This invention relates to tool attachments and tools for powered hammers and the like; more particularly this invention relates to novel and improved means for interchangeably mounting different tools on powered hammers depending upon the work to be performed, and additionally to impact tools that are adaptable for use in association with powered hammers for the specific purpose of cutting and breaking concrete, asphalt, rock and other similar materials.

The advantages and features of the tool attachment and tool of the present invention can best be appreciated from a consideration of their use in association with powered hammers of the type used for performing a number of different tasks, such as, for breaking and cutting concrete, asphalt and similar materials, as well as for tamping earth fills, digging trenches and other earth working operations. Necessarily, different tools are attached to the lower end of the hammer mechanism according to the character of the work to be performed, and the hammer mechanism and attached tool are reciprocated or otherwise operated to deliver a series of impacts or blows under considerable force to the surface being worked. Accordingly, it will be appreciated that it is highly desirable to afford some rapid, dependable means for rapidly but reassuringly attaching each different tool in place, and specifically in such a way that the tool will not have a tendency to loosen or in any way shift in delivering a succession of blows to the work surface.

In cutting and breaking relatively hard surfaces such as bedrock, concrete or hard asphalt areas, it is also desirable to utilize a tool which is capable of clean, rapid straight-line cutting with a minimum of fracturing of the material. In this relation, the cutting tool is so constructed and arranged in association with the tool holder that the assembly can be mounted on hammers of different types, and also the tool can be reversibly mounted to compensate for the effects of localized wear on the cutting face.

Accordingly, it is a principal and foremost object of the present invention to provide a hammer tool attachment for powered hammers that is characterized by being conformable for use with different types of hammers and of being self-adjusting for clamping and accommodating different types of tools in carrying out cutting, breaking, tamping and similar operations.

It is another object of the present invention to provide for a novel and improved means for the conveniently attaching different tools to a powered hammer mechanism and wherein the tools can be rapidly connected and removed in a safe, efficient manner by one person; and further, wherein each tool in attached relation is rigidly clamped and wedged against loosening or displacement in use.

It is a further object of the present invention to provide for a hammer tool attachment characterized by providing a relatively broad surface area of connection between the hammer head and tool while at the same time being formed of a minimum number of parts and requiring a minimum number of operations in connecting and removing each tool; and furthermore, wherein the clamping arrangement employed as part of the tool attachment will permit reversible mounting of each different tool to minimize the effects of localized wear on the tool.
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16 adjustably secured in spaced parallel relation to the underside of the adapter plate 15. It is emphasized here that the adapter plate serves only as a means of connecting the tool attachment for use with hammer heads in different sizes and constructions and accordingly may be eliminated where the underside of the hammer head is specifically designed for direct connection of the clamping members and tool attaching head thereon. Thus, the adapter plate 15 is provided with outer borders 18 aligned with threaded apertures 19 in the bottom of the hammer head for threaded insertion of cap screws 20. In connected relation, the adapter plate provides a relatively flat downwardly facing seating surface 22 with spaced rearwardly disposed positioning plugs 24 projecting downwardly therefrom; threaded bosses 25 are spaced inwardly of each of the apertures 18 and extend upwardly through the major thickness of the plate for connection of the clamps 16 in a manner now to be described.

Broadly, the clamping members 16 are formed to rigidly but releasably secure different tools against the seat formed either at the bottom of the hammer head or the underside of the adapter plate, as the case may be, and in such a way that the clamps will form longitudinal guideways for positioning of the tool in loosely supported relation, after which the clamps are tightened to rigidly hold the tool in place both against displacement. To this end, and as best seen from FIGURES 4 to 6, each clamp is defined by a relatively thick elongated body portion 30 having a top angularly relieved surface portion 31 and a shoulder 32 projecting laterally and inwardly from the lower part of the body, the shoulder 32 forming a guiding surface 22 for insertion of one side of the tool 12. Preferably, each should have top wedging surface portions 40 which incline downwardly and inwardly toward one another from opposite ends and terminate in a shallow recessed area 41. Opposite ends of the body include bosses 34 extending vertically therethrough and a shallow spherical recessed area 35 is formed at the entrance to each bore. Spaced intermittently between the bore 34 is an upwardly directed spring-receiving opening 36 for a compression spring 38 as indicated in FIGURES 1 and 5. To adjustably secure the clamps in such a facing relationship along opposite sides of the adapter plate 15, cap screws 42 are passed upwardly through the bosses 34 and into the threaded apertures 25 in the adapter plate. Each cap screw 42 is provided with a spherical washer 44 to secure a cap 45 of each boss to prevent any lateral shifting of the clamps and afford more uniform distribution of pressure against the screws and clamps when in attached relation. On account of the sloping surfaces 31 it will be noted that the shoulders 32 will be drawn upwardly and somewhat inwardly, upward inward threading of the screws, so as to be self-adjusting according to the thickness of the clamp-engaging portions on the tool.

In order to cooperate with the tool holder to establish rigid clamping engagement between the tool and the hammer head as shown in FIGURES 7 and 8, the tool 12 is of generally T-shaped configuration with an attaching head 59 forming a top relatively flat seating surface 51, a central recessed area 52, and shoulder portions 54 projecting laterally in opposite directions from the upper end of the tool. The shoulders 54 are formed with clamp-engaging undersurfaces 55 complementary to the inclined shoulder surfaces 40 on the clamps so as to be wedgingly engaged by the shoulders 32 when the shoulder portions 54 are inserted in the guideways and the clamps are drawn upwardly by the screws 42. Preferably, the attaching head is further characterized by being square-sided so that opposite sides 56 will similarly define clamp-engaging shoulders dimensioned for insertion in the guideways in the event it is desired to turn the tool 90° from its disposition shown in FIGURE 1. By forming the head 59 in this manner, the hammer operator can preset the clamps to provide the required spacing between the shoulders 32 and seat 22 according to the thickness of the shoulders 54, and the springs 38 assist in this by urging the clamps downwardly against the spherical washers so that the clamps need not be held or positioned when the attaching head is inserted through the guideways. Thus, the operator can by grasping the tool align the shoulders 54 with the guideways and advance the shoulders along the guideways until the face of the attaching head abuts against the positioning lugs 24, whereupon the inclined surfaces 55 are properly aligned with the surfaces 40 on the clamps. By tightening the cap screws the shoulders 32 are urged upwardly and inwardly to clamp the tool head 50 rigidly against the seating surface 22. The central recessed area 52 merely assures even contact between the abutting surface portions on the adapter plate and tool head and prevents possible misalignment between the abutting surfaces due to unevenness or non-uniformities in the center area.

In the cutting tool 12 shown in FIGURES 7 and 8, a blade shank 60 is formed as an integral part of the tool and is particularly adapted for use in cutting or breaking concrete, bedrock, asphalt and other relatively hard, thick surfaces. For this purpose, the blade shank 60 first tapers outwardly from a relatively broad reinforcing portion 62 to the divergent, forming a progressively tapering, an elongated, relatively narrow cutting face 64 which is normal or squared to the blade axis. The cutting face 64 gradually increases in width from the center to opposite ends 65 since in use the major wear will take place at opposite ends of the tool, and accordingly the increased width given to the cutting face will compensate for any tendency of the ends to become somewhat tapered relative to the center and which in penetrating different rock surfaces would otherwise have a tendency to stick and develop fractures in the surfaces away from the point of impact. In order to maintain a uniform cross-sectional area for the cutting face after continued wear and sharpening, the sides 66 are given a concave shape in a plane transverse to the blade axis and, along with opposite end surfaces 65, are downwardly divergent away from the reinforcing portion 62 so as to form sharp cutting edges or corners 68 along the periphery of the cutting face.

Generally, the tool will be positioned as illustrated in FIGURE 1 with the cutting face 64 having its major axis aligned with the direction of advancement of the hammer vehicle, although as hereinbefore mentioned the tool may be and in this work is face transverse to the line of travel. Under repeated blows, if the cutting face begins to wear unevenly the tool may be reversed. In any event the principal wear will take place toward the end of the cutting face, but as previously noted this is compensated for by the widened cutting surface toward the ends together with the divergent sides and ends.

A tamping device 70 is illustrated in FIGURE 9 having a tool attaching head 50 which in every respect is identical to the attaching head 50 shown in FIGURES 7 and 8, and being shown merely to illustrate the adaptation of the tool head for different types of tools. Broadly, in the tamping device illustrated, downwardly divergent walls 72 terminate in a relatively broad tamping head 73 which may be conventionally used in compacting or leveling ground surfaces. Again, the tamping device may be reversed or merely turned 90° since the head is square-sided to form two sets of shoulders 54.

A modified form of cutting tool is illustrated in FIGURES 10 to 12 in which a blade stock 80 is detachably connected to an attaching head 82 by means of wedges 83 and adjustable wedge locking members 84. Again, the attaching head 82 is provided with shoulders 54 and clamp-engaging surfaces 55 identical to those formed on the attaching head 50 shown in FIGURES 6 and 7; and the blade stock 80 assumes the same form as the blade shank 60; however, the upper end 86 of the stock is pro-
portioned to fit into a longitudinal, downwardly directed slot 87 opening outwardly from the head 82. Extending along one side of the slot 87 are wedge-shaped guides slots 88 each for insertion of a wedge 83, shown in FIGURE 12; and a pair of adjustable locking members 84 are shown in the form of a lock nut 90 having a socket head screw 91 extending downwardly therethrough against the top surface of the wedge. The screws 91 are accessible from the top seating surface of the head 82 for downward adjustment in order to force the wedges downwardly and inwardly against the side of the blade element. Thus, the wedges 83 may first be inserted within the slots 88 followed by insertion of the upper end of the blade stock and by downward threading of the locking members 84 against the wedges will hold the blade securely in place. Once the blade is connected to the clamp head 82, the assembled tool can then be clamped in place to the lower end of the hammer by the tool holder assembly.

It will be evident that different tools, such as, tamping devices, asphalt cutters, pavement breakers and the like may be appropriately formed with an attaching head 50, or in some instances a clamp head 82, of the type described so as to make each tool conformable for attachment in cooperation with the tool holder assembly to various different powered hammers. Of course, the clamp head and wedge locking device may be used for detachably supporting different types of tools so that only one clamp head need be furnished and only the blade stock replaced as it becomes worn, or where substitution is required in performing different operations. Moreover, as stated, the tool holder assembly may be defined merely by the spaced clamps and attaching head without the adapter plate where the hammer head is designed for direct connection of the clamps. It is therefore to be understood that various modifications and changes may be made in the construction and arrangement of parts comprising the forms of invention illustrated and described without departing from the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. In a powered hammer and the like having a hammer head provided with a tool-engaging end surface, the combination of a tool comprising an attaching head disposed in abutting relation to the end surface, said attaching head including peripheral clamp-engaging portions thereon; and a tool holder comprising clamping members secured in abutting relation to the end surface of the hammer head so as to engageably engage the peripheral clamp-engaging portions on said attaching head, and adjustable means for allowing said attaching head to urge said clamping members against said clamp-engaging portions whereby to rigidly position said attaching head against the end surface of the hammer head.

2. In a powered hammer according to claim 1, said clamping members each being defined by an elongated body portion having an inwardly directed shoulder projecting laterally along one side thereof to define a wedging surface thereon engageable with a peripheral clamp-engaging portion on said attaching head.

3. In a powered hammer structure having a hammer head provided with a relatively flat tool-engaging end surface, the combination therewith of a tool having an attaching head for disposition in abutting relation against the end surface of the hammer head, said attaching head including clamp-engaging shoulders along opposite sides thereof; and a tool holder including spaced clamping members secured in abutting relation to the end surface and whereby to engageably engage the tool clampings portions defining spaced longitudinal guideways along the end surface for slideable insertion of said clamp-engaging shoulders therein, and adjustable securing means urging said tool clampings portions against said clamp-engaging shoulders to rigidly position said attaching head in abutting relation to the end surface of the impact member.

4. A hammer tool attachment comprising in combination a tool holder having an adapter plate, a pair of clamping means urgeably flat seating surfaces on said plate, a pair of clamping members arranged in spaced parallel relation to one another and in abutting relation to said plate with laterally projecting shoulders on said clamps defining longitudinal guideways facing inwardly toward one another along the seating surface, and a tool including an attaching head having a correspondingly flat end surface for disposition in abutting relation against the seating surface and shoulders projecting laterally from opposite sides thereof being dimensioned for longitudinal insertion within said guideways, the shoulders on said clamping members and said attaching head having complementary inclined interengaging surface portions, and adjustable securing elements between said clamping members and said adapter plate urging said clamping members against said attaching head whereby to rigidly position said attaching head against the connecting end of said adapter plate, whereby to urge said said clamping members against said attaching head so as to hold said head in clamping engagement within the blade-receiving slot.

5. A hammer tool attachment according to claim 4, said adapter plate having stops thereon to align the complementary surface portions on said shoulders upon insertion of said attaching head along said guideways.

6. A hammer tool attachment according to claim 4, said clamping members being defined by a clamped portion of a body having a shoulder projecting laterally along one side thereof, and said adjustable securing elements for each clamping member being defined by screws extending through bores at opposite ends of said body portion for insertion into aligned threaded apertures in said adapter plate, and spherical washers on said screws seated in spherical recesses located at the entrances to the bores on said body portion.

7. A hammer tool attachment according to claim 4, said tool further characterized by including a blade Shank extending outwardly from said attaching head and terminating in an elongated cutting face normal to the blade axis, said cutting face increasing in width toward opposite ends of said blade.

8. A hammer tool attachment according to claim 4, said tool being characterized by further including an elongated, generally rectangular blade Shank detachably connected to said head and extending outwardly therefrom, said blade Shank having downwardly divergent sides and ends terminating in an elongated cutting face square to the Shank axis, the cutting face progressively increasing in width toward the divergent ends of said Shank.

9. A hammer tool attachment according to claim 8, said tool further including a blade-receiving slot opening outwardly from one end of said head with a guide slot tapering outwardly along one side of said blade-receiving slot, a wedge positioned in the guide slot, said blade having a connecting end dimensioned to fit within the open slot with said wedge engaging one side of the connecting end of said blade, and locking means disposed in an opening behind said wedge and being accessible from the end of said connecting end and whereby to force said wedge outwardly against the side of said connecting head so as to hold said head in clamping engagement within the blade-receiving slot.

10. A hammer tool attachment for powered hammers comprising in combination an adapter plate, a pair of clamps each defined by an elongated body portion adjustably secured in abutting relation to said adapter plate and in spaced parallel relation to one another to define inwardly facing lateral slots between said clamps and an end surface of said plate, and a hammer tool having a square head portion with lateral sides dimensioned for insertion through said slots, said clamps and each of the opposed sides having complementary surfaces moveable into wedge engagement upon tightening of said clamps against opposite sides of said head portion.

11. A tool holder for interchangeably mounting tools
in connected relation to the terminal end of a tool-engaging member, each tool having an attaching head including clamp-engaging shoulders projecting laterally from opposite sides thereof and being adapted for disposition in abutting relation to the terminal end of the tool-engaging member, said tool holder comprising a pair of clamping members secured in spaced parallel relation to one another on the terminal end of the tool-engaging member, said clamping members having upper, angularly relieved surface portions inclining downwardly and inwardly toward one another from abutting relation to the terminal end and lower laterally projecting shoulders directed along the terminal end for slidably insertion of the clamp-engaging shoulders of the tool therein, and adjustable securing means threadedly connecting said clamping members to the terminal end whereupon tightening said clamping members to urge the upper angular re-

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