

Nov. 29, 1927.

1,651,013

H. N. BUSS ET AL

MOTOR DRIVEN PLANER

Filed Oct. 12, 1925

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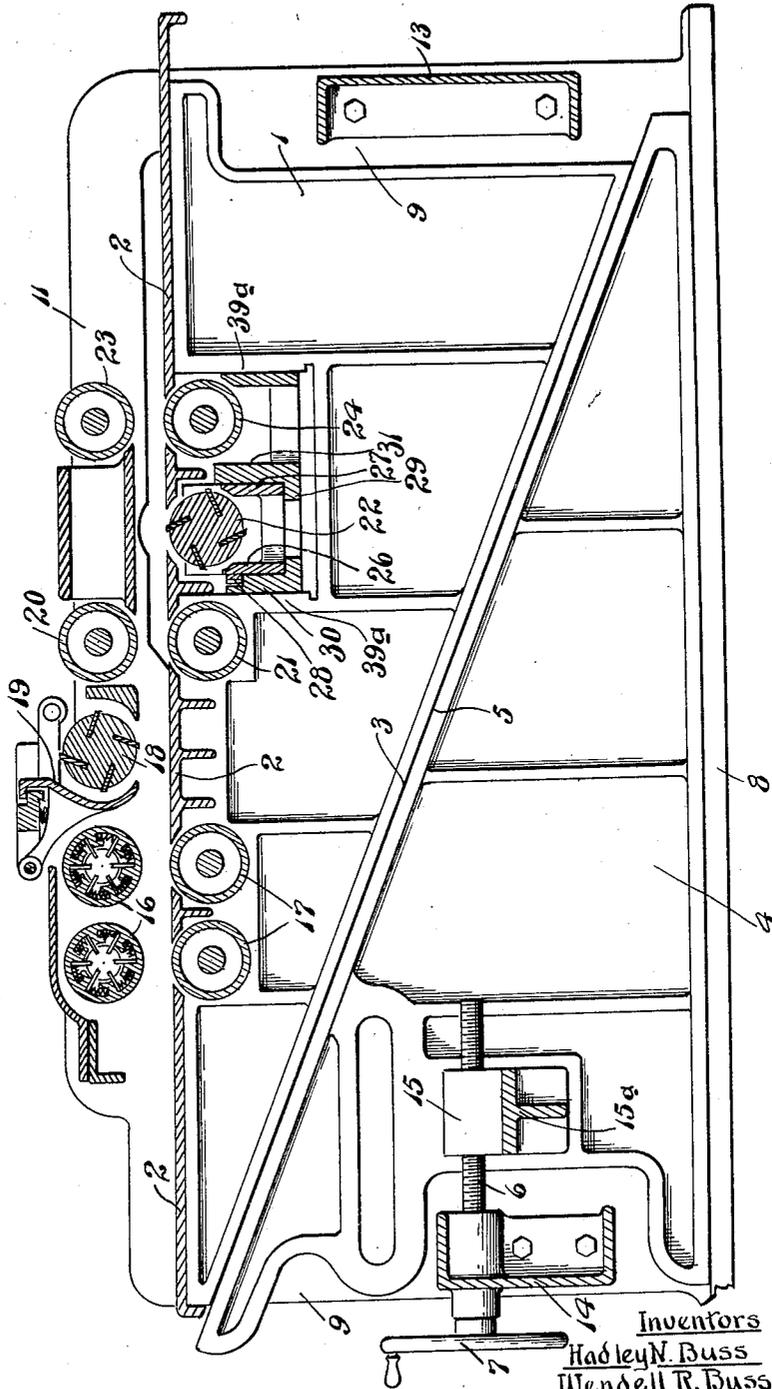


Fig. 1.

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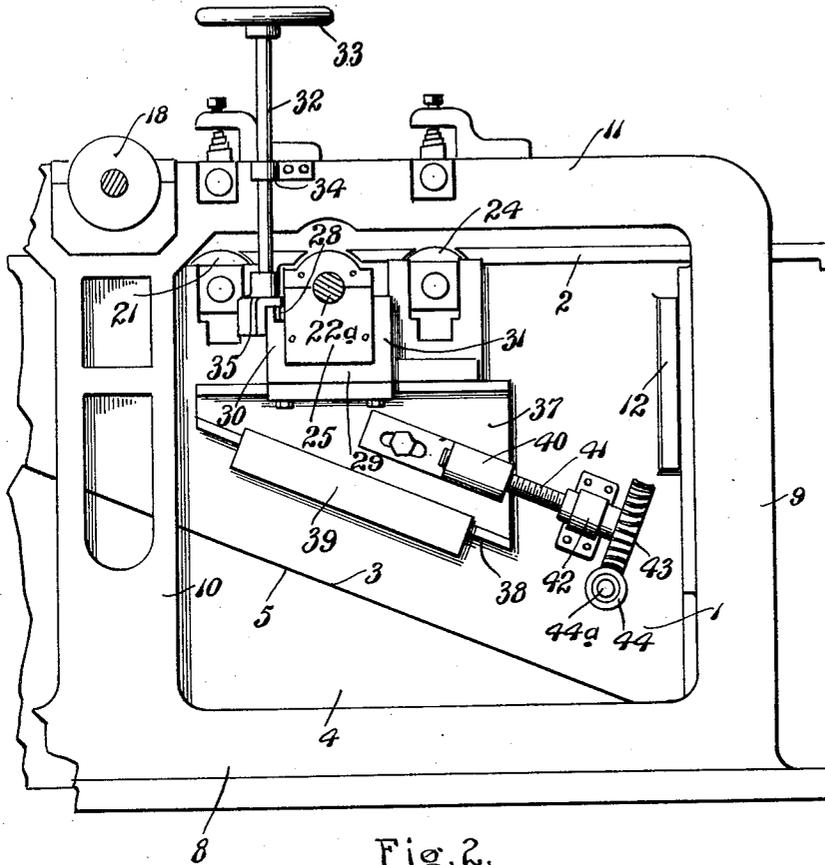


Fig. 2.

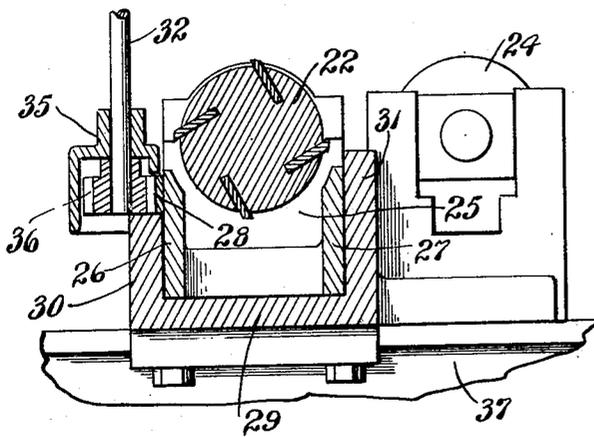


Fig. 3.

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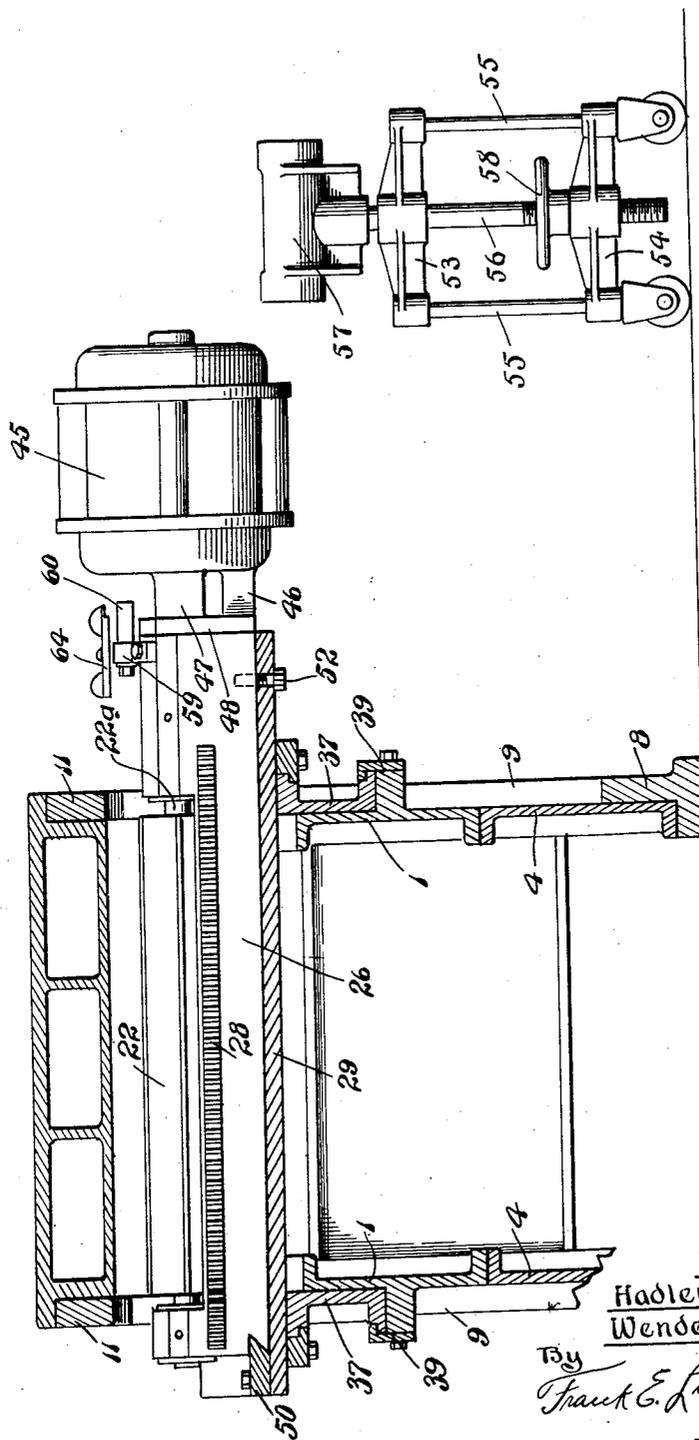


Fig. 4.

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5 Sheets-Sheet 4

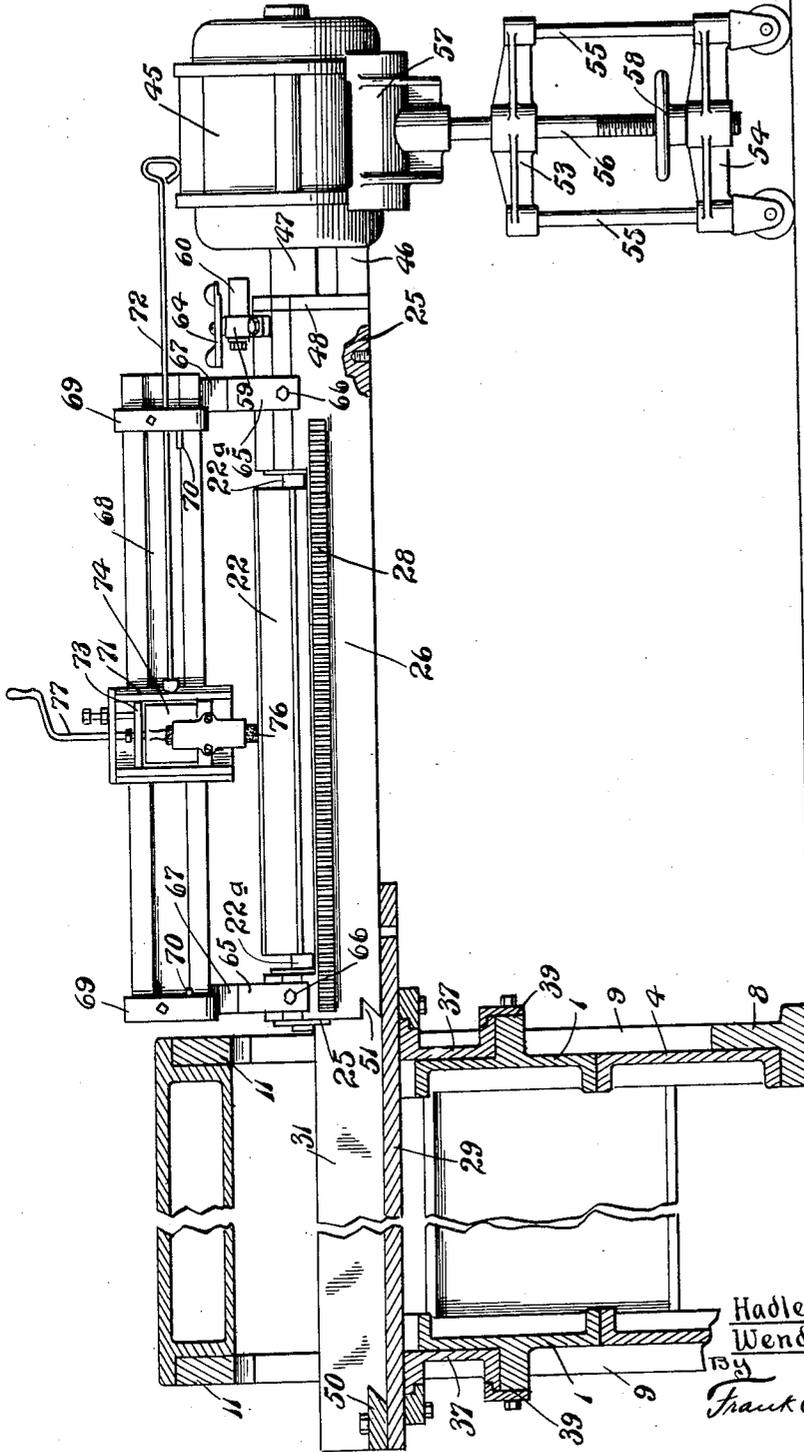


Fig. 5.

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5 Sheets-Sheet 5

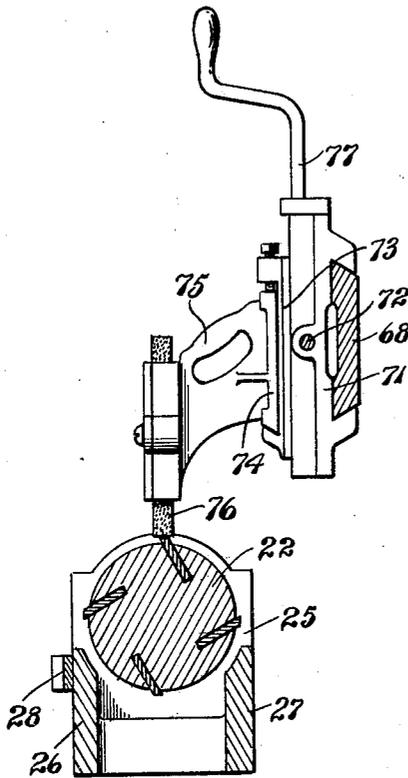


Fig. 6.

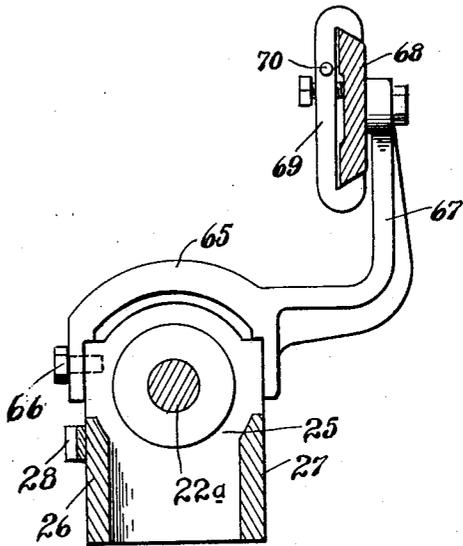


Fig. 7.

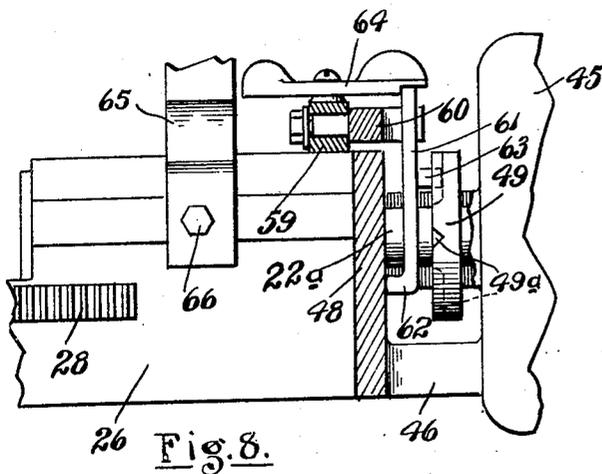


Fig. 8.

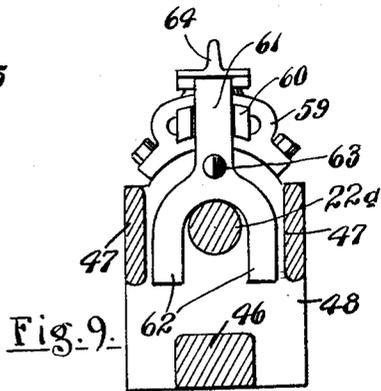


Fig. 9.

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## UNITED STATES PATENT OFFICE.

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## MOTOR-DRIVEN PLANER.

Application filed October 12, 1925. Serial No. 61,880.

This invention relates to planers, particularly wood working planers wherein the surfaces of wood articles may be cut and planed to any desired degree, and in which the cutting cylinders are motor driven.

The present invention is designed so that a motor may be directly connected to the cutter cylinder with its shaft in alignment with the cylinder shaft, particularly the lower cutter cylinder in a double surface planer, and may be moved at all times therewith in its various adjustments both for adapting the machine for different thicknesses of stock and for cutting different depths of cuts from the work fed through the machine. The invention is adaptable to the lower cutting cylinder of a planing machine whether it is a double or single surface machine, the invention being the same in both cases. In a double surface planer which has two cutter cylinders, the upper cylinder is usually fixed against adjustment vertically while the lower cylinder is adjustable toward the upper cylinder to accommodate work of different thicknesses and to vary the depth of the cut, and in order that the work shall be uniform in thickness when it leaves the machine the two cutter cylinders must remain parallel throughout all positions of adjustment.

It is a primary object and purpose of the present invention to provide a direct motor drive for the cutting cylinder or cylinders of planers, either single or double surface, and to rigidly attach said motor in connection with the adjustable cylinder whereby when it is once aligned and secured in place there is no danger of any troubles arising thereafter from poor alignment and poor adjustment which may occur where the motor is adjustable independently of the cutter cylinder. A further object of the invention is to mount this adjustable cutter cylinder so that it may be bodily moved together with the supporting frame in which it is mounted outwardly, the motor moving therewith; and when in this outer position but not wholly disconnected from the machine the knives of the cutter may be sharpened or otherwise placed in order. Here-

before it has been the practice universally to disconnect the motor from the cutter cylinder, remove the cylinder from the machine and place it in an auxiliary frame for the purpose of sharpening or otherwise placing the knives in best cutting condition. This required a re-alignment and reconnection of the motor to the cutting cylinder when it was again placed in the machine and a re-adjustment of the motor with respect to the cylinder while the trouble and effort required in moving the cylinder and replacing it and also in placing it in the sharpening frame was great. The present invention obviates all these disadvantages and makes the retouching and sharpening of the cutter knives in the cutting cylinder a very simple and easy proposition.

To these ends and to many others not at this time specifically enumerated we have made the invention described in the following description and illustrated in the accompanying drawings, in which,

Fig. 1 is a longitudinal vertical section through a planer made in accordance with our invention.

Fig. 2 is a fragmentary elevation of one end of the machine showing the mechanism used for adjusting the lower cutter cylinder for depth of cut, and also showing the manually operable means for bodily moving the cutter cylinder and the support in which it is mounted outward for the purpose of sharpening the knives, the motor which drives the cylinder being removed in this figure.

Fig. 3 is a fragmentary enlarged vertical section on a plane parallel to the face of the elevation shown in Fig. 2 but located a little farther inward.

Fig. 4 is a transverse vertical section through the machine in the plane of the lower cutter cylinder, the same being in operative position in the machine.

Fig. 5 is a like view showing the same withdrawn from the machine and supported in position for the purpose of sharpening or retouching the cutter knives of the lower cutter cylinder.

Fig. 6 is a fragmentary transverse section

through the lower cutter cylinder and its mount shown in Fig. 5.

Fig. 7 is a like view taken in another plane and illustrating the supporting means for the knife sharpening and retouching devices which may be mounted thereon.

Fig. 8 is a fragmentary elevation with parts in section of the outer end portion of said cutter cylinder where the motor is attached, illustrating the means for holding the cylinder from rotation during the sharpening operations, and

Fig. 9 is a vertical section transversely through the construction shown in Fig. 8 on a plane back of the motor.

Like reference characters refer to like parts in the different figures of the drawings.

In the construction of the planing machine, two table carrying members 1 carrying a horizontal table, 2 at their upper side are formed at their lower sides inclined in a plane at an acute angle to the horizontal as indicated at 3. In practice the members 1 are spaced apart at each side of the machine and the table 2 lies over and between the upper sides thereof. These members 1 bear upon slidably mounted similar members 4 which at their upper edges are formed at an incline and at the same angle to the horizontal as the sides 3 as indicated at 5. The members 4 lie one underneath each of the members 1 previously described and by moving the members 4 horizontally the table and all of the mechanism carried by and in association therewith may be raised or lowered. In practice members 4 are operated horizontally through a screw 6 operated by hand wheel 7, the operative connection of which will later appear.

The members 4 are mounted on the base rails 8 of the side members of the stationary frame of the machine, the frame at each side being completed by uprights 9 and 10 which are connected at their upper ends by horizontal rails 11. Guides 12 are mounted vertically one at the outer side of each of the upper members 1 which have slidable bearing against end uprights 9 as shown in Fig. 2, whereby the movement of the table 2 and the supporting members 1 therefor is maintained in vertical directions. The side members of the frame are connected by various cross members, indicated at 13 and 14 in Fig. 1 at the opposite ends of the machine and there are also suitable cross connecting members between the upper rails 11. The screw 6 passes through a bearing carried by the cross member 14 and through an interiorly threaded nut 15 mounted on a cross bar or rail 15<sup>a</sup> disposed between and attached at its ends to the oppositely disposed lower members 4. It is evident that by rotating hand wheel 7 the members 4 may be moved inwardly or outwardly with a consequent raising or lowering of the table 2

and the various feed rollers and the cutter cylinder which are mounted in association therewith.

Between the upper rails 11 of the frame and extending across and above the table 2 are feeding rollers 16 located directly above and extending across and above the table 2 are co-operating lower rollers 17 carried by and between the members 1. Back of the feed rollers 16 an upper cutter cylinder 18 is rotatably mounted, it being located above the table 2 and in association with the usual chip breaker device 19 used in machines of this character. An upper roller 20 disposed between the rails 11 lies back of the upper cutter cylinder 18 and directly above a similar lower roller 21 carried by the members 1. Back of the lower roller 21 the lower cutter cylinder 22 is mounted in a novel and very useful manner, the mounting of which will be later described, and which forms a particularly desirable and essential feature of the present invention. An upper roller 23 disposed between the rails 11 and a lower roller 24 located the one above the other are disposed in a plane back of the lower cutter cylinder 22. This is the general outline of the feed and cutter cylinders or rollers in planing machines of this character as shown in Fig. 1 and the same are shown and described as illustrating the preferred environment of the present invention. It is to be understood, however, that the invention is not limited in any respect to a double surface planer, that is, one having both upper and lower cutter cylinders, but is also available for single surface planers wherein the lower cutter cylinder alone is used.

The lower cutter cylinder 22 is provided with a shaft or spindle 22<sup>a</sup> extending beyond the cylinder at each end, the same being mounted at each end in suitable bearings carried by the vertical ends 25 of an elongated supporting frame which is completed by spaced apart vertical sides 26 and 27 disposed between and either integrally formed with or attached to the ends 25 previously noted. Between the sides 26 and 27 at desired points integral cross bars may be disposed below the cylinder 22 for the purpose of strengthening and reinforcing this frame which carries the cutter cylinder 22. On the side 26 a rack 28 may be secured, it being located horizontally near the upper edge of said side 26.

The elongated frame with the cutter cylinder 22 mounted therein in turn is mounted in a saddle of channel shape having a base 29 and upwardly extending spaced apart vertical sides 30 and 31. The sides 26 and 27 of the frame lie closely adjacent the inner surfaces of said sides 30 and 31. A vertical shaft 32 is equipped with a hand wheel 33 at its upper end and is mounted in bearings 34 and 35, the former being attached to one of the rails 11 and the latter

to the side 30 of the saddle. The bearing 35 is also extended downwardly and formed into a housing or shroud to cover a small gear 36 fixed to the lower end of shaft 32 and held in mesh with the rack 28. It is evident that a portion of the metal of the side 30 at its upper edge is removed for the reception of rack 28 and also that a slot or recess is cut through the same at its upper edge for the passage of the gear 36 for disengagement with the rack 28. By rotating the hand wheel the cutter cylinder 22 and the frame in which it is mounted may be moved laterally inward or outward depending upon the direction of rotation of the wheel.

The saddle described is carried at its ends on the upper sides of two wedge members 37 one located at each side of the machine and against the outer sides of the members 1. The wedge members 37 have horizontal upper edges and inclined lower edges, indicated at 38, which bear upon similarly inclined ledges 39 projecting outwardly from the members 1. Movement of these wedge members 37 effects the raising or lowering of the saddle. Associated with this saddle is the frame or mounting for the adjacent roller 24 so that it moves up or down with the cutter cylinder 22. The vertical movements of this saddle are guided by the guides 39<sup>a</sup> formed on members 1 (see Fig. 1).

To each of the wedge members 37 an interiorly threaded sleeve 40 is secured through which screws 41 pass, each having a bearing 42 connected to the outer side of the adjacent member 1. The screws 41 and the sleeves 40 are located at the same angle to the horizontal as the lower edges 38 of the wedge members 37. Worm gears 43 are fixed to the lower ends of the shafts 41 and are in mesh with worms 44 attached to an equalizing shaft 44<sup>a</sup> which extends horizontally through the machine and which may be manually operated to effect simultaneous movement of the wedge members 37 to raise or lower the cutter cylinder 22 and the adjacent roller 24 with respect to the table 2.

It is evident that the table 2 with all of the rollers and the cutter cylinder 22 associated therewith may be moved as a whole vertically to adjust the machine for different thicknesses of stock which are to be fed through the machine and it is also evident that by the adjustment of the wedge members 37 the cutter cylinder 22 may be raised or lowered to any desired position with respect to the table 2 and in this manner the depth of cut which is to be taken from the stock is governed and controlled.

At one end of the elongated frame carrying the lower cutter cylinder 22 an electric motor 45 is disposed, from the outer frame of which metal connecting bars 46 and 47 extend to and are integrally formed with a

vertical plate 48 which is secured permanently to the adjacent end 25 of the cutter cylinder frame. The shaft 22<sup>a</sup> of the cutter cylinder and the shaft of the motor are in alignment and are either integral or connected together permanently, there being disposed between the motor 45 and the plate 48 on said shaft a disk 49 on the inner face of which a number of radial grooves 49<sup>a</sup> are cut, one for each of the knives on the cylinder 22, the purpose of which will hereafter appear. It is evident that the motor moves with the cutter cylinder 22 and its frame at all times in the inward and outward movements of the same with respect to the remainder of the machine. Normally in the operative position of the cutter cylinder within the machine the lower side of the frame riding on the bottom 29 of the saddle at the end opposite to that at which the motor is attached comes against a stop 50 (see Fig. 4) which has a pointed inner end to fit a recess 51 made therefor in the end of the cutter cylinder frame mount and said frame is secured in its inner operative position by a set screw 52 passing upwardly through the bottom 29 of the saddle into the end 25 of the frame as shown in Fig. 4 and as indicated in Fig. 5. All that is required to free the lower cutter cylinder and the motor for outward movement is to remove the set screw 52 whereupon by rotation of the shaft 32 the cutter cylinder with the attached motor and the frame carrying the same may be moved outwardly from the position shown in Fig. 4 to that shown in Fig. 5.

As the lower cutter cylinder, the frame carrying the same, and the motor secured to the frame are moved outwardly it is desirable to support the free outwardly extending portion to eliminate strains and prevent overbalancing and tilting thereof. To accomplish this a truck is provided, as shown in Figs. 4 and 5. This truck, preferably, includes an upper casting 53 and a lower casting 54 connected by vertical rods 55 and the lower casting is equipped with rollers so that it may be easily moved over the floor. A shaft 56 passes through the upper casting and at its lower end is threaded and extends into and through the lower casting as shown. At the upper end of the shaft a head 57 is mounted shaped at its upper side so as to substantially cradle the lower side of the motor, it fitting snugly and easily into the head. A hand wheel with an interiorly threaded hub is mounted on the shaft 56 and rests on the lower casting 54, it being evident that by turning this wheel shaft 56 with the attached head 57 may be raised or lowered to desired position. The truck is placed underneath the motor 45 and the shaft adjusted upwardly so that the head fits against the under side of the motor and

then with the outward movement of the motor the truck moves therewith supporting the same and holding the cutter cylinder and the frame in which it is mounted substantially horizontal.

On the end of the elongated frame supporting the cutter cylinder 22 a bracket 59 is permanently secured, projecting from which is a member 60 divided at its end adjacent the motor so as to provide two spaced apart fingers. A bar 61 is guided between these fingers and at its lower end is formed into a fork having two downwardly extending arms 62 which are adapted to pass one at each side of the shaft 22<sup>a</sup> and inside of the bars 47. A pin 63 extends from the bar 61 and is adapted to be received in any one of the recesses or radial grooves 49<sup>a</sup> in the disk 49 previously described. A turn button 64 is pivotally mounted in a horizontal position on the bracket 59 and may be turned so as to bear against the upper end of the bar 61 and hold the same against accidental displacement. This structure is used when, at times, the cutter cylinder 22 is to be held against rotation in sharpening and retouching the cutter knives thereof.

When the cutter cylinder 22 has been projected outwardly to the position shown in Fig. 5, a frame for carrying the sharpening devices is adapted to be connected to the supporting frame for the cylinder. It consists of two brackets 65 shaped to fit over the ends of the cutter cylinder frame and adapted to be securely held in place by set screws 66 as shown in Fig. 7. Arms 67 extend from the brackets to one side and then upwardly and between the upper ends of these arms a bar 68, trapezoidal in section, is located and permanently secured. On this bar adjacent each end thereof stop members 69, best shown in Fig. 7, may be adjustably mounted and retained in any desired position by set screws from which pins 70 extend toward each other, being for the purpose of limiting the travel of the sharpening devices which may be mounted on the bar 68. In the first operation of sharpening the knives the cylinder 22 is left free to rotate and is rotated by the motor 45. A so-called jointing device is mounted on the bar 68 and may be moved back and forth thereon, an abrasive stone or similar member being fed toward the knives which, coming in contact therewith are in this manner, with the cutter head rotating, all cut down to the same height. The construction of the jointing device comprises a slide 71 mounted on the bar 68 from which a rod 72 extends outward having a handle formed at its outer end that the slide may be moved manually back and forth on the bar 68. A plate 73 is adjustably mounted on the slide 71 on the face of which the jointing tool may be detachably secured, this comprising a base 74 fitting in and detachably connected

to the plate 73, an arm 75 extending therefrom, and a stone or similar abrasive member 76 fixed at the free end of the arm 75. The stone is positioned vertically and so located that it lies substantially in a vertical plane containing the axis of the cutter cylinder 22 (see Fig. 6). The stone may be fed toward the knives by rotating the crank 77 shown. This construction of jointing tool is not any part of this invention and specific details of the structure thereof need not be entered into.

After the jointing operation has been performed the jointing tool is removed from the bar 68 and a grinding wheel driven by an electric motor slidably mounted thereon in any suitable manner in accordance with old and accepted practice. When this is done the bar 61 with its projecting pin 63 is mounted in place and is successively engaged with the radially disposed grooves 49<sup>a</sup> in the disk 49 as shown in Fig. 8. There being as many of these grooves as there are knives in the cutter cylinder each knife may be sharpened by the motor as is evident.

It is evident from the foregoing that many advantages are inherent in this construction when applied to planers. The adjustment of the table for different thicknesses of stock carries the motor 45 with it and the adjustment of the cutter cylinder 22 for different depths of cut carries the motor with it, it at all times being aligned with the cylinder and there is no possibility or likelihood of any misalignment occurring as in other structures where the motor has to be disconnected from the cutter cylinder whenever the same is removed for sharpening the knives. The direct and permanent connection of the motor is a very valuable and practical feature of this invention. The possibility of the outward projection of the cutter cylinder whenever it requires attention and the knives need dressing or sharpening without requiring its removal bodily from the machine, and the simple and efficient mechanism by which it is projected is another exceedingly valuable feature of the invention. Where the cutter cylinder has been removed heretofore it has not only necessitated some form of coupling between the motor shaft and the cutter cylinder, which coupling had to be detachable so that the motor could be shifted out of the way, but the cylinder being heavy and cumbersome it was necessary for at least two men to take care of the removal and the replacement of the cylinder. The cutter cylinder had to be carried to a suitable auxiliary sharpening and grinding device and placed therein, thus requiring a separate and distinct machine which owners of planers of this character were required to keep in operation at their plants. All of this trouble and effort is obviated by the present invention. The cylinder does not have to be re-

moved. One man can attend to the projection thereof or the retraction into the body of the machine and the supporting frame consisting of the bracket 65, arms 67 and bar 68 may be easily placed on to and taken off when necessary. The invention is defined in the appended claims and is to be considered as comprehensive of all forms of structure coming within their scope.

10 We claim:

1. In a machine of the character described, in combination, a table, a supporting saddle mounted transversely of said table, a cutter cylinder carried by the saddle, an electric motor permanently secured at one end of the saddle and directly and permanently connected with the cutter cylinder, and means for moving said cutter cylinder and motor attached thereto outwardly and in a plane parallel to the length of the saddle, and means for supporting the motor and outer end of the cutter cylinder as the same are moved outwardly, substantially as described.

2. In a machine of the class described, in combination, a table and a cutter cylinder mounted transversely thereof, work engaging means located above said table and cylinder, means for simultaneously adjusting the table and cutter cylinder toward and from said opposed work engaging means for different thicknesses of work, a motor directly and permanently connected to the cutter cylinder, means for adjusting the cutter cylinder relative to the table to vary the depth of cut, said motor moving with the cutter cylinder when thus adjusted, means for mounting said cutter cylinder in the machine whereby it and the motor connected thereto may be bodily moved outward or inward together with respect to the machine, and means interposed between the cutter cylinder and the mount therefor, manually operable to move said cylinder and attached motor bodily outward or inward.

3. In a machine of the class described, in combination, a table, a supporting saddle mounted transversely of said table, a cutter cylinder rotatably mounted and extending longitudinally of said saddle, a motor located at one end of the saddle and permanently connected to said cutter cylinder to drive the same, means interposed between the cutter cylinder and saddle, manual operation of which moves the cylinder with attached motor in a direction parallel to the length of the cutter cylinder, and means for releasably securing said cylinder in the machine when it is in operative position therein.

4. In a machine of the character described, in combination, a table, an elongated saddle located transversely of the table the full width thereof, a cutter cylinder rotatably mounted in and located lengthwise of the saddle, an electric motor located

at one end of the saddle and permanently connected with the cutter cylinder to drive the same, means for slidably mounting said cylinder for movements longitudinally in one direction, means interposed between the cutter cylinder and saddle, manual operation of which moves the cylinder with attached motor in the direction of the length of the cylinder, and means for releasably securing the cylinder to said saddle when it is in inner operative position in said machine.

5. In a machine of the class described, in combination, a frame, a table carried by said frame, a saddle mounted transversely of the table and below the same on said frame, an elongated supporting frame slidably received in the saddle, a cutter cylinder rotatably mounted on and at the upper part of said elongated supporting frame lengthwise thereof, an electric motor permanently secured to the end of the supporting frame having its shaft permanently connected with the cutter cylinder and means interposed between said slidable supporting frame and the saddle adapted to be manually operated to move the cutter cylinder and attached motor inward or outward.

6. In a machine of the character described, in combination, a frame, a channel-shaped saddle mounted transversely of said frame, a table located above the saddle, said saddle being open at its upper side and having upstanding flanges, an elongated supporting frame carried by said saddle between the flanges thereof and slidable lengthwise of the saddle, a cutter cylinder rotatably mounted on and located lengthwise of the supporting frame, an electric motor permanently secured at one end of the supporting frame and having its shaft permanently secured to the cutter cylinder, a rack located against and attached to one side of the supporting frame, a pinion engaging with said rack, and means for manually turning the pinion to move the supporting frame with its attached cutter cylinder and motor back and forth lengthwise of the saddle, substantially as described.

7. A construction containing the elements in combination defined in claim 6, combined with a truck adapted to be disposed underneath the motor, said truck being provided with a vertically adjustable head against which the under side of the motor may bear, and means for vertically adjusting said head, substantially as described.

8. In a machine of the class described, the combination of a table and a support therefor, work engaging means opposed to said table, a saddle mounted on the support transversely thereof, means for adjusting said saddle vertically, an elongated frame located lengthwise of and slidably mounted on the saddle, a cutter cylinder rotatably mounted on and extending lengthwise of the

frame, an electric motor permanently secured to one end of the frame and having its shaft permanently connected to the cutter cylinder, means for adjusting the first mentioned support and the table toward or away from said work engaging means, and means for slidably moving the frame with its cutter cylinder and motor mounted thereon outwardly and inwardly and in a direction parallel to the length of the saddle, substantially as described. 10

In testimony whereof we affix our signatures.

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WENDELL R. BUSS.