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TRACK TAMPER

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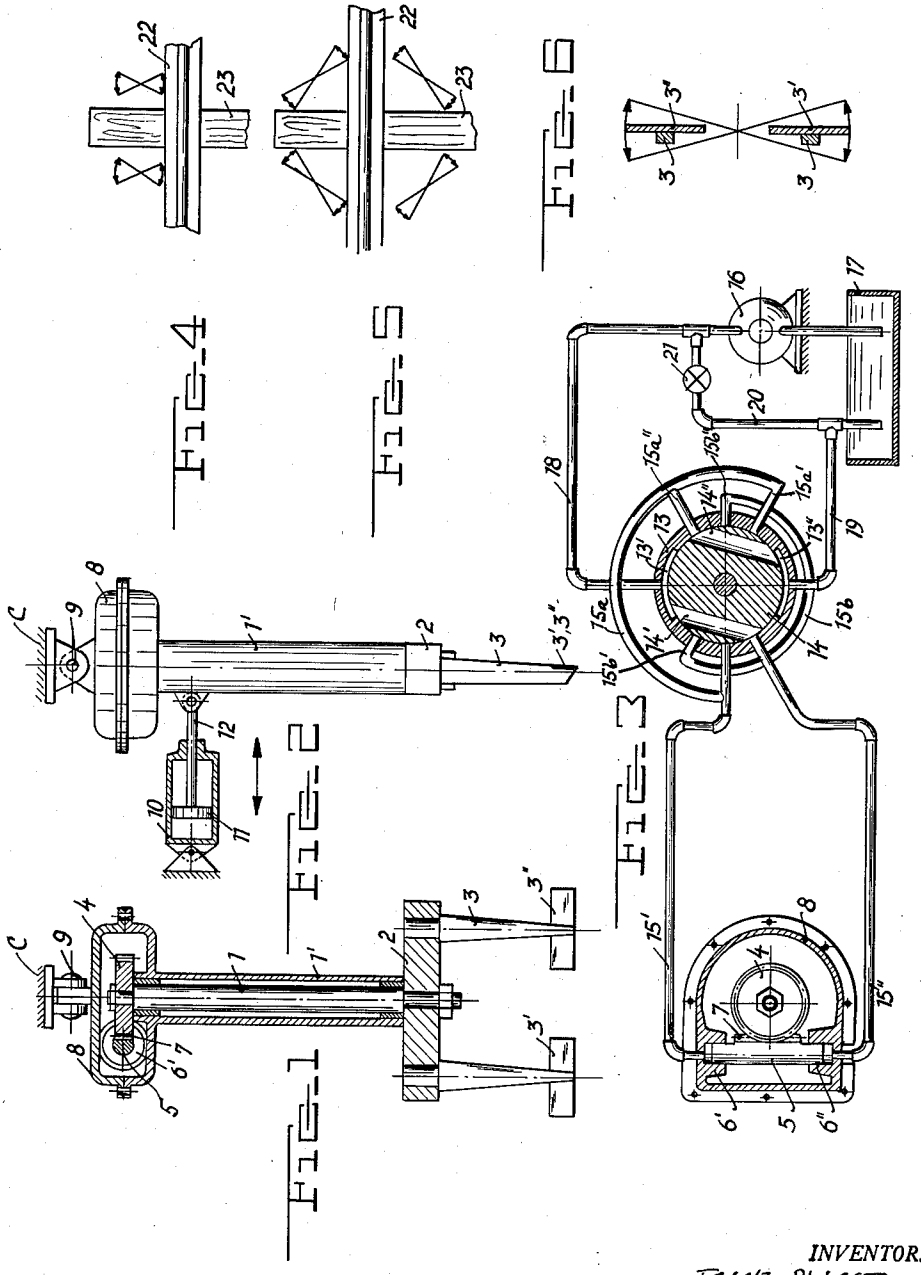

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

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TRACK TAMPER

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1 Claim. (Cl. 104—12)

The present invention relates to track tampers and more particularly to mobile track tamping machines with vertically adjustable tamping tool carriers which may be lowered into operating position with their tamping tools immersed in the ballast preferably adjacent each side of a tie to be tamped so that their tamping movement may compress the ballast under the tie.

One commonly used type of tamper uses mutually reciprocating pairs of vibrating tamping tools whose jaws compress the ballast between them as they approach. In another type of tamper the tamping tools are rotated or oscillated about a vertical axis so that their flat ends move ballast from the space between the ties underneath the ties. A common and unyielding drive means was provided for the rotation of all the tamping tools. The unyielding drive caused excessively high wear of the drive parts, particularly in oscillating movements, and the breakage of machine parts was accordingly very high. The common drive made it impossible to adjust the rotational force of each tool individually to conform to the local ballast resistance. For these reasons, the known tampers with rotating tamping tools found no practical application.

In accordance with the present invention, a pressure fluid, for instance hydraulically, operated reciprocable piston drives each individual tamping tool to oscillate it about the axis of a reciprocatingly rotating shaft which is operatively engaged by the piston. Preferably, the ends of the reciprocable piston are guided in the open ends of two cylinders while a center portion of the piston is free and operatively engages the shaft. This engagement may be effected by a rack on the piston meshing with a pinion on the shaft.

If a rack-and-pinion drive is used between piston and shaft, may be placed in a fluid-tight drive housing filled with a lubricating liquid, for instance oils so that all drive means for each tamping tool are well protected.

According to one preferred embodiment, the periodically alternating supply of pressure fluid to the piston ends is controlled by a continuously rotating distributing valve which alternately supplies pressure fluid to one of the cylinders while it permits the fluid from the other cylinder to be displaced therefrom.

The above and other features of the present invention will appear more fully from the following detailed description of a specific embodiment thereof, provided merely for purposes of illustration and without in any way limiting the scope of the invention. In the drawing,

Fig. 1 is a side view of a tamping tool according to the invention, partly in section;

Fig. 2 is another side view of the tamping tool, taken at an angle 90° removed from the view of Fig. 1;

Fig. 3 is a horizontal section schematically showing the tamping tool drive means including the pressure fluid conduit therefor; and

Figs. 4 to 6 schematically illustrate various tamping positions of the tool.

Since the present invention is concerned neither with the mobile carriage of the tamper nor with the vertically adjustable tamping tool carrier, the same have not been illustrated, any conventional structure being suitable for this purpose.

Referring now to the drawing and more particularly to Figs. 1 and 2, the tamping tool is shown supported by a shaft 1 which is rotatably journaled in a tubular housing 1'. A transversely extending beam 2 is fixed to the lower end of shaft 1, the particular fixing means being shown to include a threaded shaft end and a nut 24 holding the beam on the threaded shaft end. A pair of flat tamping jaws 3', 3'' are removably attached to holders 3 which are fixedly or removably mounted in beam 2, the beam, the tamping jaws and the rotatable shaft lying in a common plane whereby the oscillation of the shaft is transmitted by the jaws to the ballast wherein they are immersed.

The drive means for the reciprocating rotation of shaft 1 includes a reciprocable piston 5 which operatively engages the shaft. As shown, the two ends of the piston are guided in the open ends of cylinders 6', 6'', leaving a free center portion which carries a rack 7 meshing with a pinion 4 keyed to shaft 1. A fluid-tight housing 8 encloses the drive means and may be filled with oil to keep the drive protected and lubricated.

The entire tamping tool support is pivotally mounted on the tamping tool carrier C at pivot means 9 so that the position of the tamping tool may be adjusted in accordance with the most favorable tamping conditions. For this purpose, there may be provided a fluid-operated cylinder 10 (see Fig. 2) whose one end is linked to the tamping tool carrier. A piston 11 is glidably supported in the cylinder and its piston rod 12 is linked to the tubular shaft housing 1' whereby supply of pressure fluid to a cylinder chamber will reciprocate the tamping tool in a transverse direction indicated by the arrow in Fig. 2.

A preferred rotary distributing valve for controlling the pressure fluid supply to the ends of reciprocable piston 5 is illustrated in Fig. 3. As shown, the pressure fluid conduit includes a pressure fluid inlet means 18 receiving pressure fluid from pressure fluid supply 17 through pump 16 and a pressure fluid outlet means 19 returning pressure fluid to the supply. The distributing valve is mounted between the inlet and the outlet means and includes a fixed housing 13 and a rotary valve body 14 which continuously rotates in the housing and thus periodically establishes communication between the pressure fluid inlet means 18 and pressure fluid supply lines 15', 15'' leading to cylinders 6', 6'', respectively. Simultaneously, it permits the pressure fluid displaced from a respective cylinder to flow through outlet means 19 back into the storage tank 17.

The flawless reciprocation of piston 5 without shocks or jerks is obtained by the following construction of the valve:

The rotary valve body 14 has two chordal bores 14', 14'' arranged symmetrically in relation to the rotating center of the valve and the valve housing has recess 13', 13'' extending over an arc of 60° and being arranged diametrically opposite each other through which the fluid inlet means 18 and the fluid outlet means 19 communicate with the interior of the housing. In this manner, one of the chordal bores is always in communication with the inlet means while being shut off from the outlet means and the other one of the chordal bores is simultaneously in communication with the outlet means while being shut off from the inlet means, as illustrated. Supply lines 15' and 15'' alternatingly communicate with the interior of the housing at a distance of 30° at diametrically opposite sides of the housing between the

sides where the inlet and outlet means communicate therewith, for which purpose the line 15′ has an arcuate branch line 15*a* with inlets 15*a*′, 15*a*″ leading into the housing at one side while the main line 15′ leads directly to the housing at the opposite side and the line 15″ has an arcuate branch line 15*b* with inlets 15*b*′, 15*b*″ leading into the housing at opposite sides thereof while the main line 15″ leads directly to the housing at a spacing of 60° from inlet 15*b*′.

As conventional in pressure fluid conduits, the maximum pressure of the system is controlled by a pressure relief valve 21 mounted on overflow line 20.

Figs. 4 to 6 show different operating positions of the tamping tools. In Fig. 4, two reciprocatingly rotating tamping tools are positioned symmetrically at each side of a tie 23 close to the point where the rail 22 rests thereon. Fig. 5 shows four such tools being arranged symmetrically in relation to the support point of the rail on the tie.

Fig. 6 shows the sector-shaped movement of the tamping jaws 3′, 3″ during reciprocation of rotatable shaft 1.

While the invention has been described in connection with a specific embodiment, it will be obvious to the skilled in the art that many variations and modifications are possible without departing from the spirit and scope thereof as defined in the appended claim.

What we claim is:

A track tamper comprising a tamping tool carrier, a rotatable shaft mounted on said carrier and supporting a tamping tool, the tamping tool consisting of two flat tamping-jaws forming a plane with the shaft and being positioned on either side thereof, a reciprocable piston operatively engaging said shaft and pressure fluid means for reciprocating said piston and thereby to oscillate the tamping tool about the axis of the reciprocatingly rotating shaft.

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