Sept. 6, 1966 H. KESTEL 3,270,635

MANUALLY GUIDED, MOTOR DRIVEN TAMPING DEVICES

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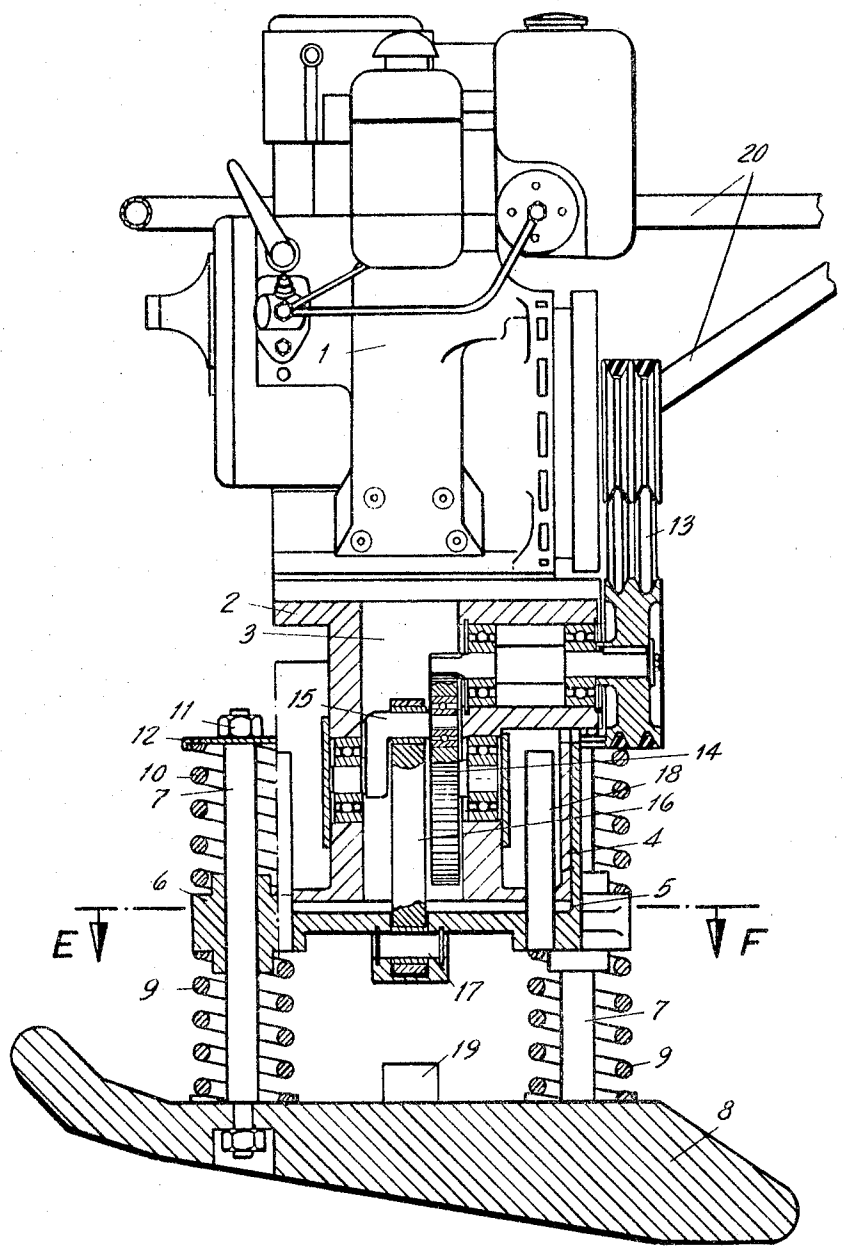



FIG. 1

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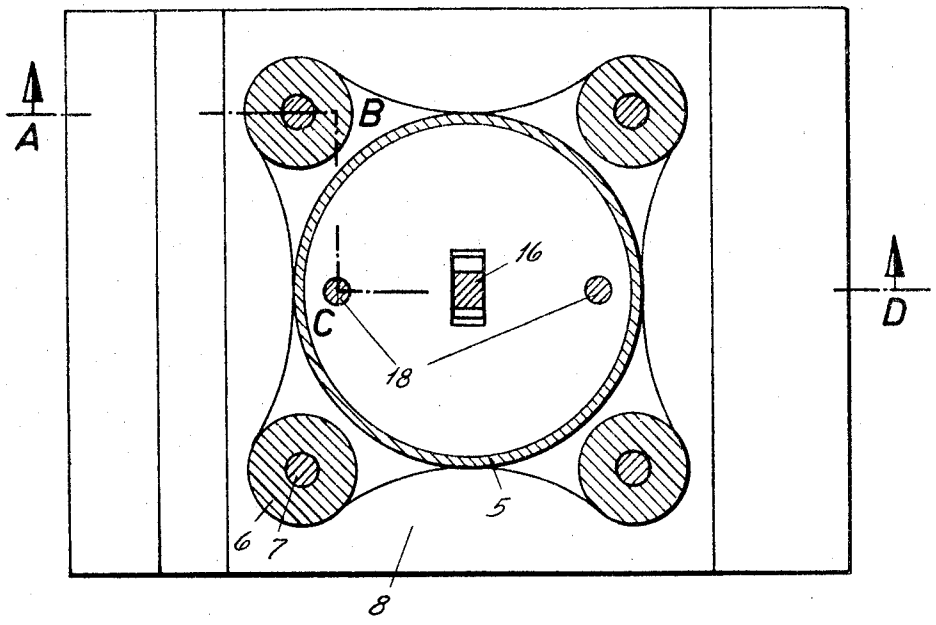



FIG. 2

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United States Patent Office 3,270,635 Patented Sept. 6, 1966



3,270,635

# MANUALLY GUIDED, MOTOR DRIVEN TAMPING DEVICES

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Filed Sept. 15, 1964, Ser. No. 396,495
Claims priority, application Germany, Nov. 15, 1963, W 35,641
5 Claims. (Cl. 94—49)

The invention relates to tamping devices and is particularly concerned with improvements in manually guided, motor driven tamping devices for compacting concrete, earth or the like.

Different types of such tamping devices are known where the tool effects deciprocating operating movements. In such devices the drive motor is rigidly or interchangeably connected with the working tool. The transmission of power from the motor to the reciprocating system is effected by way of a pinion mounted upon the motor shaft, a transmission cooperating therewith and a crank drive means. The crank drive means actuates a connecting rod.

In one known embodiment the connecting rod engages a cylinder which is axially movable in the housing of the apparatus. In the interior of this movable cylinder a piston is slidably mounted which is supported with respect to the two end surfaces of the cylinder by means of springs. The piston is interchangeably connected with the tool such as a tamping foot at the lower end of the device.

A further embodiment of such a tamping apparatus is known which corresponds to the structure described above with the difference that here a connecting rod is linked to a piston which is slidable in a cylinder. This cylinder in turn is axially movable in the housing of the apparatus and is moved by the piston which is biased by means of springs against the two end walls of the cylinder. In this embodiment the tool is connected to the cylinder.

Finally, a third embodiment of such an apparatus is known where the connecting rod which is driven by a crank is directly linked to the piston by means of a wrist pin without the intermediary of a piston rod and where the piston slides in the operating cylinder, where it is biased against the upper and lower end walls of the cylinder by means of one or more springs. Also in this case the operating cylinder supports the working tool.

All devices or apparatuses which are constructed in accordance with the above systems have in common that the springs required for the reciprocating system are arranged in a cylinder coaxially with the axis of the apparatus. The magnitude of the diameter of the guiding cylinder and of the helical springs determines the manner in which the motor transmission and the tamping foot are arranged and also, therefore, the standing ability of the tamper. However, the known apparatuses have the shortcoming that the diameter of the helical springs and the guiding cylinder cannot exceed a certain magnitude, so that narrow limits are set for the guiding qualities. In addition there is a further disadvantage in that the reciprocating system together with the transmission is of relatively tall construction so that they are only suitable for relatively small drive motors, i.e., the standing ability is not sufficient for larger and heavier drive motors. Consequently it has not been possible to construct tamping apparatuses incorporating diesel motors. Accordingly the known tampers cannot be constructed for any desired output and size.

It is an object of the present invention to overcome the foregoing disadvantages and to provide apparatus of greater efficiency and output. In accordance with the



invention the motor is mounted on a support above the transmission which is arranged in a cylinder, which in turn is slidably guided in a further cylinder and is connected thereto by way of a crank, connecting rod and a wrist pin. Furthermore, the guiding cylinder is movably connected to the tamping foot by way of a guide plate at the circumference through four guide sleeves and four guide standards and is biased with respect to the tamping foot by means of springs toward the bottom and the top.

An apparatus in accordance with the invention provides essential advantages. The guide standards which are widely spaced provide for reliable guidance and standing ability of a tamping device. The standing ability is further improved by an extremely low form of construction where the gear transmission and the crank drive is accommodated in the cylinder inside the guiding cylinder, a space which in known devices was required for accommodating the springs for the reciprocating system. It is thus possible to equip tampers with stronger and heavier drive motors, particularly also diesel motors. This in turn means that tampers may be constructed in a manner to provide greater sealing and surface area efficiency.

A still further advantage is provided in that by separating the springs for the reciprocating system and providing in lieu of a separate unit four spring assemblies, one for each of the standards, finer adjustment of the springs for the reciprocating system may be obtained. Thus a further increase in efficiency can be attained by means of the tamping device in accordance with the invention.

Finally, an apparatus in accordance with the invention provides the advantage that the spring assemblies can be observed at any time, and it is readily possible to replace damaged springs.

The foregoing and other objects and advantages of the invention will become apparent with reference to the accompanying drawings which illustrate a practical embodiment of the invention, and in which:

FIG. 1 is a side view of a tamper, partly in section, taken along line A–B–C–D through the driving and reciprocating system, and

FIG. 2 is a section taken along line E–F of the reciprocating system.

A drive motor **1** is mounted upon a support **2** which is part of the housing of a transmission **3**. The transmission **3** is disposed in a cylinder **4** which is guided for axial displacement in a guiding cylinder **5**. The guiding cylinder **5** in turn is axially displaceable and slides by way of four guiding sleeves **6** which are arranged externally circumferentially of the guiding cylinder upon four guide pins or standards **7** which are rigidly connected with a tamping foot **8**. Guiding sleeves **6** on the guiding cylinder **5** are biased with respect to the tamping foot **8** by means of springs **9** toward the bottom and by means of springs **10** toward the top, where the springs at their upper end are secured by means of nuts **11** and spring disks **12** in a manner that the tension can be adjusted.

The drive of the tamper is effected from motor **1** by way of a V-belt drive **13** and a gear transmission **14** to a crank **15** onto which is linked a connecting rod **16**. Connecting rod **16** is linked to the bottom of the guiding cylinder **5** by means of a wrist pin **17**. The crank drive causes movement of the guiding cylinder **5** relative to the cylinder **4** which carries transmission **3** and the drive motor **1**, and this initiates the movement of the reciprocating system.

Cylinder **4** and guiding cylinder **5** are secured against rotary displacement by means of pins **18**. Furthermore, in order to protect the reciprocating system the tamping foot **8** is provided with an elastic element **19** which

serves as a shock absorbing means and limits the path of the tamping foot with respect to the guiding cylinder **5** and thus also the compression of the springs **9**. A bail **20** is provided for manipulating or guiding the apparatus.

Having now described my invention with reference to the embodiment illustrated in the drawings, I do not wish to be limited thereto, but what I desire to protect by Letters Patent of the United States is set forth in he appended claims.

I claim:

**1.** A manually guided, motor driven tamping device for compacting earth, concrete and the like, said device comprising a motor, a guided cylinder defining a housing, said motor being supported upon said housing, a gear transmission and a crank disposed in said housing and operatively connected to said motor, a reciprocating system comprising a guiding cylinder open at the top and slidingly receiving said guided cylinder and a connecting rod having one end linked to said crank and having its other end pivotally connected to said guiding cylinder by means of a wrist pin, a plurality of sleeves arranged circumferentially around the lower end of said guiding cylinder, a tamping foot disposed below said guiding cylinder and having a plurality of guide pins extending upwardly therefrom, one through each of said sleeves for sliding movement therein, and biasing springs associated in pairs with said guide pins, one above and one below each said sleeve, each spring of a pair having one end



biased against one said sleeve, the other ends of the springs above said sleeves being biased against the upper ends of said guide pins, and the other ends of said springs below said sleeves being biased against said tamping foot.

**2.** A tamping device in accordance with claim **1**, including four said guide pins and four said sleeves.

**3.** A tamping device in accordance with claim **1**, comprising a plurality of pins extending between said housing and said guiding cylinder to prevent relative rotational movement.

**4.** A tamping device in accordance with claim **1** where an elastic element is mounted on said tamping foot below said connecting rod to serve as a shock absorbing means.

**5.** A tamping device in accordance with claim **1**, where means are provided externally of said housing and of said motor for operatively connecting said gear transmission to said motor.


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