detail, it will be understood that various variants of the described principles may occur to the skilled in the art, particularly after they have had the benefit of the present disclosure, without departing from the spirit and scope of the present invention as defined in the appended claim.

What we claim is:

In a track tamping machine of the type comprising a wheeled carriage for mobility on the track, a vertically movable carrier mounted on the carriage, at least one pair of opposing tamping tools carried by the carrier to reciprocate in a direction substantially parallel to the track, and eccentric shaft means operatively connected to the upper ends of the tamping tools for imparting a vibratory motion to the tools: a pressure-operated mechanism for varying the relative distance between the tamping tools of each pair of opposing tools, said mechanism including a stationary cylinder closed at both ends and fixedly mounted on the tamping tool carrier between the opposing tools and with its axis substantially parallel to the track, a fixed guide member having two ends supported in said tamping tool carrier and passing through said cylinder along the cylinder axis, two opposing hollow piston rods reciprocably mounted on said guide member in both cylinder ends, each piston having one end extending into the cylinder to reciprocate in a direction substantially parallel to the track, an annular piston carried at said one end of each rod, the two pistons dividing the cylinder into a center chamber and two outer chambers, the piston rods and the pistons being arranged substantially symmetrically with regard to the center point of the cylinder, a support yoke fixedly mounted on each of said piston rods at a position between the cylinder and the support of the fixed guide member in the tamping tool carrier to form a pair of substantially symmetrically arranged yokes reciprocating in unison with the piston rods, each support yoke having two laterally spaced ends, pivot means connecting each tamping tool of a pair of opposing tools substantially at the midpoint of the tool to a respective one of said yoke ends, and pressure means for applying pressure to each of said cylinder chambers and to reciprocate the tamping tools in a direction parallel to the track, the pressure means connected to the two outside chambers being hydraulic fluid.

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