Abstract: A hammer-action attachment for use with an electric drill comprises a main shaft with an impact member mounted in longitudinal force transmitting relation on the main shaft for rotation therewith. An actuator mechanism is mounted on the main shaft for free rotation and for longitudinal sliding movement between a forwardly displaced position and a rearwardly displaced position. A drill engaging member is securely connected to the actuator mechanism and extends rearwardly to engage an electric drill. The drill engaging member biases the actuator mechanism into force transmitting engagement with the impact member, and precludes rotational movement about the longitudinal axis of the actuator mechanism with respect to the drill. Rotation of the main shaft and impact member causes the actuator mechanism to move in a reciprocating motion between the rearwardly displaced position and the forwardly displaced position, and transmits impact forces forwardly along the longitudinal axis to the main shaft.
HAMMER-ACTION ATTACHMENT FOR USE WITH A CONVENTIONAL ELECTRIC DRILL

FIELD OF THE INVENTION

[0001] The present invention relates to drill attachments, and more particularly to drill attachments that cause a hammering action.

BACKGROUND OF THE INVENTION

[0002] Hammer drills are well known and are typically used, even by home craftsmen, to drill holes in relatively hard substances, such as concrete and the like. Such hammer drills typically have a rotating spindle that drives the drill chuck. A fixed disc having a rearwardly facing toothed surface is secured to the rotations spindle. A movable disc having a forwardly facing toothed surface is selectively engageable with the rearwardly facing toothed surface of the fixed disc so as to provide the hammer drill function. Although the apparatus does work, it presents a serious drawback in that the impact created by the engagement of the two toothed surfaces is directed forwardly through the drill bit and also back through the drill itself, as a reaction force. Accordingly, the bearings of the drill tend to wear excessively, which is highly undesirable. Further, it is well known that there can be significant heat build with prior art hammer drills.

[0003] Such hammer drills, also known as percussion drills, can be found in for example United States Patent 2,942,852, issued June 28, 1960 to Muthman and United States Patent 5,653,294, issued August 5, 1997 to Thurler.

[0004] United States Patent 4,450,919, issued May 29, 1984 to Cousineau discloses a drill attachment for use with a conventional electric drill. This drill attachment provides a hammering and drilling action so that a conventional drill may be used to drill into hard substances. The drill attachment comprises a hammer assembly having a rearward case and a forward chuck assembly. A rotating spindle is mounted within the case and has a reciprocating spindle mounted in the front end thereof. The rotating spindle drives a drill chuck within the chuck assembly via the reciprocating spindle. A rotating clutch plate mounted on the reciprocating spindle rotates with the reciprocating spindle. Teeth on the rotating clutch plate engage cooperating teeth on
the stationary clutch that is securely mounted on the case. A removable handle connected to the case permits
the case, and therefore the stationary clutch, to be selectively moved forwardly such that the teeth of the
stationary clutch engage the teeth of the rotating clutch plate, to thereby impart the hammering function to a
drill bit retained within the bit chuck. As is well known, the friction generated by the two sets of co-operating
teeth frictionally engaging each other, is inefficient in terms of energy transfer and causes unnecessary heat
buildup.

[0005] It is a further object of the present invention to provide a hammer drill bit chuck attachment.

[0006] It is yet a further object of the present invention to provide a hammer drill bit chuck
attachment that is inexpensive to manufacture.

[0007] It is yet a further object of the present invention to provide a hammer drill bit chuck
attachment that is robust.

[0008] It is yet a further object of the present invention to provide a hammer drill bit chuck
attachment wherein heat build up is minimized.

[0009] It is yet a further object of the present invention to provide a hammer drill bit chuck
attachment wherein an electric drill used in conjunction with the hammer drill bit chuck attachment can be
operated at lower rotational speeds.

[0010] It is yet a further object of the present invention to provide a hammer drill bit chuck
attachment that is operable without manual actuation in an operatively engaged position.

[0011] It is yet a further object of the present invention to provide a hammer drill bit chuck
attachment wherein more power is available to be transferred to a drill bit from an electric drill used in
conjunction with the hammer drill bit chuck attachment.

SUMMARY OF THE INVENTION
In accordance with one aspect of the present invention there is disclosed a novel hammer-action attachment for use with a conventional electric drill. The hammer-action attachment comprises a main shaft having a forward drill chuck end portion and a rearward shank portion, and defines a longitudinal axis. An impact member is securely mounted in longitudinal force transmitting relation on the main shaft for rotation therewith about the longitudinal axis. An actuator mechanism is mounted on the main shaft for free rotation of the main shaft with respect to the actuator mechanism and for longitudinal sliding movement of the actuator mechanism along the main shaft between a forwardly displaced position and a rearwardly displaced position. A drill engaging member is securely connected to the actuator mechanism and extends rearwardly from the actuator mechanism for engagement with the electric drill. The drill engaging member biases the actuator mechanism into force transmitting engagement with the impact member, and precludes rotational movement about the longitudinal axis of the actuator mechanism with respect to the electric drill. Rotation of the main shaft and impact member about the longitudinal axis when the actuator mechanism is biased into force transmitting engagement with the impact member, causes the actuator mechanism to move in a reciprocating motion between the forwardly displaced position and the rearwardly displaced position, and transmits impact forces forwardly along the longitudinal axis to the main shaft.

Other advantages, features and characteristics of the present invention, as well as methods of operation and functions of the related elements of the structure, and the combination of parts and economies of manufacture, will become more apparent upon consideration of the following detailed description and the appended claims with reference to the accompanying drawings, the latter of which is briefly described herein below.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features which are believed to be characteristic of the hammer-action attachment for use with a conventional electric drill according to the present invention, as to its structure, organization, use and method of operation, together with further objectives and advantages thereof, will be better understood from the following drawings in which a presently preferred embodiment of the invention will now be illustrated by way of example. It is expressly understood, however, that the drawings are for the purpose of illustration and description only, and are not intended as a definition of the limits of the invention. In the accompanying drawings:
Figure 1 is a perspective view of the first preferred embodiment of the hammer-action attachment for use with a conventional electric drill according to the present invention;

Figure 2 is a top plan view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 3 is a side elevational view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 4 is a front end view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 5 is a back end view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 6 is a partly exploded perspective view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 7 is a sectional side elevational view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, taken along section line 7-7 of Figure 4;

Figure 8 is a sectional top plan view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, taken along section line 8-8 of Figure 4;

Figure 9 is a partly exploded perspective view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, with the plastic overmold removed for the sake of clarity;

Figure 10 is a side elevational of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, with the plastic overmold removed for the sake of clarity;
Figure 11 is a perspective view of the plastic overmold used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 12 is a side elevational view of the plastic overmold used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 13 is a sectional side elevational view of the plastic overmold used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, taken along section line 13-13 of Figure 11;

Figure 14 is a perspective view of the locking collar used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 15 is a perspective view of the drill engaging member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 16 is a side elevational view of the drill engaging member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 17 is a sectional side elevational view of the drill engaging member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, taken along section line 17-17 of Figure 15;

Figure 18 is a sectional top plan view of the drill engaging member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 19 is a perspective view of the impact member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 20 is a perspective view of the drill engaging member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;
Figure 21 is a back end elevational view of the drill engaging member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 22 is a sectional side elevational view of the drill engaging member used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, taken along section line 22-22 of Figure 21;

Figure 23 is a perspective view of the substantially cylindrical core of the actuator mechanism used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 24 is a side elevational view of the substantially cylindrical core of the actuator mechanism used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 25 is a perspective view of the contact ring of the actuator mechanism used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 26 is a perspective view of the main shaft of the actuator mechanism used in the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1;

Figure 27 is a side elevational view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, with the actuator mechanism in an forwardly displaced position;

Figure 28 is a side elevational view of the first preferred embodiment hammer-action attachment for use with a conventional electric drill of Figure 1, with the actuator mechanism in a rearwardly displaced position;

Figure 29 is a perspective view of the second preferred embodiment of the hammer-action attachment for use with a conventional electric drill according to the present invention;
[00044] **Figure 30** is a sectional top plan view of the second preferred embodiment of the hammer-action attachment for use with a conventional electric drill of Figure 29, taken along section line 30-30 of Figure 29;

[00045] **Figure 31** is a sectional side elevational view of the second preferred embodiment of the hammer-action attachment for use with a conventional electric drill of Figure 29, taken along section line 31-31 of Figure 29;

[00046] **Figure 32** is a front end view of the second preferred embodiment of the hammer-action attachment for use with a conventional electric drill of Figure 29;

[00047] **Figure 33** is a perspective view from the back of the handle member used in the second preferred embodiment of the hammer-action attachment for use with a conventional electric drill of Figure 29;

[00048] **Figure 34** is a sectional top plan view of the handle member used in the second preferred embodiment of the hammer-action attachment for use with a conventional electric drill according to the present invention, taken along section line 34-34 of Figure 33; and,

[00049] **Figure 35** is a sectional side elevational view of the handle member used in the second preferred embodiment of the hammer-action attachment for use with a conventional electric drill of Figure 29, taken along section line 35-35 of Figure 33.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

[00050] Referring to Figures 1 through 35 of the drawings, it will be noted that Figures 1 through 28 illustrate a first preferred embodiment of the hammer-action attachment for use with a conventional electric drill of the present invention, and Figures 29 through 35 illustrate a second preferred embodiment of the hammer-action attachment for use with a conventional electric drill of the present invention.
Reference will now be made to Figures 1 through 28, which show a preferred embodiment of the hammer-action attachment for use with a conventional electric drill of the present invention, as indicated by general reference numeral 20, for use with a conventional electric drill 28 (shown in Figures 27 and 28).

The hammer-action attachment for use with a conventional electric drill 20 comprises a main shaft 30 having a forward drill chuck end portion 33 and a rearward shank portion 34 that is preferably hexagonal in cross-section. The main shaft 30 defines a longitudinal axis "L" about which the main shaft 30 rotates.

A conventional drill bit chuck 35 is mountable on the forward drill chuck end portion 33 of the main shaft 30 for rotation therewith, and comprises three movable jaw members 36 that receive and retain a conventional drill bit 29 therein. The drill bit chuck 35 has a threaded bore hole 39a that receives the co-operating threaded forward drill chuck end portion 33 in secure engagement. Fundamentally, the hammer drill bit chuck attachment 20 comprises a main shaft 30, an impact member 40, an actuator mechanism 50, and a drill engaging member 70, as will be described in greater detail below.

The impact member 40 is securely mounted in fixed relation on the main shaft 30, so as to be in longitudinal force transmitting relation, for rotation therewith about the longitudinal axis "L". The impact member 40 has a rearwardly facing impact surface 42 that in the first preferred embodiment as illustrate comprises a plurality of teeth 44. Other types and shapes of impact surfaces have also been found to be suitable.

The actuator mechanism 50 is mounted on the main shaft 30 for free rotation of the main shaft 30 with respect to the actuator mechanism 50 and for longitudinal sliding movement of actuator mechanism 50 along the main shaft 30 between a forwardly displaced position, as can be best seen in Figure 27, and a rearwardly displaced position, as can be best seen in Figure 28. A roller bearing 57 disposed at the rear of the substantially cylindrical core 53 ensures a close but non-binding fit on the rearward shank portion 34 of the main shaft 30. The actuator mechanism 50 engages the impact surface 42 of the impact member 40 when the actuator mechanism 50 is in its forwardly displaced position.

The actuator mechanism is retained on the rearward shank portion 34 of the main shaft 30 by means of a "C"-clip 58 securely engaged in an annular slot 36 in the rearward shank portion 34.
The actuator mechanism 50 has at least one roller member 52 freely rotatably mounted thereon by means of suitable threaded fasteners 52a, and in the first preferred embodiment as illustrated, the at least one roller member 52 comprises three roller members 52, each freely rotatably mounted on the actuator mechanism 50. Preferably the three roller members 52 are substantially equally radially spaced around the actuator mechanism 50, and around the longitudinal axis "L". When the actuator mechanism 50 is biased in to forced transmitting engagement with the impact member 40, by the drill engaging member 70, the three roller members 52 are in force transmitting engagement with the impact surface 42 of the impact member 40, as the main shaft 30 rotates with respect to the actuator mechanism 52.

The actuator mechanism 50 comprises a substantially cylindrical main body member 54 that preferably comprises a plastic overmold 51 molded over a substantially cylindrical core 53. The substantially cylindrical main body member 54, and specifically the plastic overmold 51, has a male-threaded exterior surface 55.

The plastic overmold 51 also has a forwardly extending annular portion 51a. The three roller members 52 of the actuator mechanism 50 are covered by the forwardly extending annular portion 51. As can be seen in the figures, when the actuator mechanism 50 in its forwardly displaced position, the roller members 52 engage the impact surface 42 of the impact member 40, as the main shaft rotates with respect to the actuator mechanism 50.

The hammer-action attachment 20 further comprises a drive collar 60 having a throughpassage 62. The drive collar 60 is connected in freely slidable relation to the actuator member 50, to permit longitudinal movement of the actuator member 50 on the rearward shank portion 34 of the main shaft 30. The drive collar 60 extends rearwardly from the actuator member 50 to receive the rearward shank portion of 34 of the main shaft 30 in the throughpassage 62. The drive collar 60 is hexagonal in cross section so that it can be gripped more securely in the chuck 23 of the electric drill 22, which is especially important in an electric drill having a keyless chuck. Further, the throughpassage 62 is hexagonal in cross-section so that is does not rotate around the rearward shank portion 34 of the main shaft, and thereby can transmit rotational force from the electric drill 22 to the main shaft 30.
The first preferred embodiment hammer-action attachment 20 also comprises a drill engaging member 70 securely connected to the actuator mechanism 50. The drill engaging member 70 extends rearwardly from the actuator mechanism 50 for engagement with the electric drill 22. The drill engaging member 70 biases the actuator mechanism 50 in to force transmitting engagement with the impact surface 42 of the impact member 40, and precludes rotational movement about the longitudinal axis "L" of the actuator mechanism 50 with respect to the electric drill 22.

The drill engaging member 70 comprises a front collar 72, a rear collar 74, a first arm member 71 and a second arm member 72. The first and second arm member 71, 72 extend between the front collar 73 and the rear collar 74. The first and second arm member 71, 72 are longitudinally flexible, so as to provide for the biasing action of the drill engaging member 70, and are preferably made from ABS plastic (acrylonitrile butadiene styrene).

The front collar 73 of the drill engaging member 70 has a cooperating female threaded interior surface 77 that threadibly engages the male threaded exterior surface 55 of the substantially cylindrical main body member 54, thereby permitting the front collar 73 of the drill engaging member 70 to be longitudinally adjustable on the substantially cylindrical main body member 54 of the actuator mechanism 50. In this manner, the overall length of the first preferred embodiment hammer-action attachment 20 is adjustable, to accommodate various sizes and shapes of conventional electric drills.

The hammer-action attachment 20 further comprises a locking collar 78 having a co-operating female-threaded interior surface 79 that threadibly engages the male-threaded exterior surface 55 of the substantially cylindrical main body member 54 of the actuator mechanism 50. The locking collar 78 is rotated to abut against the front collar 73 of the drill engaging member 70, to thereby lock the drill engaging member 70 in place on the substantially cylindrical main body member 54 of the actuator mechanism 50.

The rear collar 74 of the drill engaging member 70 has a high friction surface 75 at its back and, to preclude slippage with respect to the electric drill 22. The high friction surface 75 is part of a high friction ring member 76 that is preferably made from poly vinyl chloride.

Rotation of the main shaft 30 and the impact member 40 about the longitudinal axis "L", when the actuator mechanism is biased in to force transmitting engagement with the impact member 40 by the drill engaging member 70, causes the actuator mechanism 50 to move in a reciprocating motion between its...
forwardly displaced position and its rearwardly displaced position, and transmits impact forces forwardly along the longitudinal axis "L" to the main shaft 30, thereby providing a hammer-action to the drill bit 29 in the chuck 35.

[00067] Reference will now be made to Figures 29 through 35, which show a second preferred embodiment of the present invention. In the second preferred embodiment, indicated by the general reference numeral 220, the hammer-action attachment 220 comprises a hand grip 270 having an internal threaded passage way 272 that threadably engages the male-threaded exterior surface 55 of the substantially cylindrical main body member 54 of the actuator mechanism. This hand grip 270 permits manual manipulation of the actuator 50 into engagement with the impact member 40, and might be used when it is desirable to select between a hammer drilling action and a conventional drilling action.

[00068] It can readily be seen that the hammer-action attachment for use with a conventional electric drill, according to the present invention, permits a conventional electric drill to function as a hammer drill, when the hammer-action attachment is used with a conventional electric drill. It has been found that using the combination of the hammer-action attachment according to the present invention with a conventional electric drill, holes can be drilled into masonry and the like even faster than with most hammer drills, even those costing several hundred dollars.

[00069] Further, it has been found that with the hammer drill bit chuck attachment 20 of the present invention, there is reduced friction, reduced heat build up, reduced wear and improved drilling performance compared with conventional hammer drills, which have two sets of impacting steel teeth used to perform the hammering function. Heat build up is of particular concern under IEC 60745-1:2001, as adopted by UL, CSA and other national governing bodies regulating safety in hand held power tools and accessories. An electric drill using the present invention experiences very minimal loss of speed due to the reduced friction between the roller members 52 and the impact member 40. Accordingly, the rotational energy is directed to the actual longitudinal vibration, and not to losses due to friction and heat. This is important for being able to achieve the maximum possible speed with a drill, and also for reduced wear of the hammer drill bit chuck attachment of the present invention and an electric drill being used. In contrast, an electric hammer drill actually operates at a significantly reduced rotational speed compared to the maximum rotational speed of the drill, due to the friction of the steel teeth.
As can be understood from the above description and from the accompanying drawings, the present invention provides a hammer-action attachment for use with a conventional electric drill that is inexpensive to manufacture, that is robust, wherein the frequency and amplitude of impacts can be adjusted or selected, wherein heat build up is minimized, wherein an electric drill used in conjunction with the hammer drill bit chuck attachment can be operated at lower rotational speeds, and wherein more power is available to be transferred to a drill bit from an electric drill used in conjunction with the hammer drill bit chuck attachment, all of which features are unknown in the prior art.

Other variations of the above principles will be apparent to those who are knowledgeable in the field of the invention, and such variations are considered to be within the scope of the present invention. Further, other modifications and alterations may be used in the design and manufacture of the hammer drill bit and hammer drill bit chuck attachment of the present invention without departing from the spirit and scope of the accompanying claims.
I CLAIM:

1. A hammer-action attachment for use with a conventional electric drill, said hammer-action attachment comprising:

   a main shaft having a forward drill chuck end portion and a rearward shank portion, and defining a longitudinal axis;

   an impact member securely mounted in longitudinal force transmitting relation on said main shaft for rotation therewith about said longitudinal axis;

   an actuator mechanism mounted on said main shaft for free rotation of said main shaft with respect to said actuator mechanism and for longitudinal sliding movement of said actuator mechanism along said main shaft between a forwardly displaced position and a rearwardly displaced position; and,

   a drill engaging member securely connected to said actuator mechanism and extending rearwardly from said actuator mechanism for engagement with said electric drill, wherein said drill engaging member biases said actuator mechanism into force transmitting engagement with said impact member, and precludes rotational movement about said longitudinal axis of said actuator mechanism with respect to said electric drill;

   wherein rotation of said main shaft and impact member about said longitudinal axis when said actuator mechanism is biased into force transmitting engagement with said impact member, causes said actuator mechanism to move in a reciprocating motion between said forwardly displaced position and said rearwardly displaced position, and transmits impact forces forwardly along said longitudinal axis to said main shaft.

2. The hammer-action attachment of claim 1, wherein said actuator mechanism has at least one roller member freely rotatably mounted thereon, and wherein when said actuator mechanism is biased into said force transmitting engagement with said impact member, said at least one roller member is in said force transmitting engagement with said impact member as said main shaft rotates with respect to said actuator mechanism.
3. The hammer-action attachment of claim 1, wherein said impact member is mounted in fixed relation on said main shaft for rotation therewith.

4. The hammer-action attachment of claim 3, wherein said impact member has an impact surface, and said actuator mechanism engages said impact surface when said actuator mechanism is in said forwardly displaced position.

5. The hammer-action attachment of claim 4, wherein said impact surface is rearwardly facing.

6. The hammer-action attachment of claim 5, wherein said impact surface comprises a plurality of teeth.

7. The hammer-action attachment of claim 6, wherein said actuator mechanism has at least one roller member freely rotatably mounted thereon, and wherein when said actuator mechanism is biased into said force transmitting engagement with said impact member, said at least one roller member is in said force transmitting engagement with said impact surface as said main shaft rotates with respect to said actuator mechanism.

8. The hammer-action attachment of claim 7, wherein said at least one roller member comprises three roller members, each freely rotatably mounted on said actuator mechanism.

9. The hammer-action attachment of claim 8, wherein said three roller members are substantially equally radially spaced around said actuator mechanism.

10. The hammer-action attachment of claim 7, wherein, when said actuator mechanism is in rearwardly displaced position, said at least one roller member is removed from said engagement with said impact surface.

11. The hammer-action attachment of claim 1, wherein said rearward shank portion is hexagonal in cross-section.
12. The hammer-action attachment of claim 11, further comprising a drive collar having a throughpassage, wherein said drive collar is connected in freely slidable relation to said actuator member and extends rearwardly therefrom to receive said rearward shank portion of said main shaft in said throughpassage.

13. The hammer-action attachment of claim 12, wherein said drive collar is hexagonal in cross-section and said throughpassage is hexagonal in cross-section.

14. The hammer-action attachment of claim 1, wherein said actuator mechanism is retained on said rearward shank portion of said main shaft by means of a "C"-clip securely engaged in an annular slot in said rearward shank portion.

15. The hammer-action attachment of claim 1, wherein said drill engaging member comprises a front collar, a rear collar, and first and second arm members extending between said front collar and said rear collar.

16. The hammer-action attachment of claim 15, wherein said rear collar has a high-friction surface at its back end.

17. The hammer-action attachment of claim 16, wherein said high-friction surface is part of a high-friction ring member.

18. The hammer-action attachment of claim 17, wherein said high-friction ring member is made from polyvinyl chloride.

19. The hammer-action attachment of claim 15, wherein said actuator mechanism comprises a substantially cylindrical main body member having a male-threaded exterior surface, and said front collar of said drill engaging member has a co-operating female-threaded interior surface that threadibly engages said male-threaded exterior surface, thereby permitting said front collar to be longitudinally adjustable on said substantially cylindrical main body member of said actuator mechanism.
20. The hammer-action attachment of claim 19, further comprising a locking collar having a co-operating female-threaded interior surface that threadibly engages said male-threaded exterior surface of said substantially cylindrical main body member of said actuator mechanism.

21. The hammer-action attachment of claim 15, wherein said first and second arm members are longitudinally flexible.

22. The hammer-action attachment of claim 15, wherein said substantially cylindrical main body member of said actuator mechanism comprises a plastic overmold molded over a substantially cylindrical core.

23. The hammer-action attachment of claim 22, wherein said plastic overmold has a forwardly extending annular portion, and said actuator mechanism has at least one roller member freely rotatably mounted thereon so as to be covered by said forwardly extending annular portion, and wherein when said actuator mechanism is in said forwardly displaced position said at least one roller member engages said impact surface as said main shaft rotates with respect to said actuator mechanism.

24. The hammer-action attachment of claim 15, wherein said drill engaging member is made substantially from acrylonitrile butadiene styrene plastic.