Nov. 14, 1961 W. HAMMER 3,008,501

MULTIPLE VERTICAL SPINDLE WOODWORKING MACHINE AND METHOD OF WOODWORKING

Filed May 21, 1958 4 Sheets-Sheet 1

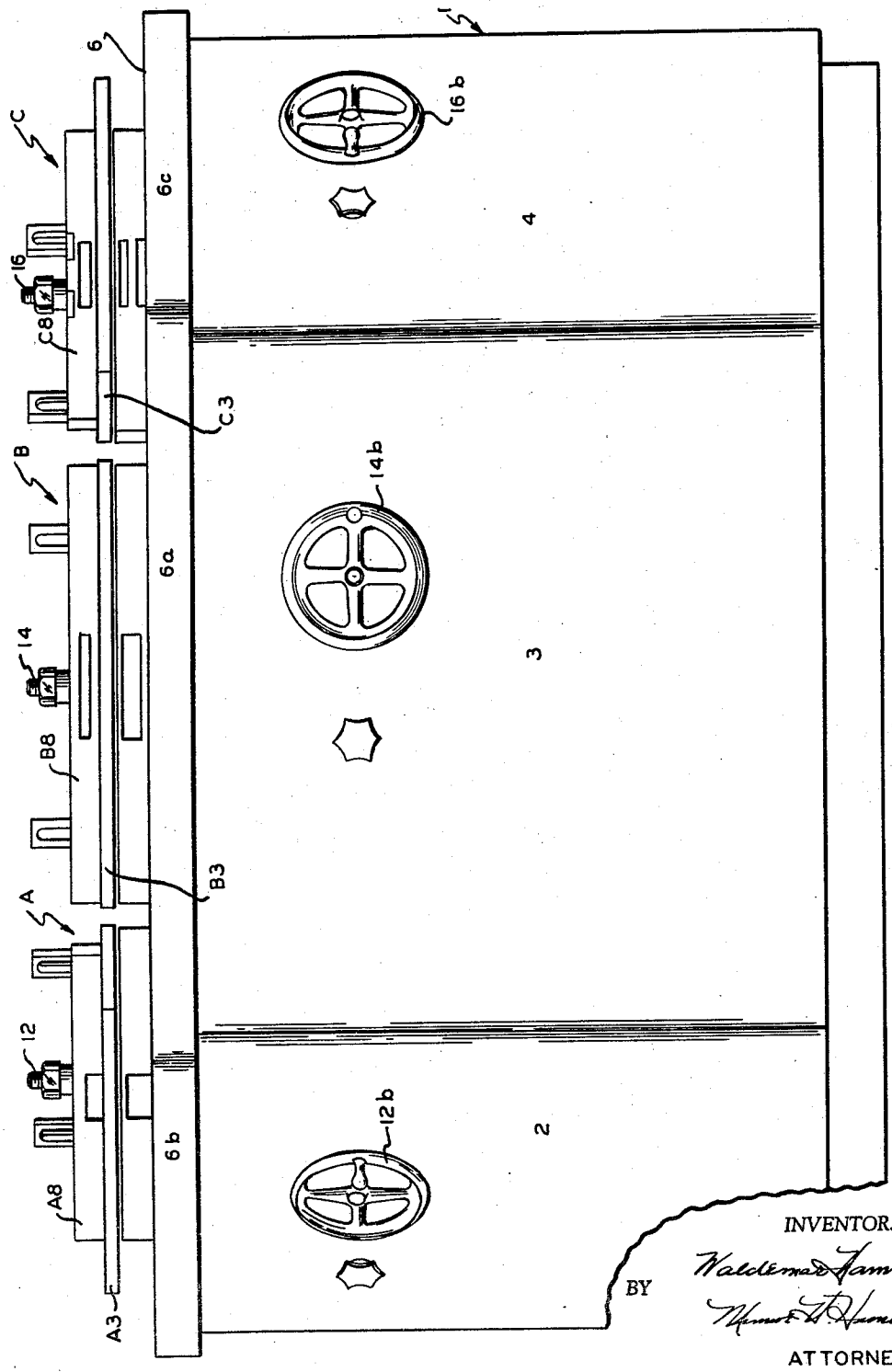

FIG. 1.

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MULTIPLE VERTICAL SPINDLE WOODWORKING MACHINE AND METHOD OF WOODWORKING

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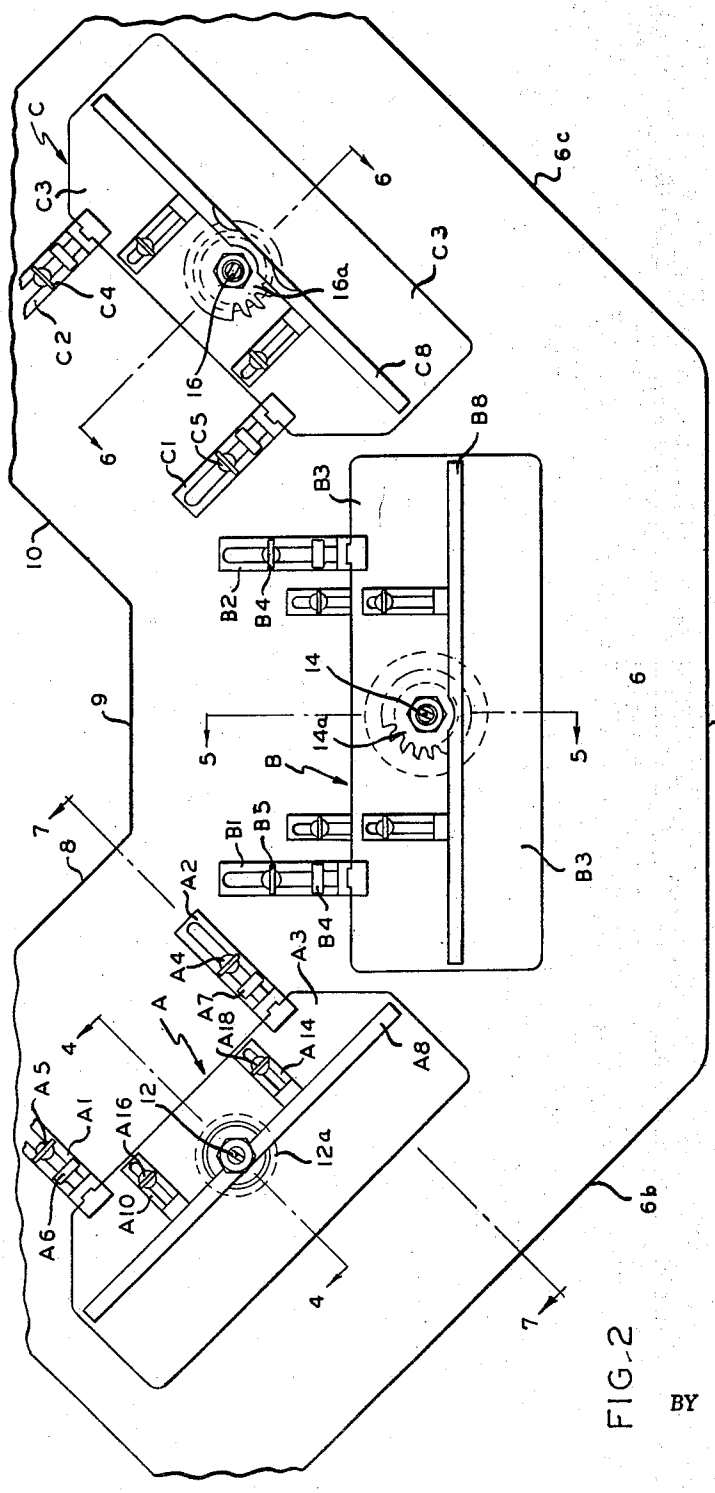

FIG. 2

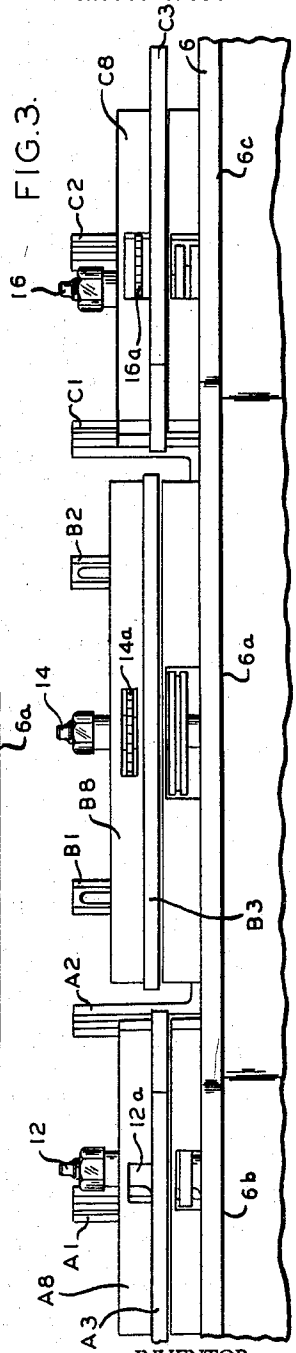

FIG. 3.

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FIG. 4.

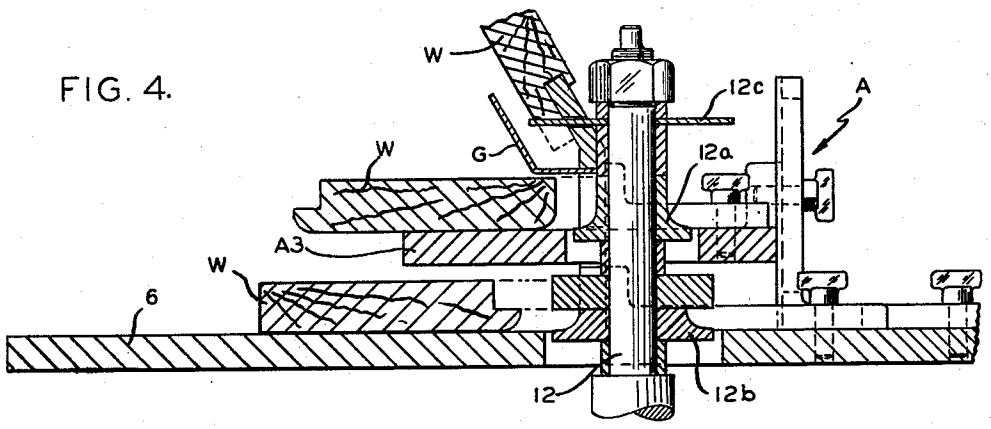


FIG. 5.

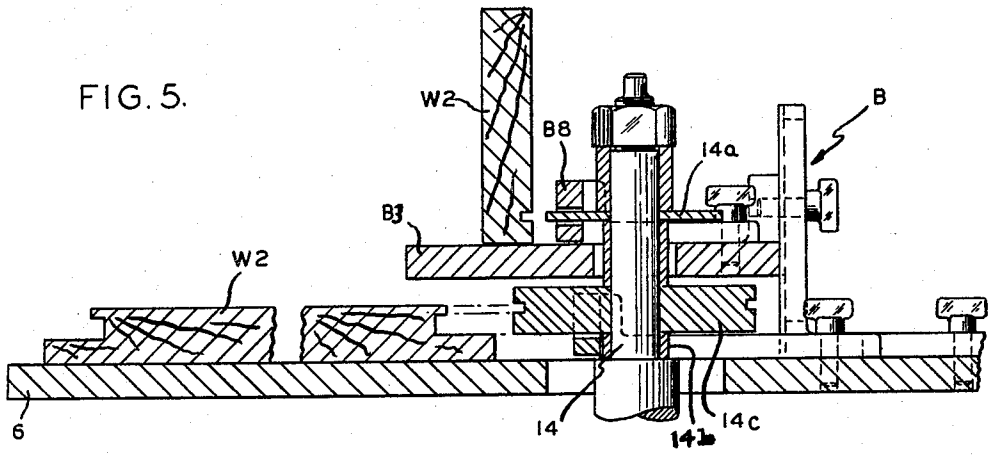
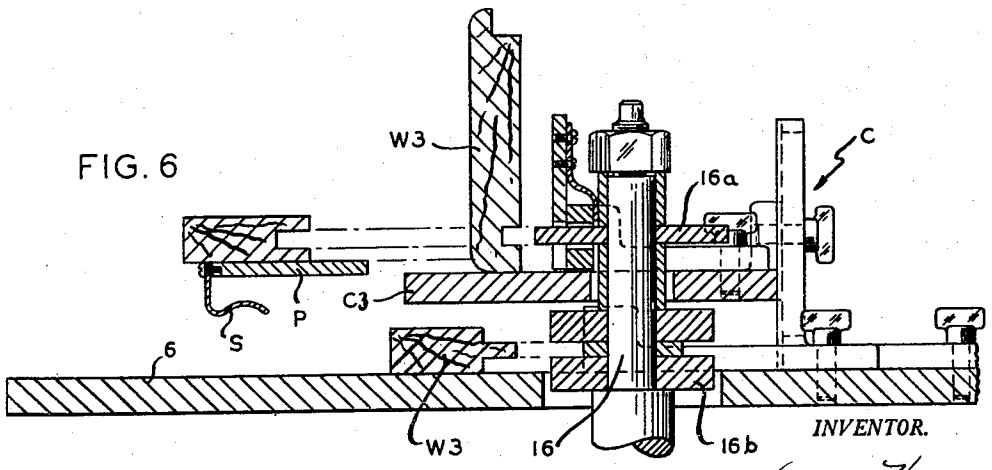


FIG. 6



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MULTIPLE VERTICAL SPINDLE WOODWORKING MACHINE AND METHOD OF WOODWORKING

Filed May 21, 1958 4 Sheets-Sheet 4

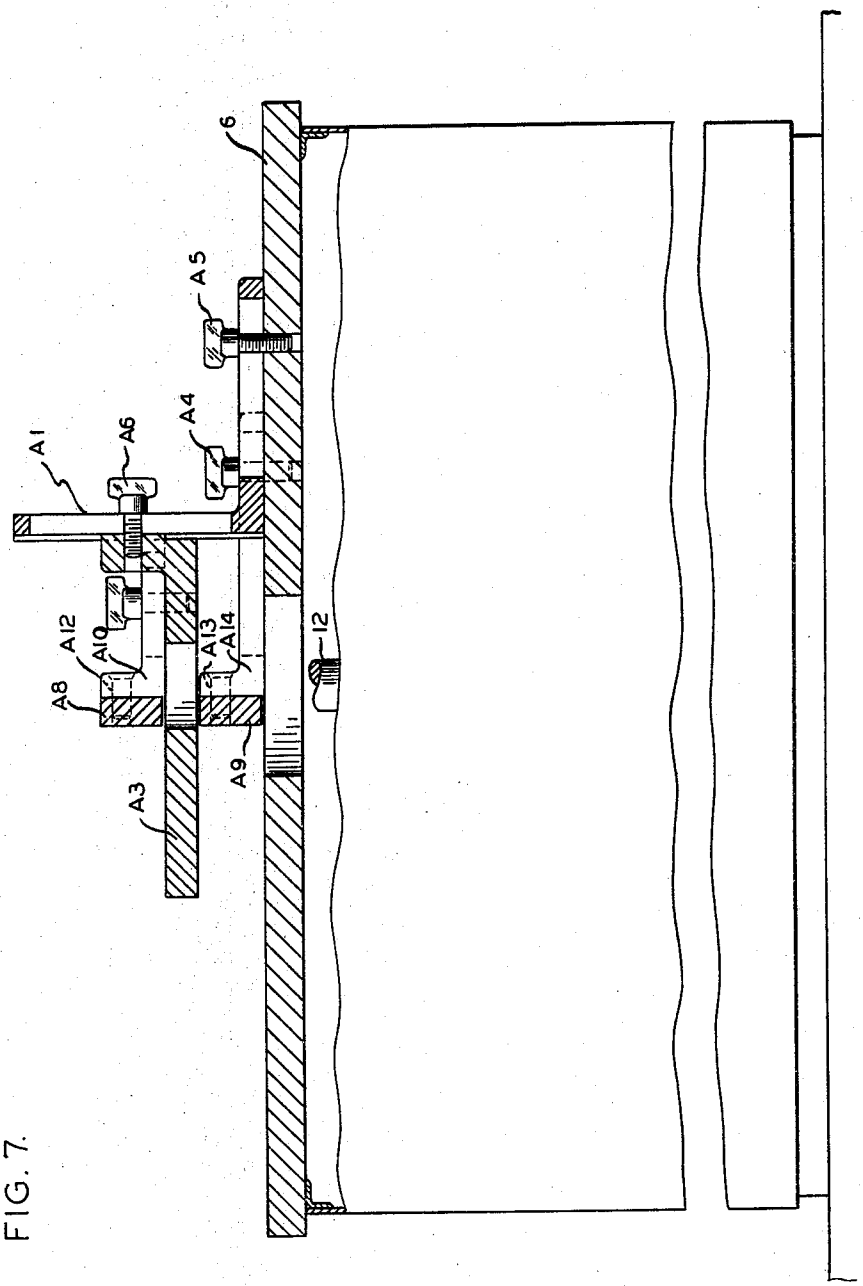

FIG. 7.

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3,008,501

MULTIPLE VERTICAL SPINDLE WOODWORKING MACHINE AND METHOD OF WOODWORKING

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Filed May 21, 1958, Ser. No. 736,865
1 Claim. (Cl. 144—1)

This invention relates to an improved method and machine for working wood and other materials of the class employed in the cabinet making art. More particularly, the invention is concerned with a woodworking machine construction designed especially for facilitating cutting operations such as rabbeting, grooving, forming notches, roll turns and the like.

In one specific respect the invention is concerned with a simplified method and arrangement of cutting elements for drawer making. In this class of conventional wood working operation, the drawer components are subjected to a number of different cutting steps, and it is the present practice in the cabinet making art to employ a series of machine setups requiring considerable time and work and involving as many as six or seven different changes in completing the more complex type of drawer construction.

It is a general object of the present invention to improve methods and apparatus for carrying out woodworking operations and, specifically, it is an object to deal with the problem of changing machine setups and to reduce and simplify the operations required in drawer making.

These and other objects and novel features will be more fully understood and appreciated from the following description of a preferred embodiment of the invention selected for purposes of illustration and shown in the accompanying drawings, in which:

FIG. 1 is a front elevational view of the improved wood working machine of the invention;

FIG. 2 is a plan view showing portions of the machine of FIG. 1 partly broken away;

FIG. 3 is a fragmentary enlarged elevational view of multiple surface table structure of the invention;

FIG. 4 is a view in cross section taken on the line 4—4 of FIG. 2;

FIG. 5 is a view in cross section taken on the line 5—5 of FIG. 2;

FIG. 6 is a cross section taken on the line 6—6 of FIG. 2; and

FIG. 7 is an elevational view partly in cross section with the cross sectional portion of the figure having been taken on the line 7—7 of FIG. 2.

In accordance with the invention, I have conceived of a multiple-surface table structure in which a plurality of driving spindles are arranged in spaced relation to one another and each spindle is combined with an upper and lower table and fence assembly so that a series of woodworking operations on a single piece of stock may be initiated at one of the spindle stations and continuously worked through each of the spindle stations until the final cut is made without separate handling operations.

Considering this multiple surface table structure in greater detail, arrow **1** denotes an enclosure body, preferably consisting of a steel casing. This enclosure body, as shown in FIG. 1, is formed with a vertical side wall **2**, a vertical front wall **3** and another vertical side wall **4**. The two side walls **2** and **4** extend substantially in an angularly disposed position, as is more clearly shown in FIG. 2. Supported above these side wall members, in overhanging relationship thereto, is a main table **6** which is formed with a front edge **6***a* and angularly extending edges **6***b* and **6***c*. At its rear, the enclosure **1** may be closed by sides as **8**, **9**, **10**.

In this three-sided angular enclosure body, I mount in

a vertically disposed position, three driving spindles **12**, **14** and **16** which may, for example, have fixed thereto cutting elements as **14***a*, **16***a* and **12***a*. As illustrated in FIG. 2 the spindles are set back from the table edges **6***b*, **6***a* and **6***c* to extend through suitable openings formed in the main table **6** and the spindles occur in substantially centered relationship in the table sections which are included by respective front edges **6***b*, **6***a* and **6***c*. Thus the spindles and their cutting elements present three cutting stations which are offset with respect to one another.

The spindles **12**, **14** and **16** may preferably consist of the customary form of driving spindles employed in shapers of conventional design. Also, as is customary with driving spindles of this nature, vertical adjustment is provided for by adjustment wheels as **12***b*, **14***b* and **16***b*, FIGURES 4 to 6 respectively. It will be further understood that these spindles are preferably power driven by electrical motor means contained in the enclosure body and the electrical motor means are not shown in the drawings as they are of well known form.

In combination with these three cutting stations which are comprised by the main table **6** and the spindles **12**, **14** and **16**, I provide three special multiple work surface units. These multiple work surface units are generally indicated by the arrows A, B and C respectively as best shown in FIGURES 1 and 2. Each multiple work surface unit includes a raised secondary table element, cooperating fence means and supporting bracket members for adjustably locating the table elements and their respective fences in a desired working position with respect to the driving spindles **12**, **14** and **16**.

Considering these multiple work surface units in greater detail, the unit A includes a pair of angle brackets A1 and A2. The brackets are formed with slotted base sections slidable on the main table **6** and adjustably secured by means of wing screws A4 and A5 which are threaded into the main table **6**. By loosening the wing screws the brackets A1 and A2 may be horizontally adjusted as desired. The brackets A1 and A2 also present vertical sections which are channeled as suggested in FIGURE 2 and in the channeled portions of these vertical sections are mounted, for vertical sliding adjustment, a table element A3 as is better shown in FIGURE 7. Wing nuts A6 and A7 are threaded into adjacent shouldered portions of the table element A3 to solidly lock the table element in any position of vertical adjustment desired as indicated in FIG. 7.

Further, in accordance with the invention, I provide a dual fence structure consisting of an upper fence element A8 and a lower fence element A9, which is supported on angle brackets as A10 and A11 respectively by means of locking screws A12 and A13. These angle brackets A10 and A11 are supplemented by a second pair of brackets one of which is shown in FIGURE 2 and denoted by the numeral A14. The brackets A10 and A14 are adjustably positioned and secured by means of wing screws A16 and A18.

By means of the arrangement described, a considerable range of adjustment may be realized both horizontally and vertically with respect to the table element A3 and also the fence sections A8 and A9 and thus a work piece may be brought into any position of engagement desired with respect to a cutting element supported on the spindle **12**.

It will be understood that the second multiple work surface unit B includes a table element B3 and a fence section B8, also the third multiple work surface C includes a table element C3 and fence section C8, with each of these units being supported on brackets corresponding to those already described with respect to the unit A.

By means of the three multiple work surface units described, it will be apparent that a work piece may be

initially advanced through any one of the stations and will be guided along a common horizontal path of movement. By changing the work piece from one station to another the work piece may be continued in a common horizontal plane of movement but its vertical plane of guidance is varied so that a series of different cutting steps may be carried out in rapid succession and with a single handling of the work piece.

Another important feature of the invention is the increased number of cutting operations which can be carried out. Attention is directed to FIGURES 4, 5 and 6. These figures represent cross sectional views taken vertically through the successive cutting stations of units A, B and C. As shown in FIGURE 4, for example, a work piece W may be engaged against the lower cutting element on the spindle **12***a* to provide a rabbeted cut as shown. This work piece may then be turned and advanced on the table A3 into engagement with a second cutter **12***a* on the spindle **12** to provide both rabbet edge and rounded corner. I may also wish to angle cut this work piece, or some other work piece and where this is desired, I may provide an angle guide G against which the work piece may be held while advanced into engagement with a cutting element **12***c* located at the top of the spindle **12**. It will be understood that various cutting elements may be interchanged and a wide range of cutting tools employed to carry out further desired cabinet working operations.

For example, in FIGURE 5 I have illustrated the spindle equipped with a table element B3 and fence B8, through which extends the cutter **14***a*. This cutter may be used to form a work piece W2 as shown. Another cutter **14***c*, located below the table element B1 may be employed to form another grooved edge in the work piece W2, or some other work piece.

In FIGURE 6, the driving spindle **16** is shown with the cutting tool **16***a*, cutting a slot in a work piece W3. Below the table element C3 is mounted a cutter **16***b*, which forms a rib on the work piece W3, or some other work piece. I may also provide an adaptor plate P which is adapted to overlie the table element C1 and be resiliently retained at the underside thereof by a spring S. The use of such a plate P makes it possible to use different thicknesses of stock in forming the slot or channel produced the cutter **16***a*.

It should be understood that these illustrated cutting operations are intended to indicate a wide range of other cutting steps and forming operations which may be carried out by varying the type of tool which is fixed on the driving spindles, or by using spaces or angle fence or other devices of this nature.

It will be further observed that in the operations illustrated in FIGURES 4, 5 and 6, almost all of the common cutting steps employed in making cabinet drawers can be carried out for each component of the drawer without having to lay the piece down from the time the work is

started until it is completed. This necessarily provides a substantial saving in time and labor in the setting up of special machines and the entire drawer making operation is greatly facilitated. It should be further understood that the invention, although particularly suitable for drawer making, is equally adaptable to various other cabinet making operations in the woodworking field.

While I have shown preferred embodiments of multiple work surface units, it should be understood that various changes and modifications may be resorted to within the scope of the appended claim.

Having thus described my invention, what I claim is:

A power tool comprising a stand having a horizontal work supporting surface mounted at the upper side thereof, a plurality of vertically disposed power driven spindles arranged in offset relation within the stand and extending upwardly through the work supporting surface, cutting elements fixed to the upper ends of the spindles, work guiding fence means extending upwards from the horizontal work supporting surfaces and presenting a plurality of vertical guide surfaces through which the said cutting elements may project in a lateral direction, said vertical guide surfaces being constructed and arranged to intersect one another and define a plurality of cutting stations which occur angularly with respect to one another along a common horizontal work supporting plane and adjustable work surface means located in spaced relation to the said horizontal work supporting surface, said stand presenting vertical sides which also occur in angularly disposed relationship to one another to provide relieved operator standing areas lying directly in back of respective vertical guide surfaces whereby a workpiece may be guided along the said common horizontal plane of travel and through successively changing vertical planes of travel for selectively engaging each of the cutting elements independently of one another.

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