

[54] HANDLE MOUNTING CONSTRUCTION FOR ELECTRIC PAVING BREAKER

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[58] Field of Search 310/50, 51; 267/137, 141,
267/44, 152, 153; 248/26, 358 AA; 16/110
R, 111 R; 173/117, 162; 306/20, 38

[57] ABSTRACT

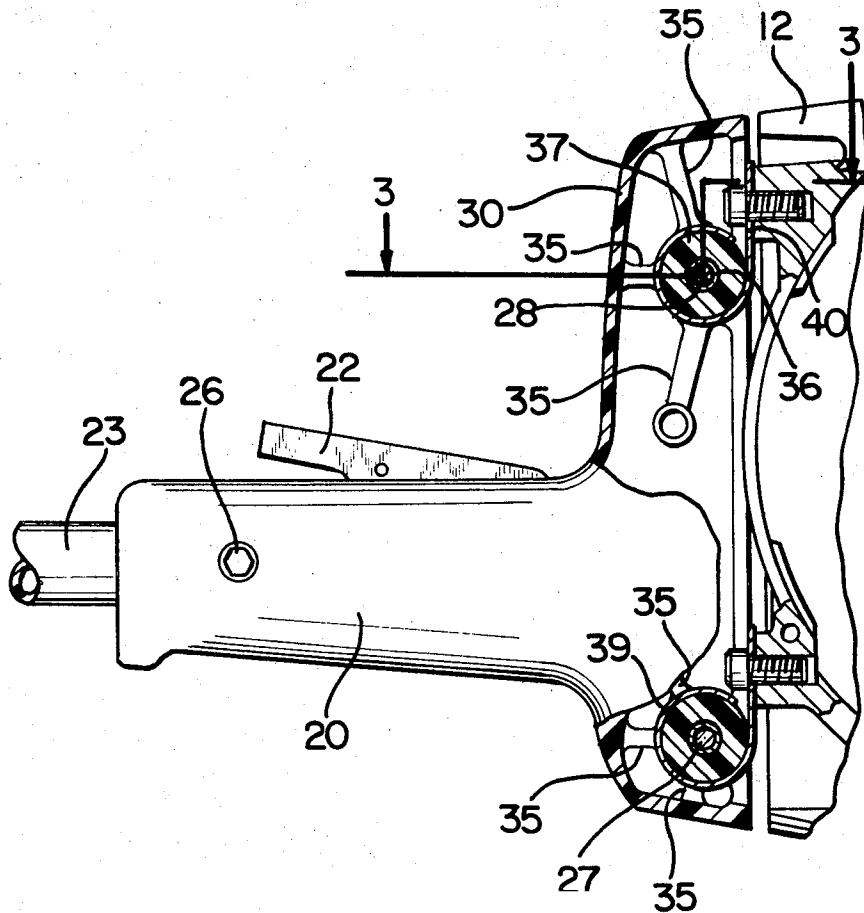
An electric paving breaker is described which includes an electric motor, a crank and piston driven by the motor and a ram which delivers energy to a bit to produce a hammering output. A pair of handles are mounted on an axis perpendicular to the axial direction of the hammering force. A shock-absorbing mounting for the handles is described.

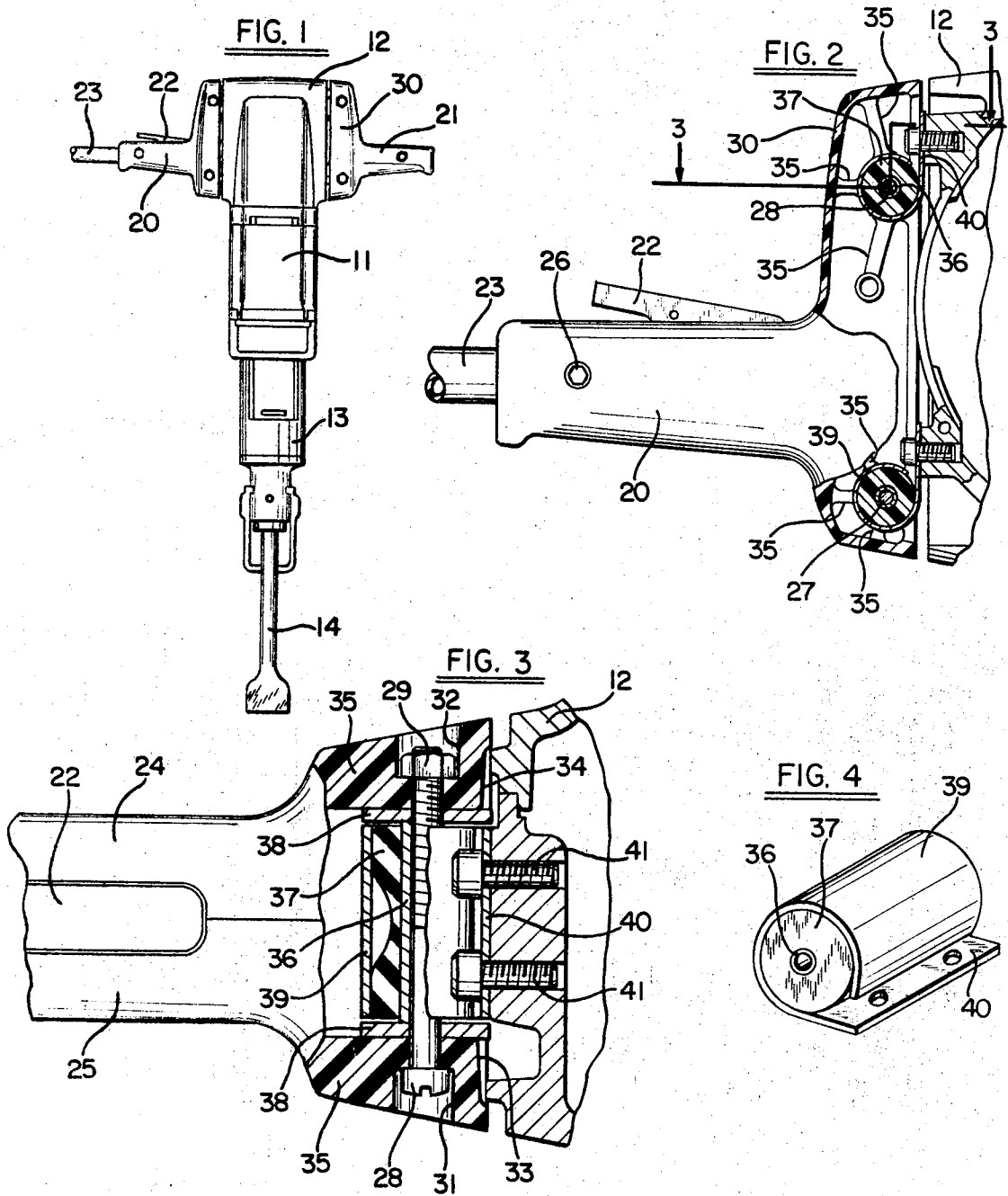
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2 Claims, 4 Drawing Figures





HANDLE MOUNTING CONSTRUCTION FOR ELECTRIC PAVING BREAKER

The present invention is directed to heavy-duty power tools of the type used as paving breakers and for other demolition work, and is specifically directed to an improved shock-absorbing mounting for the handles of such tools.

In the use of portable paving breakers and other portable demolition-type tools, the operator controls the tool by means of a pair of laterally extending handles affixed to the housing of the tool mechanism. As the hammering action occurs, along a direction perpendicular to the axis of the handles, the tool is subjected to a vibrating motion in reaction to the hammering forces delivered to the tool bit. This motion normally subjects the operator to a substantial vibrational force. It is a purpose of this invention to provide a shock-absorbing mounting which will reduce this vibration.

During the use of the tool, the operator frequently rotates the bit by twisting the handles in a horizontal plane. Accordingly, a rigid connection in the plane of the handles is required. However, these tools are often dropped on pavement or other hard surfaces; some flexibility is thus desirable in the handle connection, including the plane of the handles, so that they do not break under impact. It is a further purpose of this invention to provide a handle mount which combines these features.

Another desirable feature of such a tool, particularly an electric hammer, is the provision of nonmetallic handles. This reduces the hazard of electric shock in case of internal failure; also, in extreme heat or cold, nonmetallic handles are more comfortable for the operator. However, given the rough usage, including the above-mentioned vibrational and impact forces to which the tool is subjected, it is necessary to provide nonmetallic handles with a shock-absorbing mounting arrangement to prevent premature failure. Accordingly, it is another purpose of this invention to provide an improved shock-absorbing handle mount which is suitable for use with nonmetallic handles.

It is accordingly an object of the present invention to provide a new and improved shock-absorbing handle mount for handles of portable power tools.

It is a further object of this invention to provide an improved electric paving breaker having laterally extending handles and shock-absorber mounts for the handles.

Another object of this invention is the provision of an improved shock-absorbing handle mount which permits movement in a first plane but resists movement in a second, perpendicular plane.

Further objects and advantages of this invention will become apparent as the description and illustration thereof proceed.

Briefly, in accord with one embodiment of this invention, an electrically powered paving breaker is provided of the type designed for use in a generally vertical or upright position. A pair of handles extend laterally from the tool near the top of the housing to provide for operator control of the tool. The handles are preferably of a nonmetallic material such as fiberglass.

In accord with a specific aspect of this invention, the handles are each provided with a plurality of horizontally extending bolts which extend through internally mounted sleeves in a direction perpendicular to the

handles and to the casing. Each of the sleeves is surrounded by a resilient cushion such as a molded rubber cylinder. A metallic strap encircles the rubber cylinder and an extension of the strap is bolted to the housing of the paving breaker. This construction permits flexing of the handles in a vertical plane but resists movement of the handles in a horizontal plane.

In the drawing

FIG. 1 is an elevational view of an electric paving breaker constructed in accord with the present invention;

FIG. 2 is a detailed view, partially broken away, which illustrates the mounting arrangement of the handles of the tool of FIG. 1;

FIG. 3 is a section view taken along the lines 3—3 of FIG. 2; and

FIG. 4 is a perspective view of the coupling member of FIG. 3.

FIG. 1 illustrates generally an electric paving breaker in accord with the present invention. The tool, which is indicated generally at 10, includes a motor housing 11 and a transmission housing 12. A motor, not shown, drives the transmission which, in turn, reciprocates a piston in a barrel 13. A hammer cooperates with the piston to produce hammer blows on an output member such as a bit 14. The internal mechanism of this particular tool is shown in detail in my co-pending application, Ser. No. 342,865, filed Mar. 19, 1973, the specification of which is incorporated herein by reference.

As shown in FIG. 1, a pair of handles 20, 21 extend laterally from the sides of the transmission housing 12. In normal use, the unit is positioned vertically as shown and the handles extend horizontally. One of the handles 20, includes an operating lever 22 for an on-off switch which controls the application of electric power to the motor. The power is applied through a conventional cable, shown in part at 23. In operation, the bit 14 is applied to a surface such as concrete and operation of the unit causes a vertical hammering action on the bit. The handles 20 and 21 are thus subjected to vertical vibration; in addition, the operator frequently levers or rotates the unit by means of the handles. The purpose of the present invention is to provide a handle mounting system which will substantially absorb the vertical vibrations while providing sufficient rigidity in the horizontal plane.

FIGS. 2 and 3 illustrate the mounting of the handle 20 to the transmission housing 12 which accomplishes these functions. Specifically, the handle 20, which is preferably of a nonmetallic material such as fiberglass, comprises a pair of cooperating clam shell halves 24 and 25 which fit together to provide a smooth gripping surface. The operating lever 22 for an on-off switch is appropriately mounted between the clam shell halves.

The handle halves are held together by a plurality of bolts 26, 27 and 28, with cooperating nuts, one of which is shown at 30 in FIG. 3. The bolts 27 and 28 are mounted within an enlarged, mounting portion 30 of the handle which is shaped to conform to the shape of the transmission housing 12. This permits the mounting points for the handles to be spread a greater distance and thus provide increased resistance to potentially damaging torques.

The bolt heads and nuts can be seen in FIG. 3 to be retained within counterbores 31 and 32 within the enlarged portion 30 of the fiberglass handle. Pedestals 33

and 34 are provided internally; these may be strengthened by the provision of suitable ribs 35. The bolts 27 and 28 extend through and retain the handle halves tightly against rigid steel sleeves 36 which serve as mounting members for the handles. These sleeves extend in a direction which is perpendicular both to the vertically extending major axis of the tool housing and to the horizontal axis of the housing. Washers 38 may be provided as a wear surface to protect the interior of the fiberglass handles at each end of the sleeves. A resilient rubber sleeve 37 is molded over each of the steel sleeves and, as shown in FIG. 4, a spring steel shock strap 39 is mounted on the rubber. The strap 39 includes a circular portion which engages with the rubber cushion and a flat tangential extension 40 which is arranged to rest against the exterior of the transmission housing 12. A plurality of bolts 41 are provided to retain the extension 40 to the transmission housing.

The handle mounting arrangement as thus described accomplishes several objectives. First, the vibrational movement of the transmission housing 12 is at least partially absorbed by the combination of the spring steel shock strap 39 and the resilient rubber cushion 37, thus decreasing the vibrational movement experienced by the operator. Furthermore, the extension of the sleeves in a direction perpendicular to both the handles and the housing provides maximum resilience about the axis of maximum impact torque if the tool is dropped. Secondly, the handle coupling illustrated is relatively rigid in the plane of the handles due to the position of the bolts 27, 28 and 41, thus permitting the operator to twist and lever the tool as required. At the same time, the compressibility of the rubber cushion provides some degree of flexibility in all directions so that a high impact force which might result from the tool being dropped in such a way as to produce a torque other than about the axis of the sleeves 36 can be absorbed. Finally, it is noted that the mounting system described is of particular merit in that it enables the use of nonmetallic handles such as fiberglass. However, the system might also be used with metallic handles since the shock-absorbing characteristics of the mount would remain the same and would reduce operator fatigue and handle breakage in the same way.

For convenience, a specific embodiment of this invention has been illustrated and described in the foregoing specification. However, it will be clear to those skilled in the art that many changes and modifications can be made therein without departing from the essential teaching of this invention. Accordingly, it is intended that the appended claims cover all such changes and modifications as may fall within the true spirit and scope of this invention.

I claim:

1. A portable, power-driven paving breaker arranged to be held in a substantially upright position during use

by means of gripping surfaces extending outwardly from the breaker comprising:

- a driving mechanism for producing a hammering output;
- a casing enclosing said driving mechanism, said casing having an extended major axis;
- a pair of handles extending from said casing along the line perpendicular to said major axis of said casing; said handles each including a grip portion shaped to be engaged by an operator's hand and a mounting portion adjacent said casing;
- a mounting member disposed within each of said mounting portions, each of said mounting members extending in a direction perpendicular to said major axis and to said handles;
- resilient means extending along and fixed to said mounting members; and
- means attaching said resilient means to said casing, said mounting members, said resilient means and said attaching means functioning to permit limited movement of said casing relative to said handles in the direction of said major axis of said casing while preventing relative motion in other directions.

2. A portable, power-driven paving breaker arranged to be held in a substantially upright position during use by means of gripping surfaces extending outwardly from the breaker comprising:

- a driving mechanism for producing a hammering output;
- a casing enclosing said driving mechanism, said casing having an extended major axis;
- a pair of handles extending from said casing along a line perpendicular to said major axis of said casing; said handles each including a grip portion shaped to be engaged by an operator's hand and a mounting portion extending parallel to said major axis of said casing;
- at least a pair of mounting members disposed within each of said mounting portions, each of said mounting members extending in a direction perpendicular to said major axis and to said handles, each of said mounting portions including one of said mounting members disposed above the line of said handles and one of said mounting members disposed below said line of said handles;
- resilient means extending along and fixed to said mounting members; and
- means attaching said resilient means to said casing whereby said resilient means permits limited movement of said casing relative to said handles in the direction of said major axis of said casing for damping vibration while preventing relative movement in other directions.

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