

March 6, 1951

H. T. LIBBY ET AL
POWER ACTUATED HAND PLANE

2,544,098

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2 Sheets-Sheet 1

Fig. 1

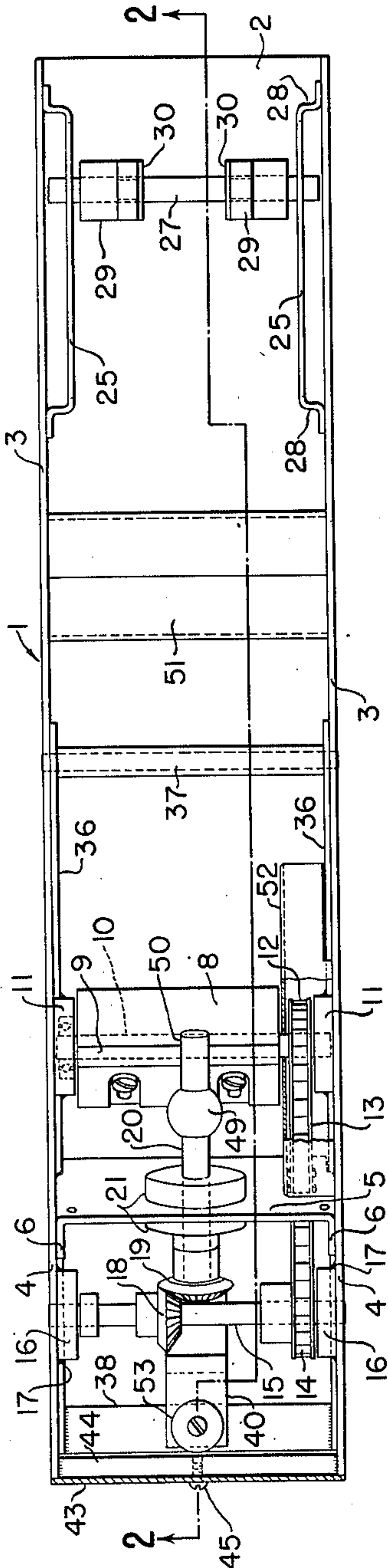
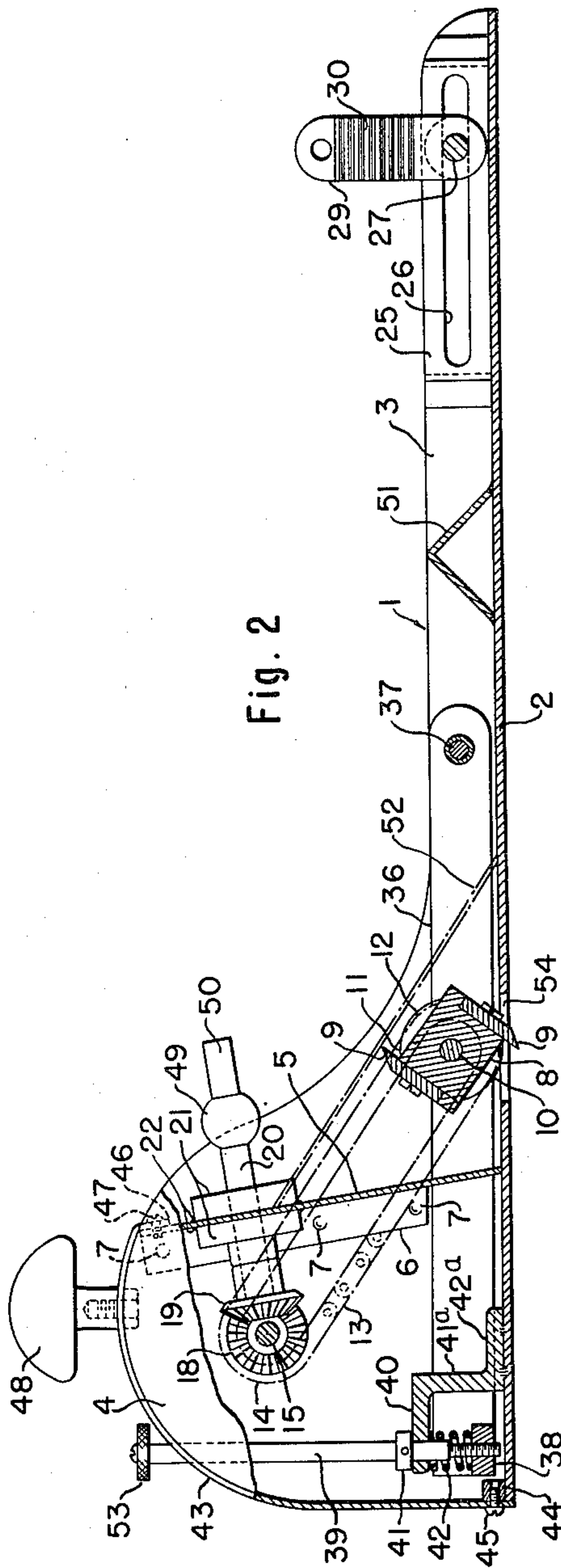


Fig. 2



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2 Sheets-Sheet 2

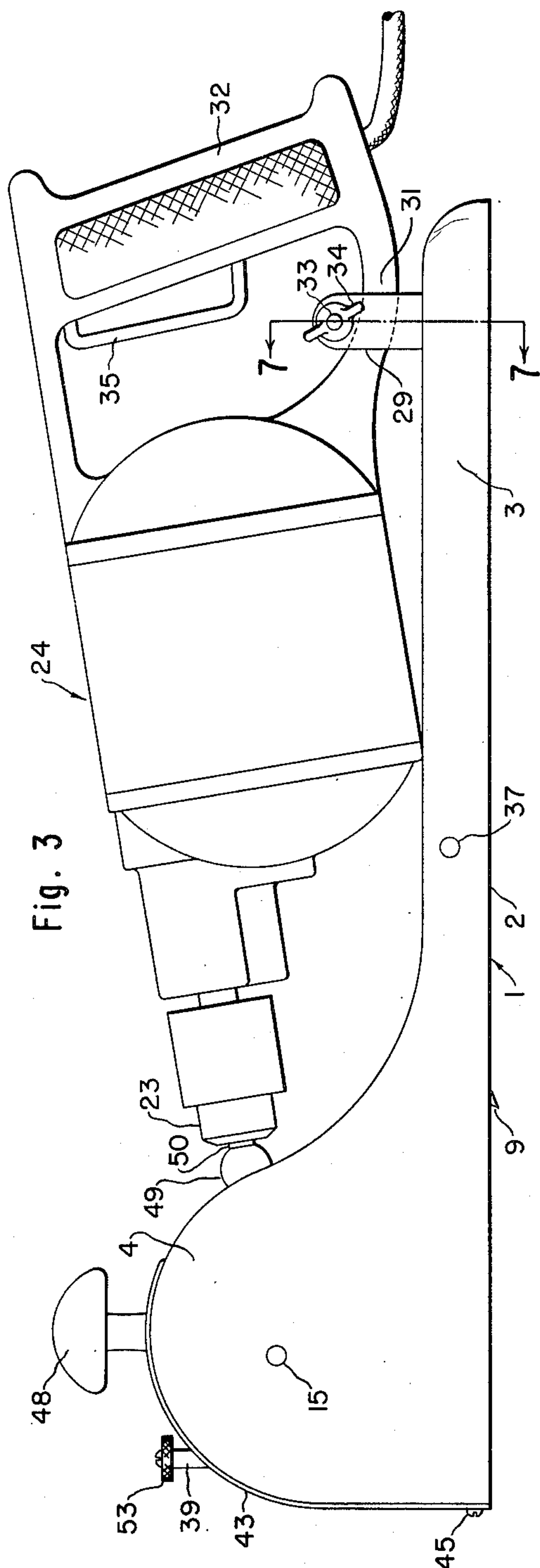


Fig. 3

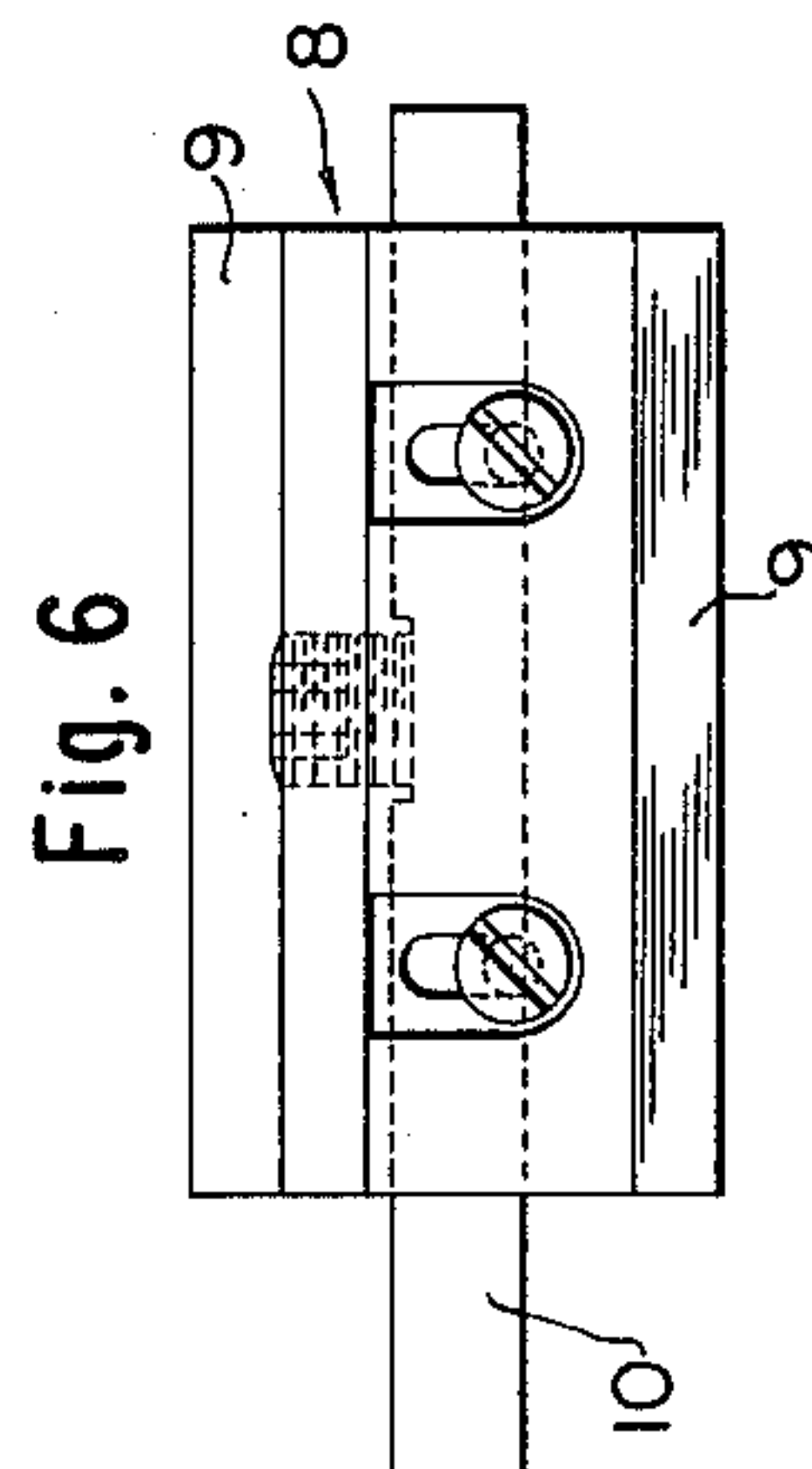


Fig. 6

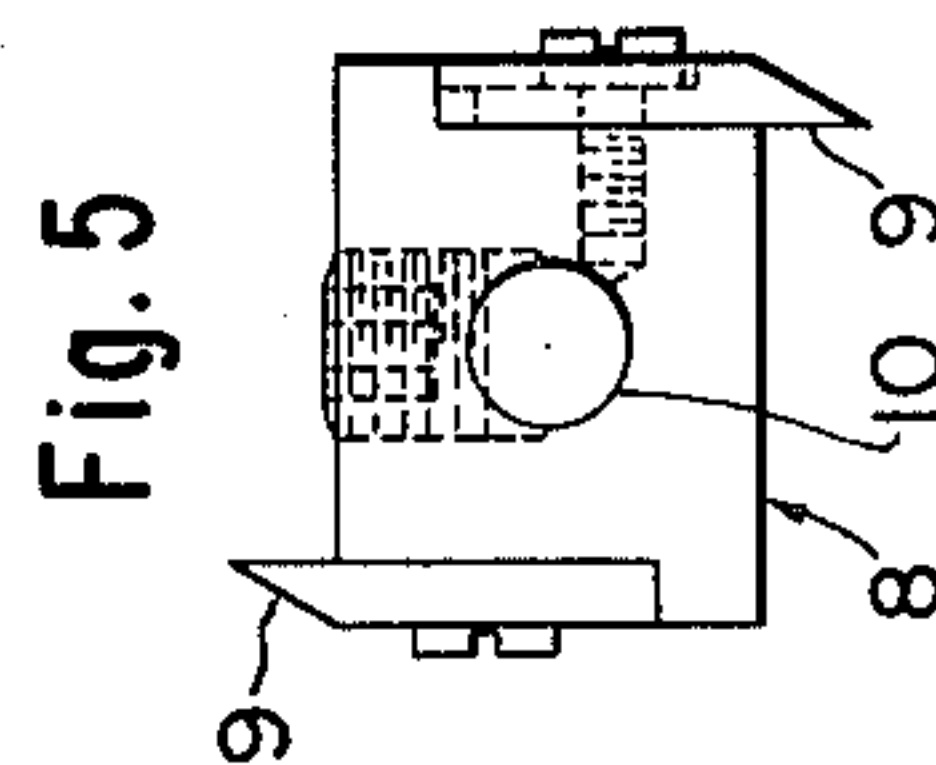


Fig. 5

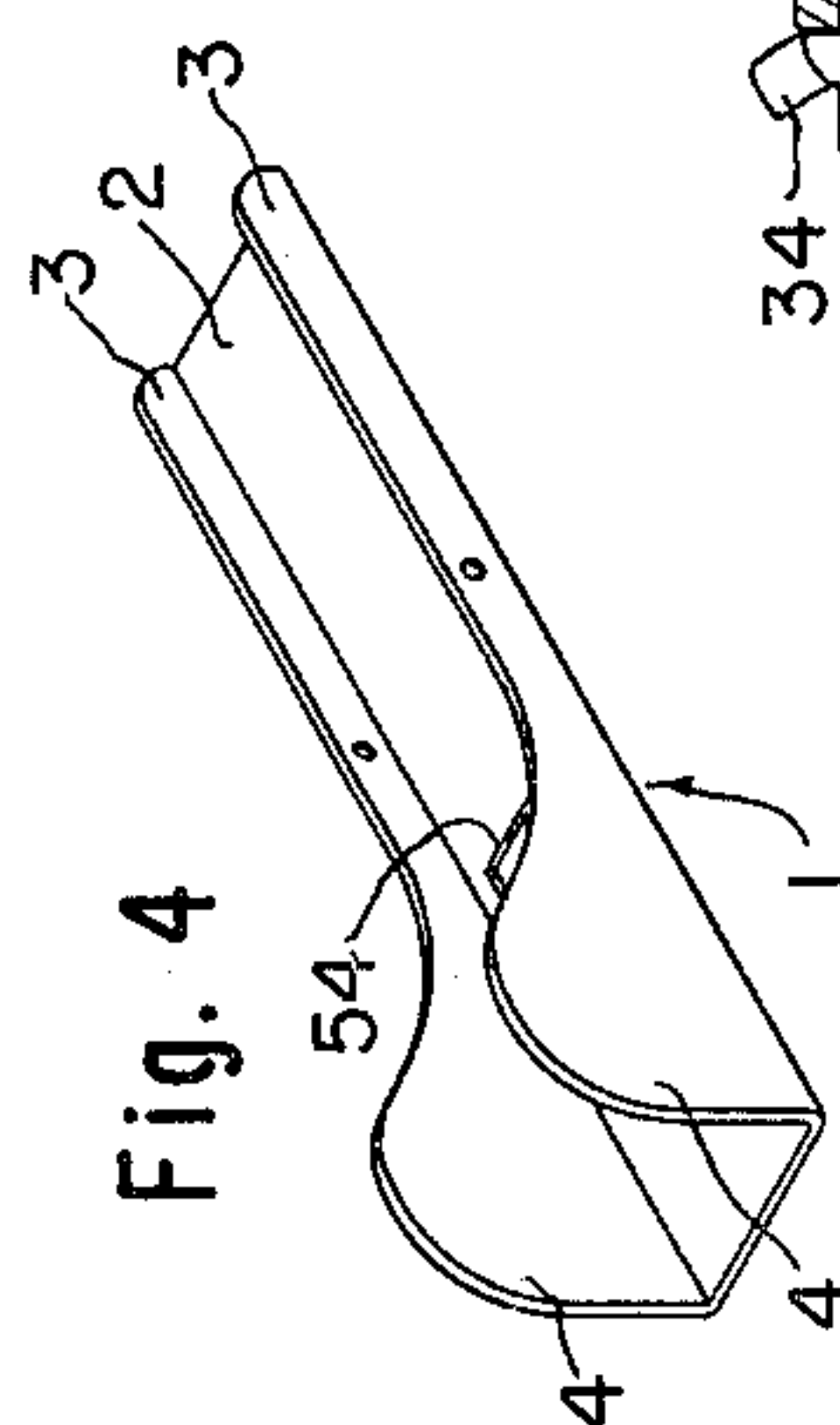


Fig. 4

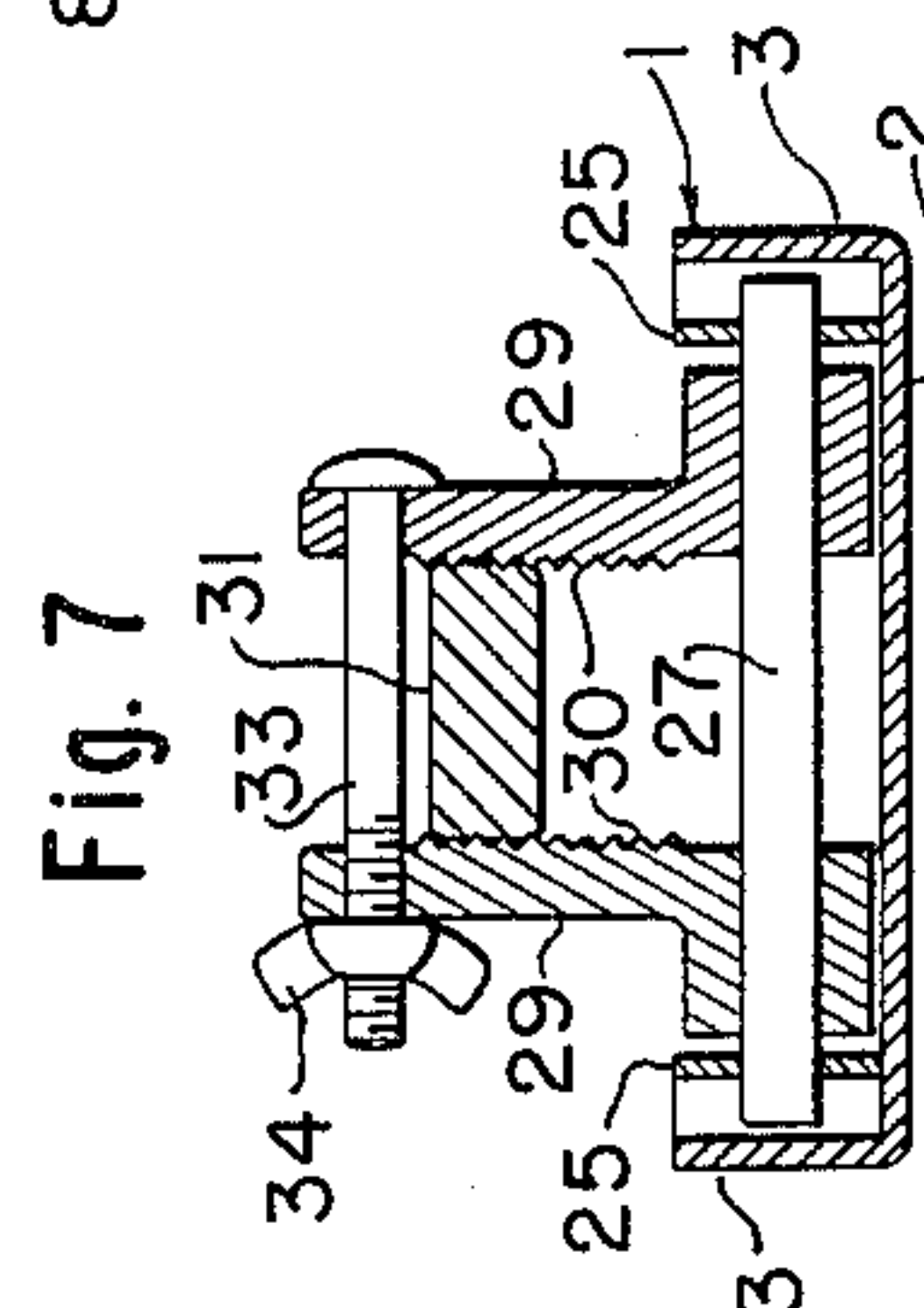


Fig. 7

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POWER ACTUATED HAND PLANE

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2 Claims. (Cl. 144—117)

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This invention relates to power actuated hand planes of the type in which the body or stock has a rotary cutter mounted thereon, and which is equipped with an electric motor for actuating the cutter as the plane is manipulated by hand.

It is one of the objects of our invention to provide a power actuated hand plane which is so constructed that the motor of an ordinary portable hand drill or some other portable power unit may be used for operating the cutter, the construction being such that the hand drill motor or other portable power unit may be readily mounted on the stock or body and operatively connected to the rotary cutter, and can be as readily demounted from the body or stock when it is desired to use the motor for drilling, reaming, or other purposes. An advantage of this construction is that the hand plane itself can be made and sold equipped merely with the rotary cutter and drive connections thereof, and may be made available for use by the simple expedient of mounting the motor of a hand drill on the base and connecting it to said driving connections.

A hand plane comprising a base and a rotary cutter but without the motor can be manufactured at considerably less expense than if the motor for operating the cutter is built into the stock.

There are many home workshops and other small shops that are equipped with an electric hand drill, and if such a shop acquires a hand plane embodying this invention and which is equipped with the rotary cutter and driving connections therefor, the plane can be easily made available for use by simply mounting the portable hand drill motor on the stock. This makes it possible for a person owning a portable electric hand drill to use the latter not only for drilling, reaming, and other purposes, but also for operating the hand plane.

In order to give an understanding of our invention, we have illustrated herein a selected embodiment thereof which will now be described, after which the novel features will be pointed out in the appended claims.

In the drawings:

Fig. 1 is a top plan view of a hand plane embodying our invention with the motor removed therefrom.

Fig. 2 is a section on the line 2—2, Fig. 1.

Fig. 3 is a side view of the plane embodying our invention with the hand drill motor mounted thereon.

Fig. 4 is a perspective view on a reduced scale

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showing the construction of the body or stock.

Fig. 5 is an end view of the rotary cutter.

Fig. 6 is a side view thereof looking toward the left in Fig. 5.

Fig. 7 is a section on the line 7—7, Fig. 3.

Our improved plane comprises a body or stock indicated generally at 1 and which is preferably made of metal. Said body is formed with the bottom portion 2 and with the two upstanding sides 3, the latter extending the length of the body and being provided with wing extensions 4 at one end. The body as thus described can conveniently be made from a blank of sheet metal which is bent to form the upstanding sides 3 with the wing extensions 4.

The wing extensions are shown as being connected by a plate 5, the vertical edges 6 of which are bent laterally to overlie the inner faces of the wings, said edges 6 being rigidly secured to the wings in some suitable way as by means of spot welding, indicated at 7.

8 indicates the rotary cutter which is provided with cutting blades 9, said cutter being mounted on a supporting shaft 10 which is journaled in bearings 11, and the cutting blades operating in an opening 54 formed in the bottom 2 of the body.

For rotating the cutter, the shaft 10 is shown as having a sprocket wheel 12 thereon which is connected by a sprocket chain 13 to another sprocket wheel 14 carried by a transversely extending shaft 15 which is mounted in suitable bearings 16 carried by the wing extensions 4. Said bearings 16 may be welded to the wings if desired as shown at 17. The shaft 15 has a bevel gear 18 thereon which meshes with a driving bevel gear 19 carried on a drive shaft 20 that extends through and is journaled in bearings 21 that are mounted on the supporting plate 5, said bearings 21 preferably being welded to the plate as indicated at 22. The drive shaft 20 has a free end 50 which is adapted to be connected to or engaged by the chuck 23 of a portable power unit such as the portable shown at 24 in Fig. 3, which is detachably mounted on the body 1.

Any suitable means may be employed for thus detachably mounting the motor unit 24 on the body. As herein shown, however, each side wall 3 of the body has a supporting plate 25 secured thereto on the inside thereof, each plate being spaced from the wall slightly and being provided with a slot 26 which receives the end of a rod or shaft 27. Each supporting plate 25 is shown as having its ends offset as indicated at 28, the offset ends being welded to the side walls 3.

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The shaft or rod has adjustably mounted thereon two clamping members 29 between which the portion 31 of the handle of the drill motor 24 is received. The inner face of each clamping member 29 is preferably serrated as shown at 30. A clamping bolt 33 extends through the upper ends of the clamping members 29, said bolt having a wing nut 34 thereon so that by tightening the wing nut, the clamping members will be clamped firmly against the sides of the portion 31 of the drill handle 32. The serrated surfaces 30 of the clamping members 29 provide a firm engagement between the clamping members and the portion 31 of the handle 32 which holds the drill in proper position.

In mounting the drill motor unit 24 on the body, the chuck 23 is opened sufficiently to receive the free end 50 of the drive shaft 20, and the said unit is then placed in position with the chuck embracing said free end 50 of the shaft, the portion 31 of the handle of the drill being placed between the clamping members 29 in a position to bring the axis of the shaft of the drill in substantial alignment with the drive shaft 20.

The clamping nut 34 is then tightened so as to clamp the handle of the drill firmly in position between the clamping members.

A hand plane thus equipped is ready for operation, the motor being controlled in the usual way by the control element 35.

Means are provided for raising and lowering the cutter head, depending upon the depth of cut which it is desired to make. For this purpose, the bearings 11 for the cutter head shaft 10 are mounted on arms 36 situated inside of the side walls of the body and pivotally mounted at one end on a supporting shaft or rod 37 which extends from one side wall 3 to the other.

The outer end of the arms 36 are connected by a cross bar 38. 39 indicates an adjusting screw having a knurled head 53, the lower end of which screw is screw threaded through the cross bar 38. Said screw extends through a stationary support 40 and is provided with a collar 41 which rests on said support. Situated between the support and the cross bar 38 is a coil spring 42 which encircles the lower end of the adjusting screw 39 and thus exerts a yielding downward pressure against the outer end of the arms 36, and hence against the cutter head 8. The support 40 is provided with a vertical portion 41a and a foot portion 42a, the latter being welded or otherwise secured to the bottom 2 of the body 1.

By turning the adjusting screw 39 in one direction, the outer ends of the arms 36 will be raised, thereby raising the cutter head, while turning movement of the adjusting screw in the opposite direction will permit the cross bar 38 and the arms 39 to move downwardly under the influence of the spring 42. It will be noted that the shaft 15 carrying the sprocket wheel 14 rotates in fixed bearings while the shaft 10 of the cutter is adjustable vertically for making cuts of different depths. It will also be noted that because the shaft 15 is located in front of the supporting plate 5 while the shaft 10 is at the rear of said plate, a line connecting said shafts makes a relatively small angle with the arms 36. Because of this construction the slight vertical movement of the shaft 10 due to any normal adjustment of the cutter does not appreciably vary the tension on the sprocket chain so that said sprocket chain will operate equally well in all adjusted positions of the cutter.

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43 indicates a cover plate, the edges of which rest on the edges of the wing extensions 4. Said cover plate is connected at its lower end by means of a screw 45 to a lug 44 carried by the bottom 2 of the body, and the upper edge of the cover plate is shown as bent downwardly so as to overlie the upper edge of the supporting plate 5 as indicated at 46, said downwardly bent edge 46 being secured to the plate 5 by means of a screw 47.

48 indicates a hand hold which is secured to and rises from the cover plate 43.

In using the plane after the motor has been installed thereon, the operator will grasp the hand hold 48 with one hand and the handle 32 of the drill motor with the other and, in this way he can readily manipulate the plane as necessary to perform any desired planing operation.

The drive shaft section 20 will preferably be provided with a universal joint 49 so as to prevent any binding of the operative parts in case the shaft of the motor is not accurately lined up with the axis of the drive shaft 20.

If desired, the portion of the sprocket chain outside of the plate 5 may be enclosed by a protective cover 52.

51 indicates a transverse reenforcing member which is illustrated as being angular in cross sectional shape and which extends between and has its ends welded or otherwise secured to the side walls 3 of the body.

While we have herein illustrated a hand plane construction adapted to have a portable hand drill motor mounted thereon, yet the invention would not be departed from if a portable power unit designed for some other purpose than drilling, reaming, etc., were detachably mounted on the body and connected to the drive shaft 20.

We claim:

1. A power actuated hand plane comprising an elongated body having a bottom portion to rest on the work and provided with a cutter-receiving opening, said body having upstanding sides, each of which is formed at the front end thereof with a wide wing extension, a rotary cutter operating in said opening, cutter-supporting means by which the cutter can be adjusted vertically, an upstanding shaft-supporting plate extending from one wing extension to the other and rigidly secured to both, said plate being located in front of the cutter-receiving opening, a shaft bearing carried by said plate, a drive shaft journaled in said bearing and extending through said plate and substantially longitudinally of the body, said shaft having a free rear end on the rear side of the plate, a horizontal shaft journaled in said wing extensions and located on the front side of the plate, gearing operatively connecting the front end of the drive shaft to the horizontal shaft, a sprocket chain driving connection between the horizontal shaft and the cutter, the sprocket chain of which extends forwardly through the upstanding plate and inclines upwardly from the rotary cutter at a relatively small angle to said bottom portion, whereby the tension on the sprocket chain is not appreciably affected by the vertical adjustment of the cutter, and means for removably mounting on the body at the rear end thereof an electric power unit having provision for detachably coupling it to the free end of said drive shaft.

2. A power actuated hand plane comprising an elongated body having a bottom portion to rest on the work and provided with a cutter-receiving

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opening, said body having upstanding sides, each of which is formed at the front end thereof with a wide wing extension, a rotary cutter operating in said opening, cutter-supporting means by which the cutter can be adjusted vertically, an upstanding shaft-supporting plate extending from one wing extension to the other and rigidly secured to both, said plate being located in front of the cutter-receiving opening, a shaft bearing carried by said plate, a drive shaft journaled in said bearing and extending through said plate and substantially longitudinally of the body, said shaft having a free rear end on the rear side of the plate, a horizontal shaft journaled in said wing extensions and located on the front side of the plate, gearing operatively connecting the front end of the drive shaft to the horizontal shaft, a sprocket chain driving connection between the horizontal shaft and the cutter, the sprocket chain of which extends through the upstanding plate, a pair of clamping members mounted on the body at the rear end thereof and adjustable lengthwise of the body, said clamping members adapted to receive between them a portion of an electric power unit which has provi-

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sion for detachably coupling it to the free end of the drive shaft, and means to clamp said clamping members firmly to said portion of the power unit.

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