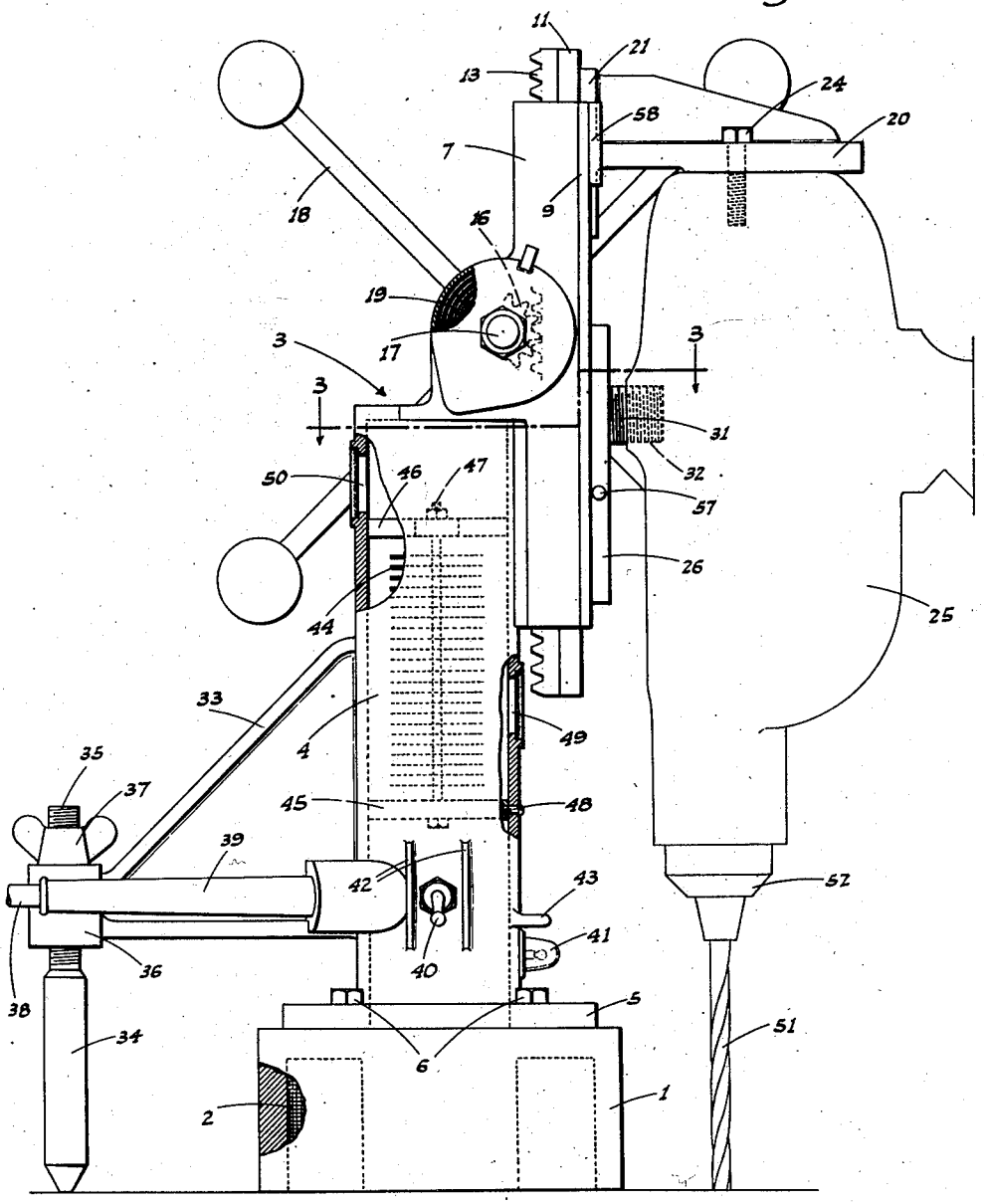
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PORTABLE MAGNETIC DRILL PRESS

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Fig. 1



INVENTOR
Eugene W. Buck

BY Lorentz & Wirth
ATTORNEYS

Jan. 21, 1958 E. W. BUCK 2,820,377

PORTABLE MAGNETIC DRILL PRESS

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Fig. 2

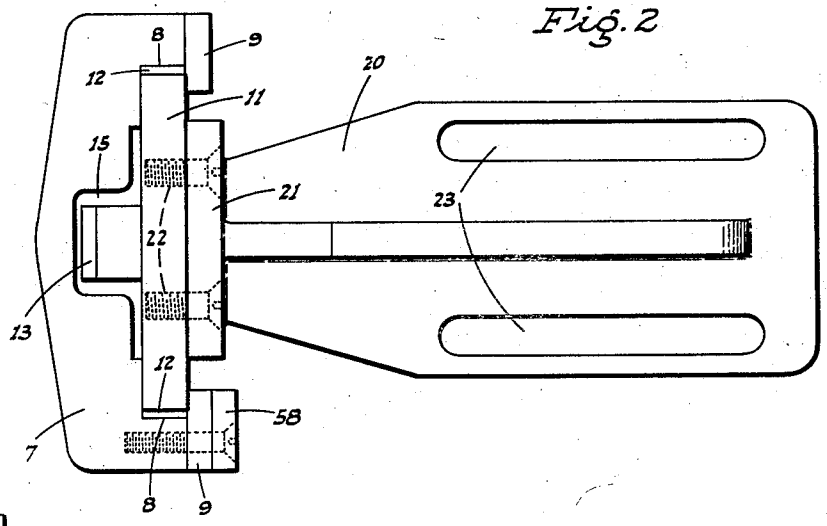


Fig. 4

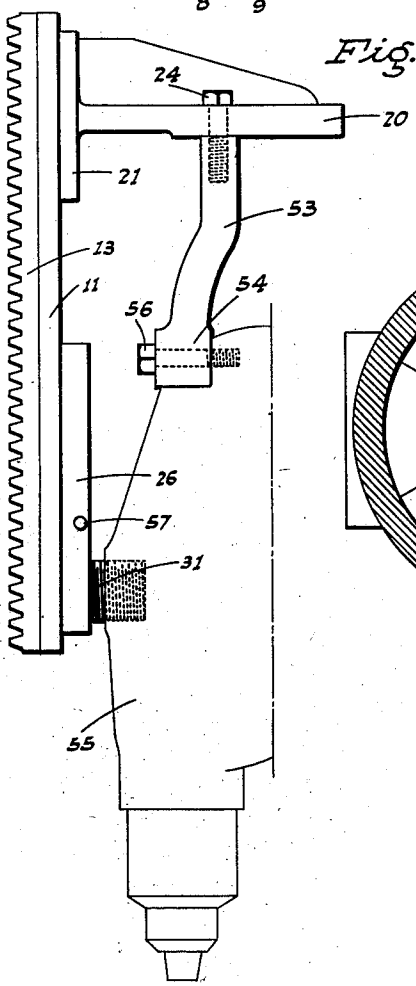
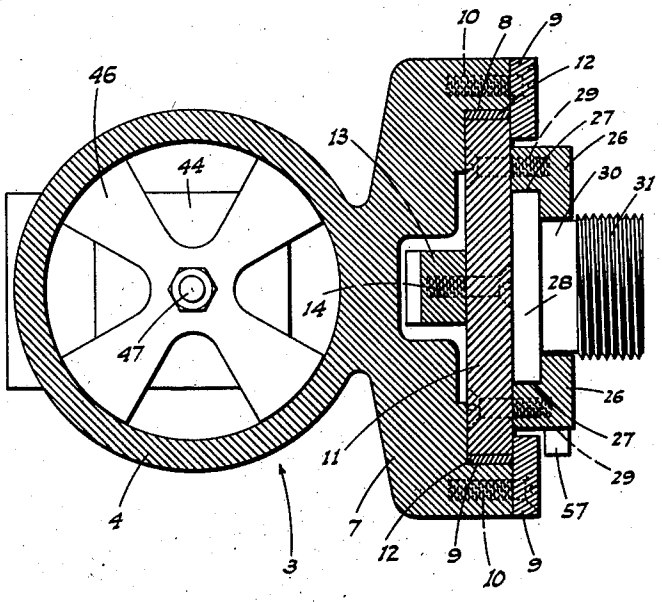


Fig. 3



INVENTOR

Eugene W. Buck

BY Wenta Worth

ATTORNEYS

United States Patent Office

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PORTABLE MAGNETIC DRILL PRESS

Eugene W. Buck, Campbell, Calif., assignor to Buck Mfg. Co., a corporation of California

Application June 1, 1954, Serial No. 433,582

10 Claims. (Cl. 77—7)

This invention is directed to, and it is a major object to provide, an improved portable magnetic drill press of the type which embodies a mount for an initially separate or portable drill, and an electro-magnetic foot attached to said mount, and which foot is adapted to magnetically hold the drill press on a metallic work surface in which a hole is to be drilled; the instant invention representing modifications of the device shown in my United States Patent No. 2,672,770, dated March 23, 1954.

Another important object of this invention is to provide an electro-magnetic drill press, as above, in which the mount includes a novel attachment arm and slide assembly which permits different types and sizes of initially separate portable drills to be secured to the mount in a ready and convenient manner.

Still another object of the instant invention is to provide an electro-magnetic drill press, as in the preceding paragraph, in which the mount is arranged so that when the initially separate or portable drill is secured thereto, said mount and drill are in close coupled relation; i. e., there is a relatively short radial distance between the parallel vertical axes of the drill and said mount; this feature being of advantage in that the extent of drill pressure which would be required to accidently break the magnetic foot from the metallic work surface increases as the radial distance between said axes is reduced.

An additional object of the invention is to provide an electro-magnetic drill press in which the mount for the drill includes an upstanding, tubular or hollow supporting post; the drill being of an electrically energized type, and the circuit for said drill embodying a rectifier; the latter being housed in the post, and there being novel means securing the rectifier in the post without obstructing circuit wire passage or adequate rectifier cooling by ventilation or air flow between certain ports formed in said post.

A separate object of the invention is to secure the electro-magnetic foot to the lower end of the post by means of a base plate of metal having relatively high heat conductivity and a substantial area of flush contact with the electro-magnetic foot, whereby to effectively dissipate the heat from said electro-magnetic foot with resultant increase in the duty thereof.

It is also an object of the invention to provide an electro-magnetic drill press which is designed for ease and economy of manufacture, long and trouble-free service, and ease of use.

A further object of the invention is to provide a practical, reliable, and durable portable magnetic drill press, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation, partly broken away and partly in section, of the electro-magnetic drill press as in use.

Fig. 2 is an enlarged plan view, detached, of the attachment arm and slide assembly.

Fig. 3 is an enlarged fragmentary transverse sectional plan on line 3—3 of Fig. 1.

Fig. 4 is a side elevation of the attachment arm and slide assembly showing its manner of use with the extension bracket.

Referring now more particularly to the drawings, and to the characters of reference thereon, and at present to the embodiments of Figs. 1–3 inclusive, the improved electro-magnetic drill press comprises an electro-magnetic foot 1 which is circular in plan and of substantial depth; such electro-magnetic foot including therein an inserted electro-magnetic coil 2 of ring form.

A mount, indicated generally at 3, upstands from the electro-magnetic foot 1; such mount including a vertical tubular post 4 formed, at its lower end, with a circular base plate 5 which lies in matching face to face engagement with the top of the foot 1, being secured to the latter by cap screws 6.

On one side thereof and adjacent the top the post 4 is fitted with a vertical guideway 7 which extends some distance above the upper end of said post; such vertical guideway being of outwardly opening, channel form and having opposed side grooves 8 formed therein in facing relation to each other. The side grooves 8 are defined in part by flange bars 9 attached to opposite sides of the vertical guideway by screws 10.

A flat, vertically elongated main slide 11 is carried in the guideway 7 for up and down sliding motion. In order to prevent such motion from being too free, friction strips 12 are disposed in the grooves 8 between the bottoms of the latter and the side edges of the main slide 11.

The main slide 11 is adapted to be run up or down, manually, by means of the following:

A vertical rack 13 is secured to the back of the main slide 11 by screws 14; such rack running in clearance relation in a vertical recess 15 in the guideway 7. A pinion 16 meshes with the rack 13 and is carried on a cross shaft 17 suitably journaled in connection with said guideway 7. The cross shaft 17 is manually rotated by means of a spider-type handle 18 on one end of said cross shaft, while the other end of said cross shaft is connected to a coil type return spring 19 which tends to rotate said cross shaft 17 in a direction to raise the main slide 11.

A horizontal attachment arm 20 projects outwardly from the upper portion of the main slide 11; said arm 20 being formed at its inner end with a flange 21 secured in rigid relation to the main slide 11 by screws 22.

The attachment arm 20 is formed with a pair of elongated, parallel slots 23 through which cap screws 24 extend downwardly from above. The cap screws 24 are threaded into the upper end of an initially separate or portable drill 24, whereby said drill is thus suspended from the attachment arm 20 and main slide 11 for motion up or down therewith.

By reason of the elongation of the slots 23 the drill 25 can be adjusted, dependent upon its diameter, to a position as close to the mount 3 as possible.

Intermediate its ends, and on the side adjacent said mount 3, the drill 25 is connected with the main slide 11 in the following manner:

The main slide 11 is fitted, exteriorly and below the attachment arm 20, with a secondary guideway 26 of outwardly opening channel form, such secondary guideway having opposed grooves 27 therein which open toward each other; the secondary guideway 26 being of a width such that it is disposed in clearance relation to the flange bars 9.

A secondary slide 28 is carried by the secondary guideway 26, in the opposed grooves 27, for up or down sliding movement relative to the main slide 11. The bars which comprise the secondary guideway 26 are secured to the main slide 11 by screws 29.

A boss 30 is formed integral with the secondary slide 28 and projects outwardly therefrom a limited distance; the outwardly projecting end portion of the boss 30 being formed as a screw plug 31 which is threaded into a tapped bore 32 in the adjacent side of the drill 25. The tapped bore 32 is conventionally present in portable drills for the purpose of receiving a threaded-in handle, which handle is of course detached before use of the drill in the present device.

The purpose of the secondary slide 28 is to permit the boss 30 and plug 31 to be adjusted up or down as is necessary for proper matching with the tapped bore 32.

With the horizontal adjustment provided by the slots 23 in the attachment arm 20, and the vertical adjustment provided by the secondary slide 28, the mount 3 can be adapted to drills of different sizes and types.

While the drill 25 is here shown as being an electric type, a pneumatically actuated drill may be mounted in a similar manner.

For the purpose of stabilizing the drill press when the electro-magnetic foot 1 is engaged with a metallic work surface, the post 4 is formed—on the side opposite the drill 25—with a radially projecting bracket 33, from the outer end of which a vertically adjustable rear stabilizer leg 34 depends. Such leg is formed, at its upper end, with a portion 35 which is threaded through a boss 36 on the outer end of said bracket 33, and which portion is held against accidental rotation by a lock nut 37.

The electrical supply circuit for the foot 1 and portable drill 25 is in the main omitted from the present disclosure for the purpose of clarity. Such circuit does however include an electric current supply cord 38 which leads into the lower end of the post 4 through a radially extending, relatively stiff but flexible elongated grommet 39. This grommet maintains the cord 38 directionally, exteriorly of the post 4, so that such cord does not tend to tangle with the handle 18 or the drill 25. The circuit includes a control switch 40 and a pilot light 41 on the post 4 adjacent the lower end; the switch 40 being spaced between transversely spaced vertical shields 42, while the pilot light 41 is disposed below an overhanging shield 43.

Another element of the circuit is an A. C.-D. C. rectifier 44 of full wave bridge type disposed within the post 4 intermediate its lower ends, and in clearance relation to the post walls; such rectifier feeding the foot 1.

The rectifier 44 is supported and located in the post 4 by means of a lower locator plate 45 and an upper locator plate 46; such plates, together with the rectifier 44, being tied together in unitary relation by a central bolt 47. The lower locator plate 45 is secured in connection with the post 4 by a screw 48.

A lower ventilation port 49, screened as shown, opens through the post 4 some distance below the upper locator plate 46, while on the other side and above said plate 46 there is an upper screened ventilation port 50. The upper locator plate 46 is of clover-leaf configuration (see Fig. 3), whereby to provide apertures which permit of free air flow upwardly from the ventilation port 49, about the rectifier 44, and out of the upper ventilation port 50.

With this arrangement effective cooling of the rectifier 44 is accomplished, and additionally by reason of its mounting within the post 4, the rectifier is always protected against damage.

The lower locator plate 45 is likewise of clover-leaf configuration; one advantage being that the circuit wires for the rectifier can pass through the apertures.

When the above described electro-magnetic drill press is in use the electro-magnetic foot 1 holds strongly against the metallic work surface, whereby a twist drill 51 in the chuck 52 of the drill 25 may be run downwardly into engagement with said work surface, for the purpose of drilling a hole therein; the drill 25 being so moved by proper manipulation of the handle 18, which causes the rack 13 and main slide 11 to travel downwardly. The rear stabilizer leg 34, when properly adjusted, counteracts to a great extent the tendency of the drill to rock the foot 1 on the work surface.

The circular base plate 5 is of aluminum or other metal which has high heat conductivity; the advantage being that such base plate effectively dissipates the heat from the electro-magnetic foot 1, whereby to materially increase the duty of the latter.

For certain types of drills—i. e. those which are relatively short—the screw plug 31 would not—within the limits of movement of the secondary slide 28—match the tapped bore 32 of the drill if the latter were attached at its upper end to the arm 20. To accommodate this type of drill I provide an extension bracket 53 which abuts at its upper end against the under side of the arm 20 and is secured thereto by the cap screws 24. At its lower end the extension bracket 53 is formed with a suitable boss 54 for connection to the upper end of the drill 55 by means of a cap screw 56.

In order to prevent the main slide 11 from traveling upward to an extent which would permit the rack 13 to run off the pinion 16, a stop pin 57 projects laterally from one side of the secondary guideway 26 outwardly of the guideway 7, which stop pin is adapted to abut against the lower end of a stop bar 58 secured to the same side of said guideway 7 at the top of the latter.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. In an electro-magnetic drill press which includes an electro-magnetic foot, and a mount upstanding from the foot adapted to support an initially separate portable drill for up and down motion parallel to the major axis of said mount; said mount comprising a post, a vertical guideway rigid with the post above the foot, a slide in the guideway, means to impart motion to the slide in said guideway, an attachment arm projecting outwardly from the slide, the arm having a lengthwise elongated slot therethrough from top to bottom, a headed screw extending through the slot, an extension bracket depending from the attachment arm, said screw securing the extension bracket to the attachment arm, and means connecting the extension bracket to the upper end of the drill, the connection of said attachment arm and said extension bracket to each other and to the drill providing for overlapping thrust absorbing relation from the attachment arm to the upper end of the drill, the slide being secured to the adjacent side of the drill below said attachment arm and extension bracket.

2. In an electro-magnetic drill press which includes an electro-magnetic foot, and a mount including a hollow post upstanding from the foot adapted to support a drill unit, an A. C.-D. C. rectifier disposed in the post, there being clearance between the sides of the rectifier and the walls of the post, locator plates engaged in the post at the ends of the rectifier, the uppermost plate being of generally clover-leaf configuration, a central tie bolt extending through the rectifier and plates connecting the same together as a unit, and means securing at least one of said plates to the post; the post having a pair of ver-

tically spaced ventilation ports therein, and one of said ports being above the uppermost plate.

3. A structure, as in claim 2, in which the other ventilation port is disposed intermediate said plates.

4. In an electro-magnetic drill press which includes an electro-magnetic foot, and a mount including a hollow post upstanding from the foot adapted to support a drill unit, an A. C.-D. C. rectifier disposed in the post, there being clearance between the sides of the rectifier and the walls of the post, locator plates engaged in the post at the ends of the rectifier, said plates being of generally clover-leaf configuration, means connecting the rectifier and said plates as a unit, and means securing at least one of said plates to the post.

5. In an electro-magnetic drill press which includes an electro-magnetic foot, and a mount including a hollow post upstanding from the foot adapted to support a drill unit, an A. C.-D. C. rectifier disposed in the post, there being clearance between the sides of the rectifier and the walls of the post, locator plates engaged in the post at the ends of the rectifier, said plates being of generally clover-leaf configuration, means connecting the rectifier and said plates as a unit, and means securing at least one of said plates to the post; the post having a pair of vertically spaced ventilation ports therein in predetermined relationship to the rectifier and to said locator plates.

6. A drill press mount to support an initially separate portable drill for up and down motion, the mount comprising an upstanding post, a vertical guideway rigid with the post on one side and above the lower end thereof, a main drill supporting slide in said guideway, means to impart motion to said slide to move said slide and a drill thereon with reference to a work piece, an attachment arm secured on and projecting outwardly from the slide adjacent its upper end for connection to a drill, means to detachably secure the attachment arm to the upper end of the drill with the drill in depending relation to provide for overlapping thrust absorbing engagement between the attachment arm and the drill, a secondary guideway in the slide below the attachment arm, a secondary slide in said secondary guideway, and a member projecting outwardly from said secondary slide and removably fitted in a bore provided in the side of the drill adjacent said slide, said secondary guideway and slide providing for adjustment of said mount to accommodate different drills.

7. A drill press mount to support an initially separate portable drill for up and down motion, the mount comprising an upstanding post, a vertical guideway rigid with the post on one side and above the lower end thereof, a main drill supporting slide in said guideway, means to impart motion to said slide to move said slide and a drill thereon with reference to a work piece, an attachment arm secured on and projecting outwardly from the slide adjacent its upper end, said attachment arm overlapping and abutting the end of the drill and disposed to directly absorb endwise thrust against the drill, means to secure the attachment arm rigidly to the drill, means to secure the slide below the arm to the adjacent side of the drill, said arm having a longitudinal elongated slot therethrough, and a headed screw extending downwardly through the slot and threaded into a tapped bore in the upper end of the drill to secure the drill to the arm in depending and non-movable relation thereto, said slot and said screw providing for adjustment of said mount to accommodate different drills.

8. A drill press mount to support an initially separate portable drill for up and down motion with reference to a work piece, the mount comprising an upstanding post, a vertical guideway rigid with the post on one side thereof and above the lower end thereof, a main drill supporting slide in said guideway, means to impart motion to said slide to move said slide and a drill thereon with reference to a work piece, an attachment arm secured on and projecting outwardly from the slide adjacent its upper end for overlapping thrust absorbing connection to a drill, said arm having a longitudinal elongated slot therethrough, a headed screw extending downward through the slot and threaded into a tapped bore in the upper end of the drill to secure the drill to the arm in depending relation thereto, a secondary guideway in the slide below the attachment arm, a secondary slide in said secondary guideway, and a member projecting outwardly from said secondary slide and removably fitted in a bore provided in the side of the drill adjacent said slide, said secondary guideway and slide providing for adjustment of said mount to accommodate different drills, and said slot and said screw providing for adjustment of said mount to accommodate different drills.

9. In an electro-magnetic drill press which includes an electro-magnetic foot structure, and a mount structure including a post upstanding from the foot structure adapted to support an electric drill unit, one of said structures including a hollow portion, an A. C.-D. C. rectifier disposed in the hollow portion, there being clearance between the rectifier and a wall of the hollow portion, locator means for said rectifier including a plate secured to the rectifier, said plate being also spaced at least in part from the wall of the hollow portion, and means for securing said locator means to said structure having said hollow portion.

10. In an electro-magnetic drill press which includes an electro-magnetic foot structure, and a mount structure including a post upstanding from the foot adapted to support an electric drill unit, one of said structures being hollow, an A. C.-D. C. rectifier disposed in the hollow structure, there being clearance between the sides of the rectifier and the walls of the hollow structure, at least one locator plate engaged in the hollow structure at one end of the rectifier, said plate being of generally recessed or cutaway configuration to provide a passage between the plate and an adjacent wall of the structure, securing means for fastening the plate to the rectifier, and means fastening the plate to the hollow structure.

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