

Nov. 20, 1962

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3,064,400

MODEL TRIMMER

Filed Nov. 2, 1959

3 Sheets-Sheet 1

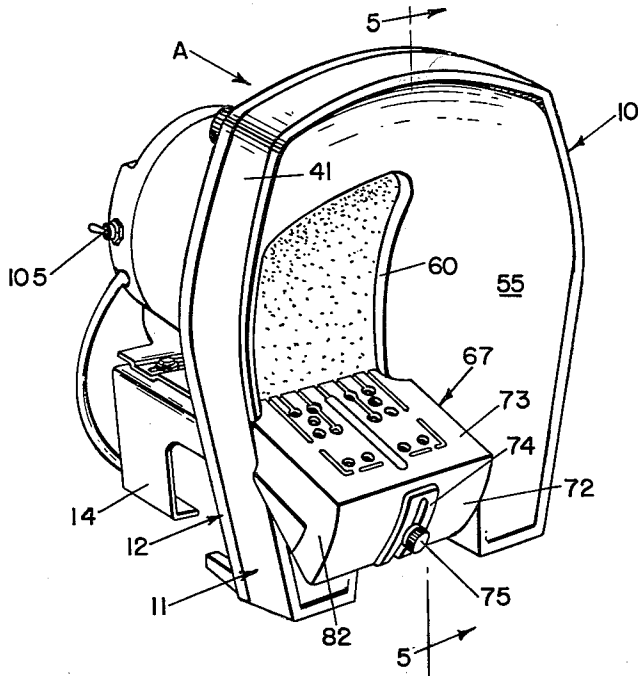


FIG. 1.

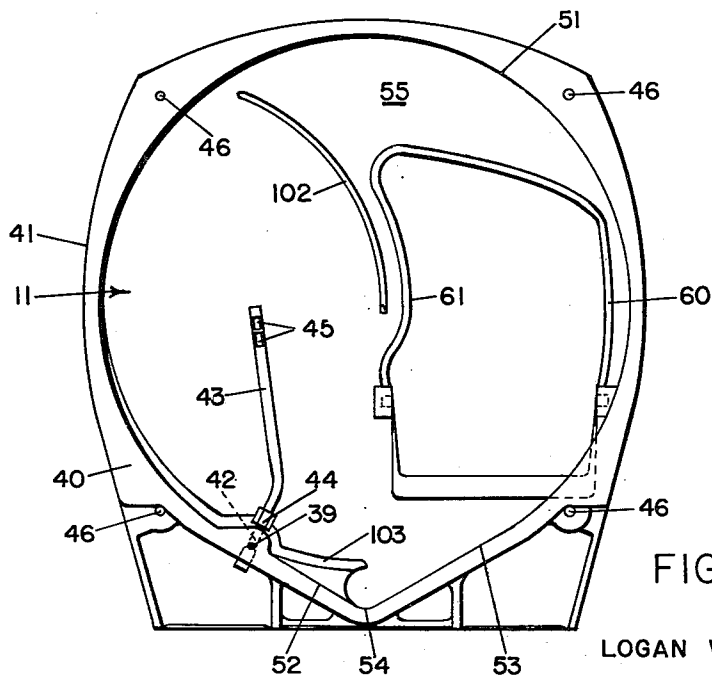


FIG. 2.

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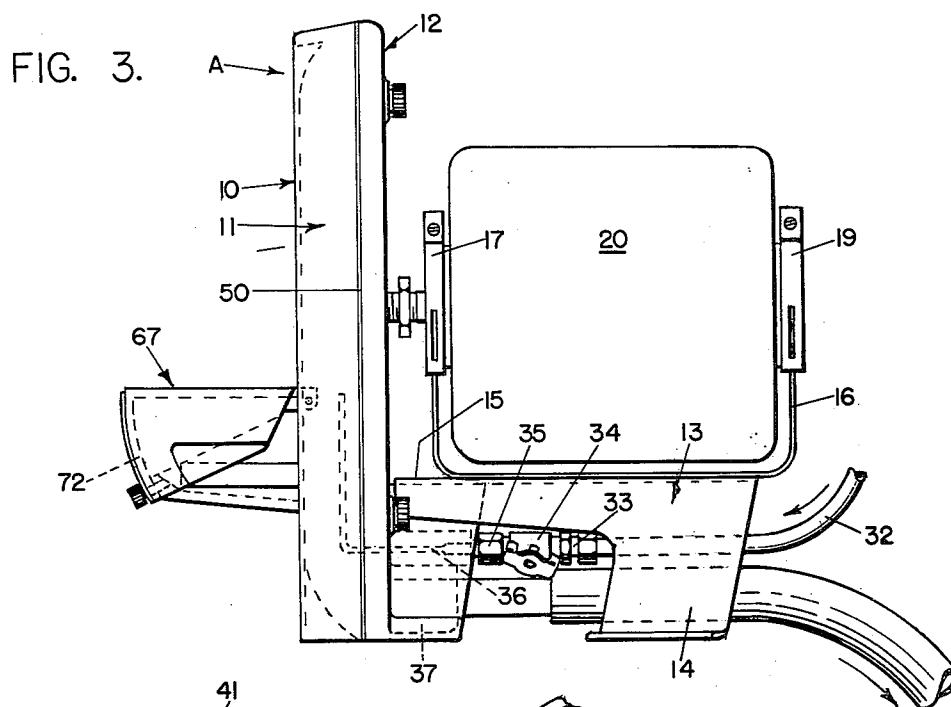
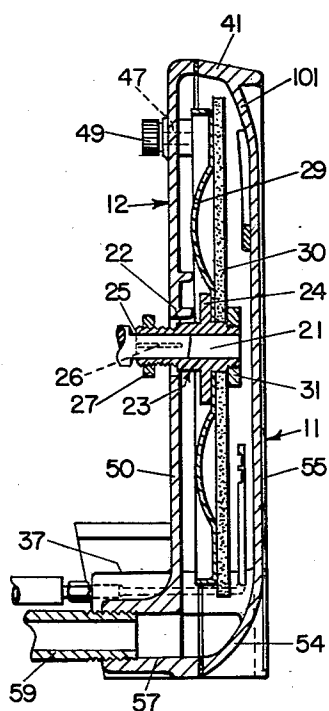
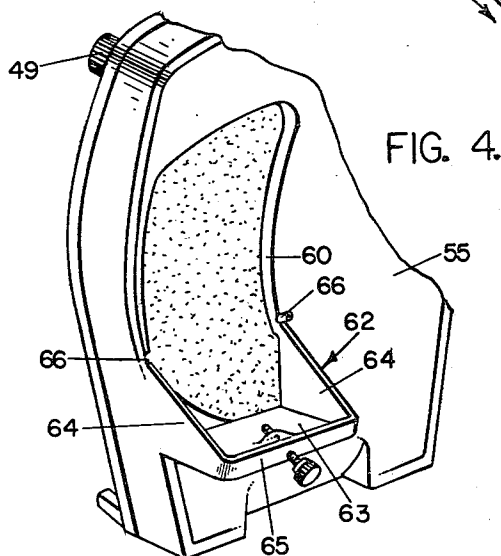


FIG. 5.



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3 Sheets-Sheet 3

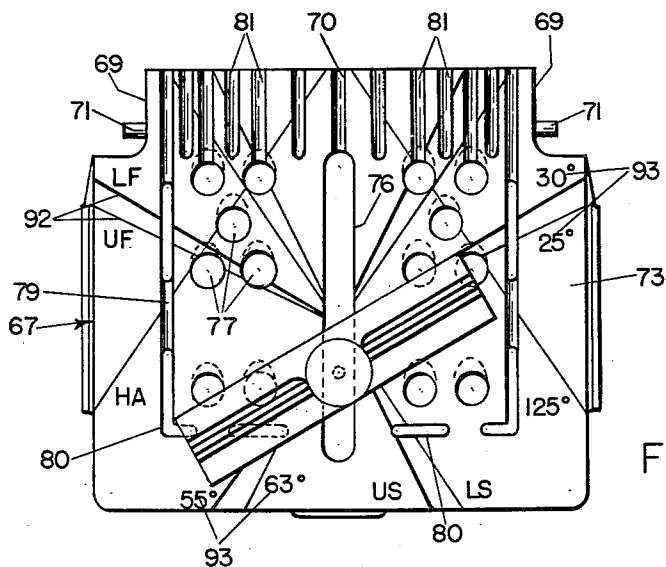


FIG. 6.

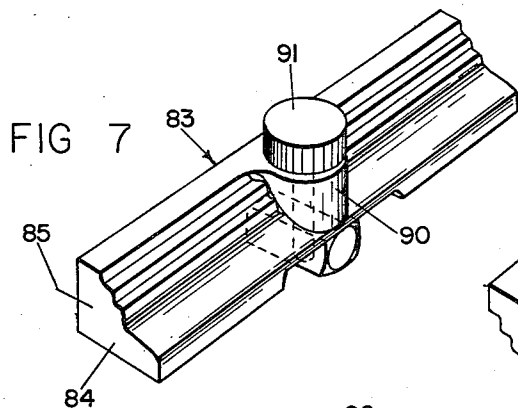


FIG. 7

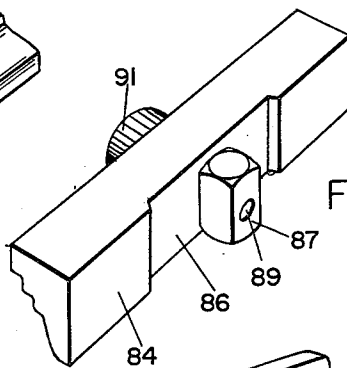


FIG. 8.

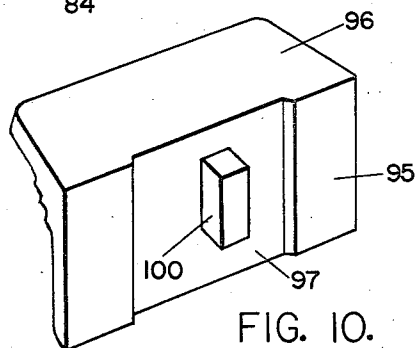


FIG. 10.

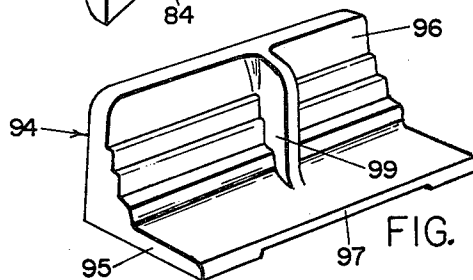


FIG. 9.

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MODEL TRIMMER

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6 Claims. (Cl. 51-267)

This invention relates to an improvement in model trimmer and deals particularly with a grinding device designed for use in trimming dental models and the like.

Model trimmers of the type used in grinding portions of dental models and the like have been produced for numerous years. These trimmers usually include a housing which encloses a grinding wheel connected to a source of power. An opening is provided in the housing through which the model to be trimmed may be extended. In some instances, water is sprayed upon the periphery of the grinding wheel in an attempt to wet the surface thereof.

The model trimmers which have been previously produced have been subject to certain difficulties. The housing which encloses the wheel must include separable parts to provide access to the wheel for changing or replacement thereof. In view of the fact that the operating motor normally is connected to the wheel through the rear of the housing, it has usually been necessary to provide a water connection to the front portion of the housing to provide a supply of water to the grinding wheel. As a result, whenever the front portion of the housing was removed to gain access to the grinding wheel, it was necessary to disconnect the water supply. If the water supply tube was connected to the fixed rear portion of the housing, it was necessary either to direct water only against the periphery of the wheel or else to bend the water pipe about the periphery of the wheel, thus interfering with the operation of removing and replacing the wheel. Furthermore, the arrangement was such that the debris caused by the grinding operation was normally thrown from the periphery of the wheel about the entire circumference of the housing, thus requiring constant cleaning of the interior of the housing. It was also difficult to properly relate the model relative to the grinding wheel so that the model would be ground at the proper angle.

It is an object of the present invention to obviate these previous difficulties.

A feature of the present invention resides in the provision of a model trimmer which includes a two part housing, one portion of which includes a peripheral wall designed to encircle the grinding wheel. In the preferred form, this peripheral wall is attached to the front panel of the housing so as to provide a better access to the interior of the housing. The water spraying system includes a spray pipe mounted on the front portion of the housing to direct water toward a portion of the grinding wheel near the axis thereof. As the wheel is rotated at a high speed, the water runs outwardly along the surface of the grinding wheel by centrifugal force, providing an even surface of water on the grinding wheel.

A further feature of the present invention resides in the provision of making passages through the front and rear portions of the housing providing a communication from a fixed water fitting on the rear portion of the housing to the spray pipe and nozzle. With this arrangement, an open passage is provided from the water supply pipe to the spray nozzle when the housing is closed. However the front portion of the housing may be detached without disconnecting the water supply pipe or the spray pipe.

A further feature of the present invention resides in the provision of a housing having a peripheral interior

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wall which is arcuate throughout the upper portion of the housing but which includes walls along the bottom of the housing which extend generally tangentially from the inner arcuate surface to the lowermost part of the housing. The inner surface of the housing is provided with ribs or veins thereupon which tend to guide the air generated by the rotation of the grinding wheel together with the water and particles of ground material toward the bottom of the housing. In other words, the rotation of the grinding wheel acts to some extent as a fan tending to direct material downwardly to the bottom of the housing and through the housing outlet. Thus the interior of the housing is aerodynamically designed to take advantage of the wheel windage to force water and foreign material through the drain. As a result of this arrangement, the the housing drain is maintained almost clear of foreign material, where, in the past, the drain pipe had to be cleaned at frequent intervals.

A further feature of the present invention resides in the provision of a simple but novel form of adjustable table supported adjoining the opening in the front of the housing exposing the grinding wheel. A generally trough shaped projection is provided on the front of the housing, the bottom of which inclines toward the interior of the housing to permit the drainage of material into the housing. The upper surface of the projections inclines forwardly and downwardly. A table is provided with a pair of opposed pivots or pintles projecting laterally therefrom which engage in pivot notches adjoining the front surface of the housing. The table includes an arcuate forward wall which extends into overlapping relation with the front of the trough shaped projection. A clamping bolt extends through a slot in the arcuate wall and into the forward end of the projection to hold the table at a desired angle. As a result, the table may be held in a horizontal position or may be supported in the forwardly and downwardly inclined position to grind the model at a desired angle.

In preferred form, the model trimmer table includes a slot which extends in a plane normal to the surface of the grinding wheel and which is vertical. A back up plate engageable with the rear of the model being trimmed is slidable toward or away from the grinding wheel and includes a downwardly projecting lug slidable in the slot. Gage lines are provided on the surface of the table intersecting the slot at various angles. By adjusting the position of the backup plates relative to the lug which is slidable in the slot, the backup plate may be adjusted to a predetermined angle relative to the grinding wheel so as to grind the model at a desired angle.

A further feature of the present invention resides in the provision of four fixed studs on the cover of the housing which are in parallel relation and which are engageable through openings in the rear portion of the housing. These studs insure the proper relation between the two parts of the housing and permit the housing to be fastened together by thumb nuts.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

FIGURE 1 is a perspective view of a model trimmer showing the general arrangement of parts.

FIGURE 2 is an elevational view of the front portion of the housing when removed from the rear portion thereof.

FIGURE 3 is a side elevational view of the model trimmer.

FIGURE 4 is a front perspective view of a portion of the model trimmer with the table removed therefrom.

FIGURE 5 is a vertical sectional view through the

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center of the model trimmer on the line 505 of FIGURE 1, portions thereof being broken away.

FIGURE 6 is a plan view of the model trimmer cable with the slide block mounted thereupon.

FIGURE 7 is a perspective view of the slide block removed from the table.

FIGURE 8 is a perspective view of the underside of the slide block shown in FIGURE 7.

FIGURE 9 is a perspective view of a modified form of slide block.

FIGURE 10 is a bottom perspective view of the slide block shown in FIGURE 9.

The model trimmer is indicated in general by the letter A and includes a housing 10 including a front portion 11 and a rear portion 12. A motor mounting table indicated in general by the numeral 13 is secured to the rear side of the rear housing portion 12. The table 13 includes supporting legs such as 14 and a horizontal table top 15.

A motor mounting cradle 16 is mounted on the table top 15 and includes resilient supports 17 and 19 which support the driving motor 20. The motor 20 includes a motor shaft 21 which extends through an aperture 22 in the rear housing portion 12. The motor shaft 21 acts to support a grinding wheel in a manner which will be later described.

A sleeve 23 having a peripheral flange 24 intermediate its ends is mounted upon the motor shaft 21. The rear end 25 of the sleeve 23 is split as indicated at 26 so that the end of the sleeve may spread apart slightly. A nut 27 is threaded on the outer surface of the sleeve end 25 and by threading the nut 27 on the sleeve, the sleeve is clamped tightly about the motor shaft to hold the sleeve in place.

A metal backing plate 29 of disc shaped form is mounted upon the forward end of the sleeve 23 and the grinding disc 30 is mounted upon the sleeve forwardly of the backing plate. A clamping nut 31 holds the grinding disc 30 and the backing plate 29 against the sleeve flange 24 to hold these parts for rotation in unison.

As indicated in FIGURES 3 and 5 of the drawings, an inlet water pipe 32 is connected through a suitable adapter 33 and a shut off valve 34 to a fitting 35 threaded into one end of a generally horizontal passage 36 leading through a rearwardly projecting boss 37 on the rear housing portion 12. The passage 36 communicates with a registrable passage 39 in the abutting surface 40 of the peripheral wall 41 of the front housing portion 11. The passage 39 leads to a generally radially extending passage 42. A spray pipe 43 is provided with a fitting 44 which is threaded or otherwise mounted in the end of the passage 42. The spray pipe 43 is provided with rearwardly facing slots 45 which are directed toward the forward surface of the grinding wheel 30 near the center thereof. The rear face surface 40 of the side wall 41 forming a part of the forward housing member 11 is provided with a series of angularly spaced parallel projecting studs 46. These studs are designed to extend through apertures such as 47 in the rear housing member 12 and thumb nuts 49 are threaded on the ends of the studs to hold the front and rear housing portions in face contact. A gasket 50 is interposed between the two housing sections to form a seal therebetween and to form a seal encircling the aligned passages 36 and 39.

The inner surface of the side wall 41 is arcuate as indicated at 51 throughout the upper portion of the housing and the lower portions of the side walls extend substantially tangentially to the inner surface as indicated at 52 and 53 toward the lowermost end of the side wall. As indicated in FIGURE 5 of the drawings, the lower portion of the front panel 55 is curved rearwardly toward the lowermost housing portion 54. The wall panel 56 of the rear housing section 12 is provided with a rearwardly extending outlet passage 57 in opposed relation to the lowermost portion 54 of the front section 11 and an

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outlet conduit 59 connects the outlet passage 57 to a suitable drain.

An opening 60 is formed in the front panel 55 of the front section 11 of the housing on one side of the center of the grinding wheel. As illustrated in FIGURE 2 of the drawings, the upper portion of the opening 60 is encircled by a rearwardly extending flange 61 which extends from the rear surface of the front plate toward the grinding wheel. As is best illustrated in FIGURE 4 of the drawings, a generally trough shaped forward projection illustrated in general by the numeral 62 extends forwardly from the lower portion of the opening 60. The projection 62 includes a bottom panel 63 which slopes downwardly and rearwardly toward the base of the opening 60, generally triangular side walls 64 extending from opposite sides of the opening 60, the forward ends of which are connected by an upwardly and forwardly extending wall 65. Aligned substantially semi-cylindrical notches 56 are provided in the side wall 64 near the juncture of these side walls with the front panel 55.

A table 67 is hingedly supported on the front housing section 11 overlying the forward projection 62. As indicated in FIGURE 6 of the drawings, the table is generally rectangular in plan and is notched as indicated at 69 so that the rear end 70 of the table may extend through the opening 60 and into close proximity with the grinding wheel 30. Opposed and aligned pintles 71 project laterally from opposite sides of the notched portion of the table, these pintles being engageable in the notches 66. Thus the table 67 is pivotally supported about the axis of the pintles 71 for movement about a substantially horizontal axis.

As indicated in FIGURES 1 and 3, the table 67 includes an arcuate forward wall 72 below the level of the table top 73 which lies forwardly of the wall 65 of the forward projection 62. A thumb screw 73 extends through a slot 74 in the forward wall 72 of the table and is threaded into the wall 65 of the trough shaped projection 52 to clamp the table 67 in an adjusted position. The upper surface 73 of the table may accordingly be positioned on a substantially horizontal plane, or may be inclined with respect to the horizontal.

The upper surface 73 of the table 67 is preferably formed as best illustrated in FIGURE 6 of the drawings. A slot 76 is provided in the table top in right angular relation to the rear edge 70 thereof, or parallel to the sides of the table. The table top 73 is preferably provided with a series of apertures such as 77 therethrough through which liquid splashed upon the table may flow and grooves such as 79 extend about the main working surface of the table portions of the grooves such as 80 extending entirely through the table to permit the drainage of moisture. Grooves such as 81, some of which communicate with the opening 77, are provided in a rear edge 70 of the table in the upper surface thereof to also act for catching moisture and sludge and to assist in maintaining the upper surface of the table flat. As indicated in FIGURES 1 and 3 of the drawings, the table 67 is provided with generally triangular sides 82 which extend downwardly from the side edges of the table top 73 and join the front wall 72.

A slide block 83 includes an under surface 84 designed to rest in face contact with the upper surface 73 of the table 67 and includes a right angular forward surface 85 against which the model being trimmed may abut. The central portion of the under surface 84 is centrally notched as indicated at 86 and a rectangular lug 87 is pivotally supported midway between the ends of the slide block by a clamping screw 89. The clamping screw 89 extends through the slide block and through a central boss 90 projecting upwardly therefrom and is provided with a knurled head 91.

In operation, when the lug 87 is engaged in the groove 76, the slide block 83 may be adjusted at any desired

angle and the thumb screw 90 to hold the slide block and lug in proper angular relation and to maintain the slide block in proper angular relation on the table.

As indicated in FIGURE 6, the upper surface of the table 73 is provided with a series of gauge lines 92 thereupon, most of which preferably intersect at a common point at the axial center of the slot 76. Indicia such as 93 is provided adjoining these gage lines to indicate a certain angular relations from a transverse position in which the slide block is parallel to the rear edge 70 of the table. The gage line 92 and indicia 93 eliminate a need for a protractor or similar instrument in setting the position of the slide block.

FIGURES 9 and 10 of the drawings disclose a supplemental or modified form of slide block which is used where angular adjustment of the slide block is not required. The slide block 94 includes a horizontal flange 95 designed to rest in face contact with the upper surface 73 of the table and an upright flange 96 which is preferably at right angles to the bottom surface 95. The under surface of the flange 95 is preferably cut away along the center portion of the slide block as indicated at 97 to minimize friction. A central reinforcing web 99 permits the slide block to be more readily manipulated. The rectangular lug 100 is provided intermediate the ends of the slide block 94 with its longitudinal axis at right angles to the flange 96. The lug 100 is of proper dimensions to slidably engage in the slot 76 and to hold the flange 96 in parallel relation to the edge 70 of the table. As indicated in FIGURE 5 of the drawings, the upper end 101 of the front panel 55 is curved inwardly and ribs or vanes such as 102 and 103 project rearwardly from the rear surface of the front panel 55 toward the grinding wheel 30. The shape of the housing is aero-dynamically designed so that the movement of air created by the rotation of the grinding wheel will tend to direct moisture and sludge downwardly toward the bottom of the housing, the air acting to assist the draining of the housing. In other words, the grinding wheel acts somewhat in the manner of a fan blade to direct air downwardly in the housing and to force the water and sludge through the outlet. This is found to be important and it has been found that if the grinding wheel and water are permitted to run for a short period of time at the completion of the grinding operation, the sludge and water will be effectively drained from the housing. In the past, it has often been necessary to clean the drain of model trimmers at frequent intervals in order to provide an effective flow and to keep the housing clean.

The operation of the apparatus has been mainly described in the foregoing description. In using the device, the water supply valve 34 is turned on, permitting sufficient liquid to flow through the spray pipe 43 to moisten the grinding wheel. As the water is sprayed on the inner portion of the wheel, it tends to flow outwardly gradually by centrifugal force so as to evenly cover the surface of the wheel.

A model is placed upon the table 67 which adjusted to the proper angle and the model is trimmed in the usual manner. Due to the shape of the interior of the housing, the air which is circulated by rotation of the grinding wheel tends to assist the water from the wheel in flushing the sludge from the bottom of the housing.

After the completion of the grinding operation, the wheel is permitted to rotate for a short period of time so as to clear the housing of sludge. The current to the motor 20 is then turned off by the switch 105 and the device remains stationary until it is again required for use.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in model trimmer, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made

within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A model trimmer comprising a housing including a rear plate and a front plate, one of said plates having peripheral walls abutting the other of said plates, means for detachably connecting said plates, a motor support connected to said rear plate, a motor on said support, a shaft connected to said motor and extending through said rear wall, an abrasive wheel on said shaft within said housing, said front plate having an opening there-through forwardly of said wheel, and inwardly projecting vane means fixedly mounted on at least one of said walls tending to direct air moved by rotation of said wheel downwardly in said housing and including an outlet at the bottom of said housing, one said vane means extending from said peripheral wall to a point directly above, and adjacent to, said outlet.

2. A model trimmer comprising a housing including a rear plate and a front plate, one of said plates having peripheral walls abutting the other of said plates, means for detachably connecting said plates, a shaft extending through said rear plate, an abrasive wheel on said shaft within said housing, said front plate having an opening therethrough forwardly of said wheel and inwardly projecting fixed vane means on at least one of said walls tending to direct air moved by rotation of said wheel downwardly in said housing, an outlet at the bottom of said housing, one of said vane means extending from said peripheral wall and terminating directly above, and adjacent to, said outlet, and means connected to said shaft for driving the same.

3. A model trimmer comprising a housing including a rear plate and a front plate, one of said plates having peripheral walls abutting the other of said plates, means for detachably connecting said plates, a motor support connected to said rear plate, a motor on said support, a shaft connected to said motor and extending through said rear wall, an abrasive wheel on said shaft within said housing, said front plate having an opening there-through forwardly of said wheel, a projection on said front wall projecting forwardly from the lower edge of said opening, a table pivotally connected to said front plate on a substantially horizontal axis across said opening, an arcuate forward wall on said table having the table pivot axis as its center of arcuation, cooperable means on said forward wall and said projection to hold said table at a desired pivotal position, said table including a groove at right angles to the table pivot axis, an elongated slide block slidable on the surface of said table, and a lug pivotally connected to the under surface of said slide block and slidable longitudinally of said groove.

4. The structure of claim 3 and including a series of guide lines intersecting said groove at various angles relative thereto.

5. The structure described in claim 3 and including a clamping screw pivotally extending through the slide block and said lug to form the pivotal connection between said lug and said slide block.

6. A model trimmer comprising a housing including a rear plate and a front plate, one of said plates having peripheral walls abutting the other of said plates, means for detachably connecting said plates, a motor support connected to said rear plate, a motor on said support, a shaft connected to said motor and extending through said rear wall, an abrasive wheel on said shaft within said housing, said front plate having an opening there-through forwardly of said wheel, a water supply pipe connected to said rear plate, said rear plate and front plate having registering passages therethrough communicating with said water supply pipe, and a spray pipe connected to said front plate in communication with the passage therein and extending forwardly of said abrasive wheel, whereby when said front plate is de-

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tached the water line is opened between said passages, said front plate including inwardly projecting fixed vane means on its inner surface tending to direct air toward the bottom of said housing, said housing having a drain opening at the bottom thereof, one of said vane means extending from said peripheral wall to a point directly above, and adjacent to, said drain opening.

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