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G. H. BROWN ET AL
IMPACTING MACHINE

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3 Sheets-Sheet 1

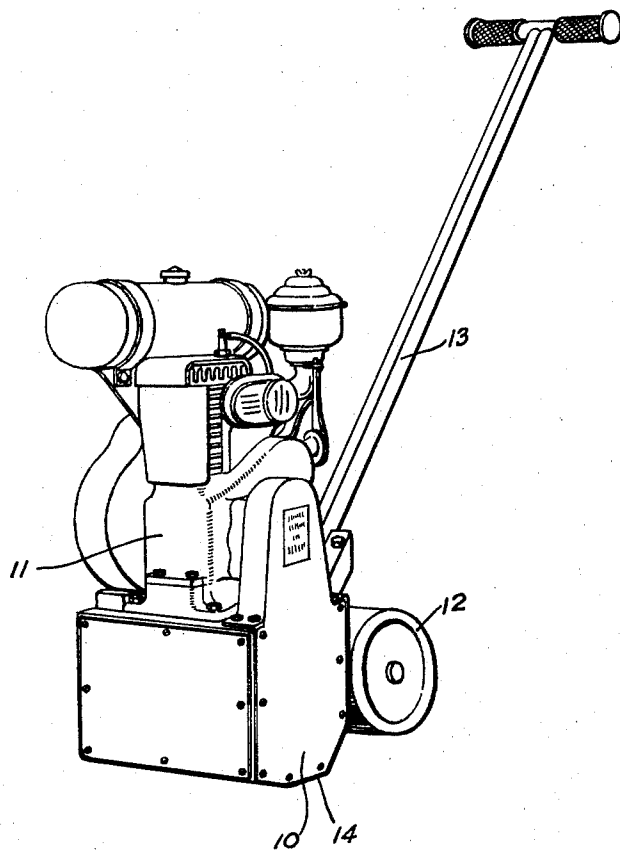


Fig. 1

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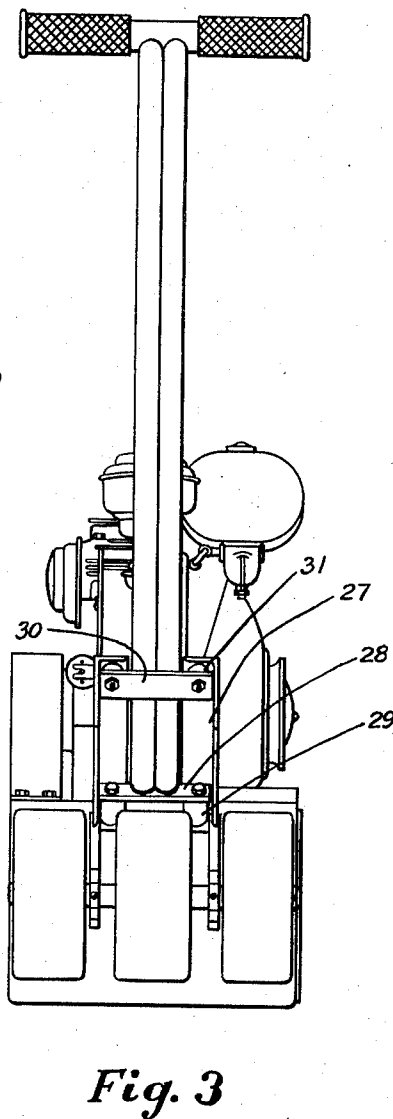
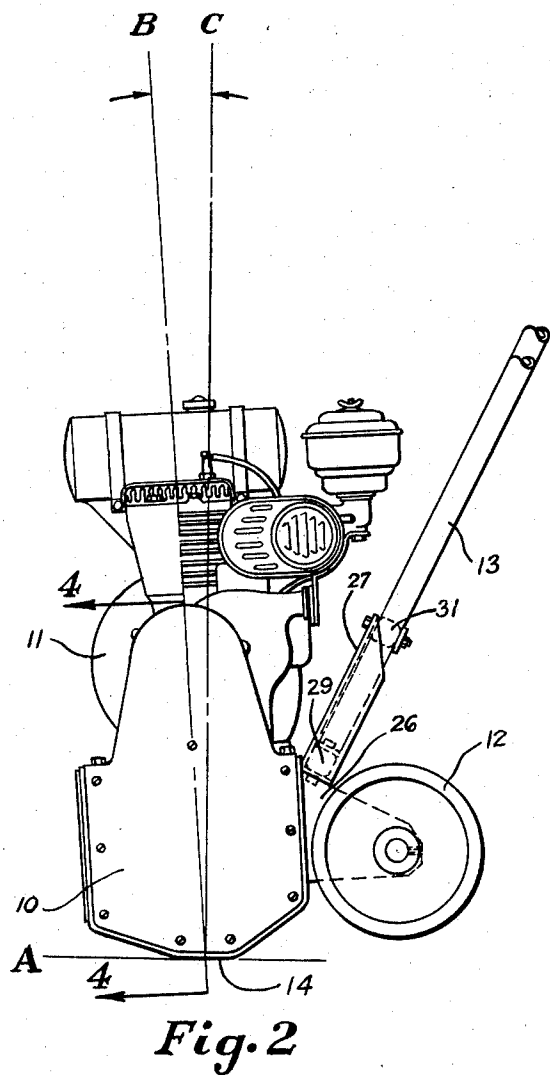
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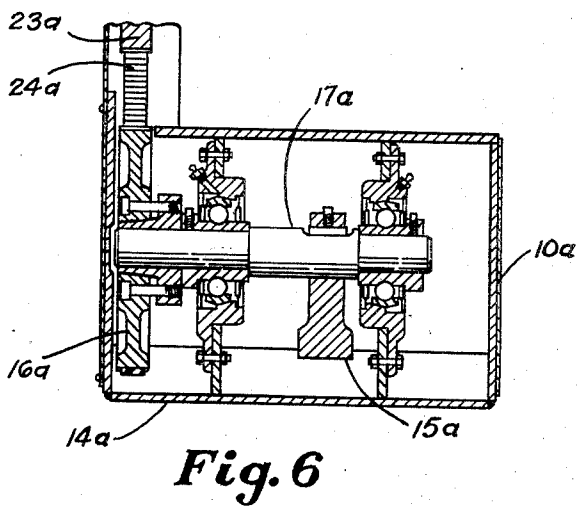
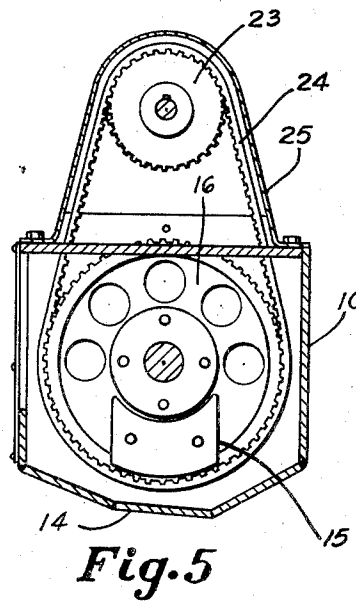
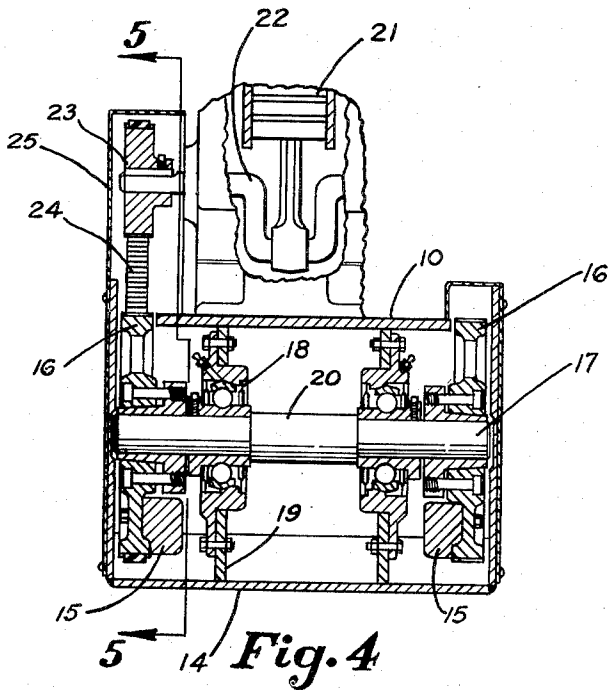
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3 Sheets-Sheet 3



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IMPACTING MACHINE

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2 Claims. (Cl. 94—48)

Our invention relates to an impacting machine. It has to do, more particularly, with a machine which can be used for impacting or compressing paving material, for tamping or compressing filling material such as dirt, and for many other impacting operations.

Machines of this general type have been used in the past. These machines consist mainly of an impactor plate which is adapted to contact the material to be impacted or compressed and means associated therewith for causing the plate to vibrate. The vibrating means comprises eccentric weights which, when driven, cause a vertical vibration of the impactor plate. These weights are carried by the impactor plate and are driven by means of an engine which is also supported by the impactor plate. The center of gravity of the elements carried by the impactor plate is disposed ahead of the transverse center line of the plate so that as the plate vibrates, the entire machine moves forwardly in a series of hops or jumps. A handle is associated with the machine so that an operator can aid in guiding it and wheels are also provided which can be moved into contact with a surface by properly tilting the entire machine by means of the handle so that the machine can be transported readily to a different location.

The present invention provides for a greatly simplified machine of the general type indicated above in which the tamping or vibrating action is accomplished much more effectively and efficiently by a very simple driving means and in which the driving means is of such a nature that exact timing between the action of the engine and the action of the eccentric weights is obtained so that the highest efficiency possible in the vibrating action results.

In the accompanying drawings, we have illustrated two examples of our invention but it is to be understood that the machine may take other forms without departing from the basic principles of our invention. In these drawings:

Figure 1 is a perspective view of a machine made according to our invention.

Figure 2 is a side elevational view of the machine of Figure 1.

Figure 3 is a rear elevational view of the machine.

Figure 4 is a vertical sectional view of the main part of the machine taken substantially along line 4—4 of Figure 2.

Figure 5 is a sectional view taken at right angles to the section of Figure 4 and along line 5—5 of Figure 4.

Figure 6 is a sectional view similar to Figure 4 but showing a modification of the machine.

With reference to the drawings and especially to Figures 1 to 3, our machine is illustrated as consisting mainly of a housing 10, an associated engine 11 preferably of the gasoline type supported by the housing, transporting wheels 12 attached to the housing and a handle 13 which can be used by the operator for aiding in guiding the machine and for tilting the machine to cause the transporting wheels 12 to function.

The housing 10 is provided with a lower wall which is

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so formed as to provide a transversely extending impacting plate or surface 14 which extends the full width transversely of the housing but which is relatively narrow, compared to the forward and rearward extent of the housing, and is located substantially midway between the forward and rearward walls of the housing. As will be explained later, this surface 14 is the final surface which will contact with the material to be compressed and will act thereon.

As shown in Figures 4 and 5, disposed within the housing 10 are a pair of eccentrically mounted weights 15 which are located at each end of the housing. These weights 15 are carried by large pulleys 16 which are rotatably mounted on the opposite ends of a shaft 17. This shaft 17 is carried by anti-friction bearings 18 which, in turn, are carried by transverse partitions 19 in the housing. The center portion of the shaft 17 is enlarged as indicated at 20 for cooperating with the bearings 18 to prevent axial movement of the shaft, the bearings also serving as thrust bearings. As indicated in the drawings, the housing is provided with removable wall sections to permit access to the interior thereof.

The housing 10 carries on its upper wall the driving engine 11 which is bolted thereto as indicated. This engine may be of any suitable type but is preferably a single cylinder gasoline operated type. As shown in Figure 4, it includes the piston 21 and the crankshaft 22 which has keyed thereto a driving pulley 23. This pulley 23 drives one of the pulleys 16 by means of a driving belt 24, the housing being provided with an upwardly extending guard section 25 which encloses the pulley 23 and the upper portion of the belt. The pulleys 16 are provided with gear teeth around their periphery and are duplicates. The belt 24 is of the timing type and is provided with gear teeth which cooperate with the teeth on the left-hand pulley 16 (Figure 4) and the teeth provided on the periphery of the driving pulley 23. This driving belt timing arrangement is provided so that the eccentric weights 15 will always be in a definite relationship to the piston 21. Thus, as shown in Figure 4, when the weights 15 are in their lowermost positions, the piston 21 is in its lowermost position. This will insure that more effective vibration of the impacting surface or plate 14 will result.

The impactor surface or plate 14 is disposed at such an angle relative to the remainder of the housing 10 that when it rests on a horizontal surface, indicated by the letter A in Figure 2, the entire machine is tilted forwardly slightly. However, the machine is so balanced that when the impactor surface 14 rests on a horizontal surface the machine will not tip over forwardly. This arrangement is indicated by the vertical center line of the machine, indicated by the letter B in Figure 2, which is disposed ahead of the vertical line C which intersects the line A at the surface 14 and which is perpendicular to the surface indicated by the line A. The result of this arrangement is that when the eccentric weights 15 are driven by the engine 11, this not only results in vibration of the impactor surface 14 but also results in the machine jumping or hopping forwardly in small increments.

The wheels 12 are shown as being three in number and are supported on brackets 26 which extend rearwardly from the housing 10. When the impactor surface 14 is resting on the supporting surface as shown in Figure 2 and the machine is tilted forwardly slightly, the wheels 12 are spaced above the supporting surface. However, for transportation the machine may be tilted rearwardly until the wheels 12 engage the supporting surface and this can be accomplished by means of the upwardly and rearwardly extending handle 13. These wheels are of such width that they will not disfigure material already impacted when they come into contact with the surface of such material. This handle 13 is attached to the

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housing 10. For this purpose brackets 27 are rigidly attached to the housing. The handle is shown as being of double tubular form and its lower end carries a transverse bar 28. This bar 28 is attached between the brackets 27 to the housing by means of flexible connections 29 which are known as vibration insulators. Similarly, the handle is attached to the upper end of the brackets 27 by means of a bar 30 welded to the handle and attached to the brackets by the mount 31. The mounts 29 cushion the handle in a direction axial thereof and the mounts 31 cushion the handle in a direction forwardly and rearwardly thereof. Thus, vibrations from the machine will be dampened before they reach the operator who may be using the handle 13 to manipulate the machine and especially to aid in guiding it.

In Figure 6 we have illustrated a modification of our machine. In this arrangement, a single eccentric weight 15a is used for vibrating the impactor plate or surface 14a. This weight 15a is disposed intermediate the ends of the housing 10a at a point transversely of the housing 10a where best balance of the driving mechanism is obtained. It is mounted on the shaft 17a which is driven substantially as before by means of the timing belt 24a, and a conventional pulley 16a which is disposed on the associated end of the shaft 17a but does not carry a weight. This machine will function substantially in the same manner as the machine disclosed in Figures 1 to 5.

It will be apparent from the above description that when the engine is operated, the eccentric weights or weight will be revolved and the impactor surface or plate will be vibrated vertically at high speeds. This will produce an impacting action and simultaneously cause the machine to move forwardly in small increments thereby advancing over the surface to be compressed and properly compressing the surface as it advances. A simple arrangement is provided for driving the eccentric weights or weight and this arrangement results in the positive synchronization of the movements of the piston of the engine and the movements of the eccentric weights or weight. The eccentric weights and associated moving parts are completely enclosed within the housing which serves to provide a rigid box-like structure that has the impactor surface formed on the lower wall thereof, instead of as a separate plate which greatly simplifies the structure of the machine and reduces considerably its cost of manufacture. The transporting wheels are of such width and number that they serve substantially as a roller and can be moved over the impacted surface without cutting thereinto.

Having thus described our invention, what we claim is:

1. An impactor machine comprising an impactor having a substantially horizontal surface for engaging the surface to be impacted, means for vibrating the impactor

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in a vertical plane, said means comprising an eccentric weight carried on a substantially horizontal shaft supported for rotation by said impactor, means for driving the weight so that it rotates in a vertical plane, said means comprising a piston-type engine supported by the impactor and including a crankshaft spaced vertically above said weight shaft in a substantially horizontal position in parallel relationship to the weight shaft and supported for rotation by said impactor with the axes of the two shafts being in substantially the same vertical plane, said engine also including a cooperating cylinder and piston having their axes disposed in a fixed vertical position along the vertical center line of the machine and said impactor surface being angularly disposed relative to said vertical center line so that when said impactor surface rests on a supporting surface the machine is tilted slightly forwardly without tipping over forwardly and so that the said vertical center line is angled forwardly of a vertical line which intersects the center line at the horizontal impactor surface and which is perpendicular to that surface so that forward rotation of the said eccentric weight will not only produce vertical vibration of said impactor surface but will also result in the machine hopping forwardly in small increments, said weight being keyed to the weight shaft in a predetermined fixed angular position so that when the piston is at the extent of its downward stroke the weight has its axis in the same vertical plane as the piston axis and is in dependent vertical position below the weight shaft, said driving means also comprising a direct interlocking drive connection between said crankshaft and said weight shaft to maintain the indicated relationship between the weight and the piston so that the downward thrust of both will be exerted simultaneously on the impactor surface, said interlocking drive connection comprising a driving member keyed in a fixed angular position on said crankshaft and a driven member keyed in a fixed angular position on said weight shaft and an endless driving and timing member passing around and interlocking with said driving and driven members whereby the predetermined indicated relationship between said weight and piston is maintained.

2. An impactor machine according to claim 1 in which said driving and driven members keyed on the respective shafts are pulleys having teeth on their circumferences and said endless driving and timing member is a driving belt which has a driving surface passing around said pulleys that is provided with driving and timing teeth interlocking with the teeth on said pulleys.

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