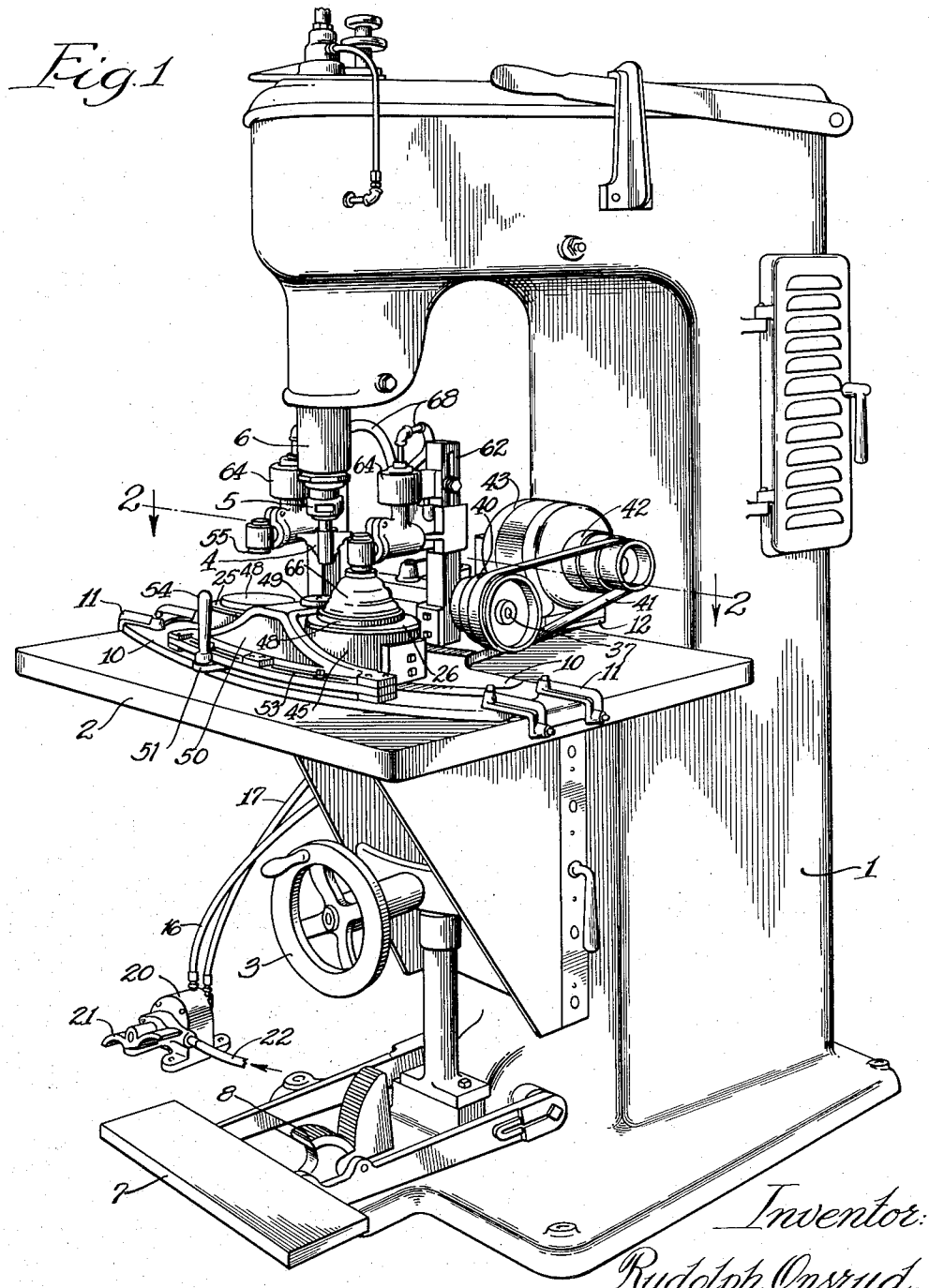
Feb. 8, 1938. R. ONSRUD 2,107,578

AUTOMATIC SHAPING MACHINE

Filed May 24, 1937 5 Sheets-Sheet 1

Fig. 1



Inventor:
Rudolph Onsrud,
By Rummler, Rummler
& Woodworth
Attorneys.

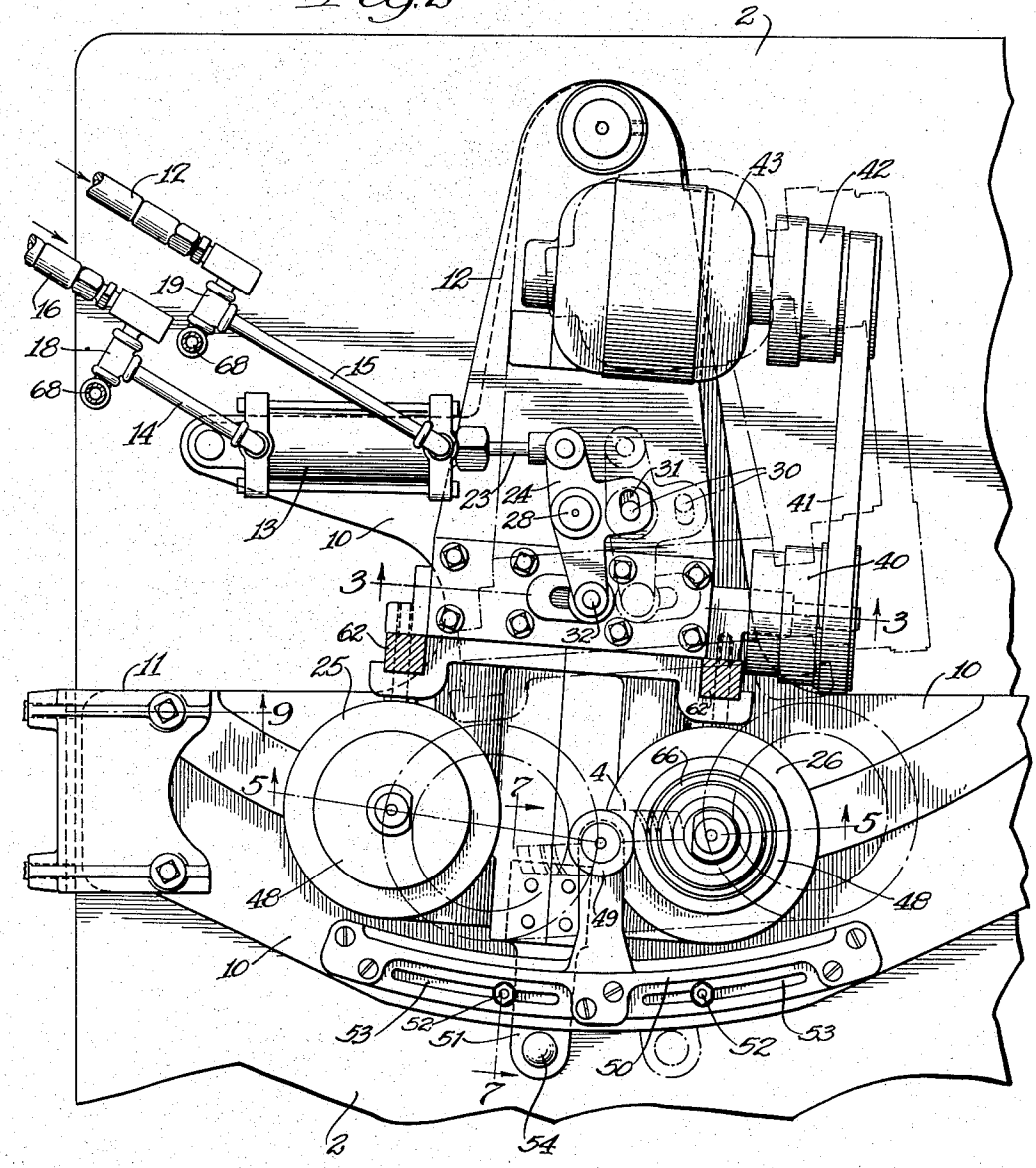
Witness:
L. I. Albert.

Feb. 8, 1938. R. ONSRUD 2,107,578

AUTOMATIC SHAPING MACHINE

Filed May 24, 1937 5 Sheets-Sheet 2

Fig. 2



Inventor:
Rudolph Onsrud,
By Rummler, Rummler & Woodworth
Attorneys.

Witness:
H. I. Ebert

Feb. 8, 1938. R. ONSRUD 2,107,578

AUTOMATIC SHAPING MACHINE

Filed May 24, 1937 5 Sheets-Sheet 3

Fig. 3

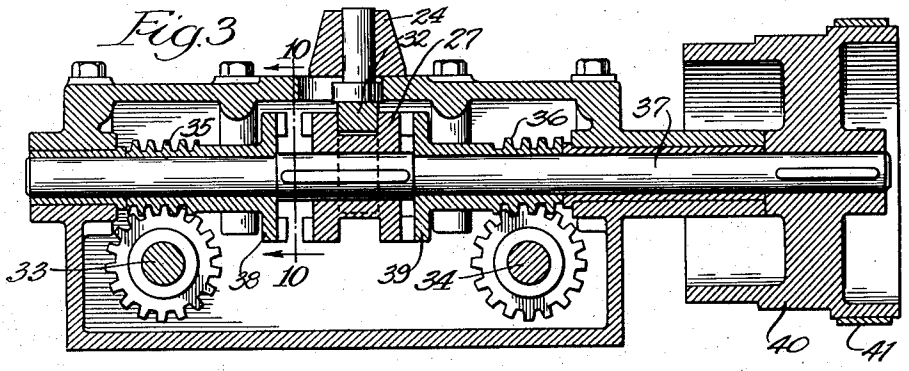


Fig. 4

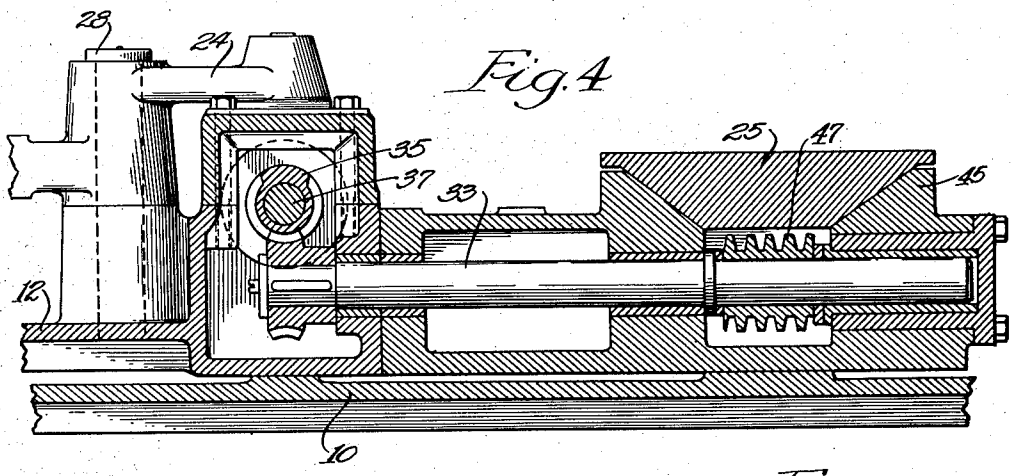


Fig. 9

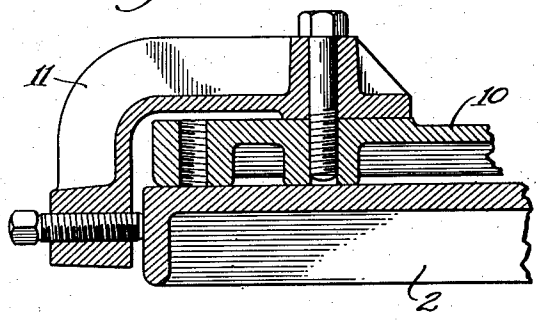
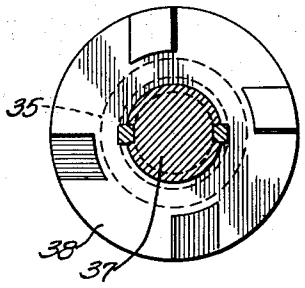


Fig. 10



Inventor:
Rudolph Onsrud,
By Rummler, Rummler & Woodworth
Attorneys.

Witness:
L. L. Ackert

Feb. 8, 1938. R. ONSRUD 2,107,578

AUTOMATIC SHAPING MACHINE

Filed May 24, 1937 5 Sheets-Sheet 4

Fig. 5

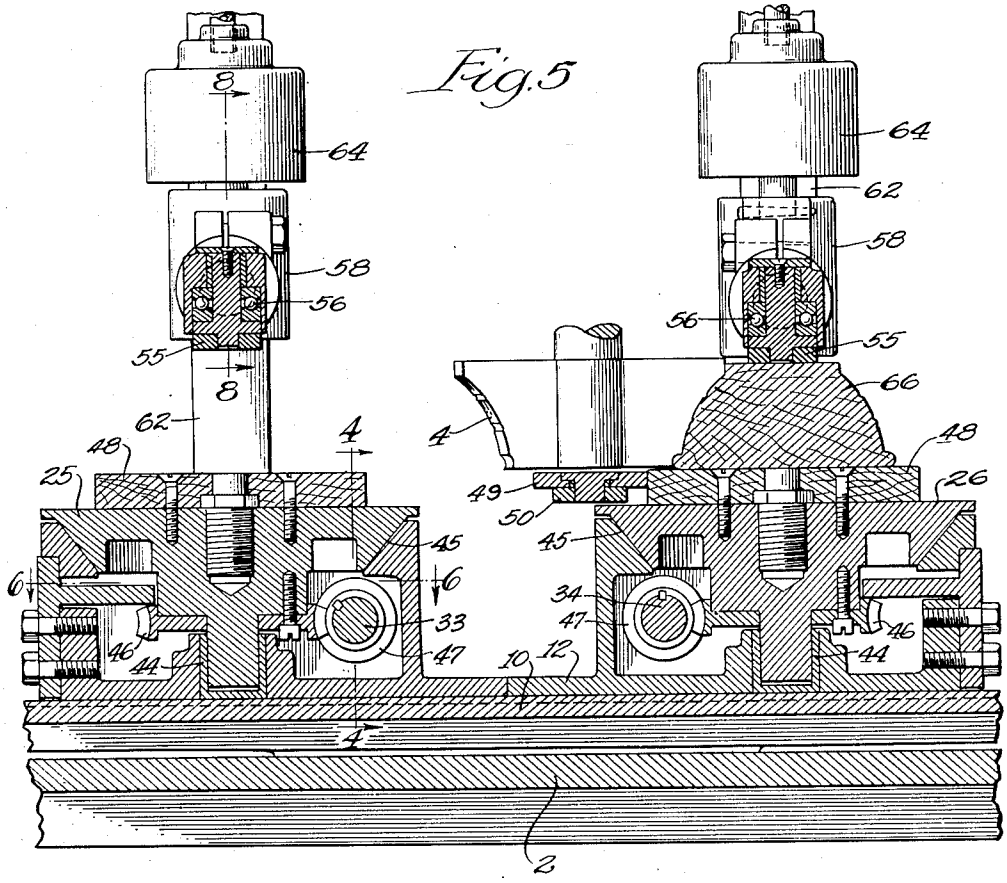


Fig. 6

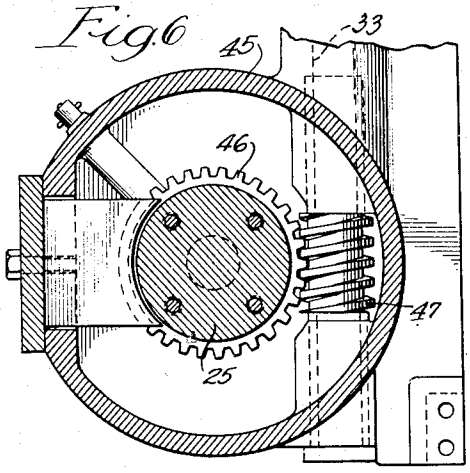
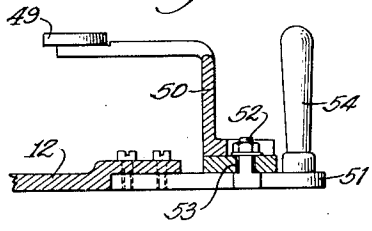


Fig. 7



Inventor:
Rudolph Onsrud,
By Rummler, Rummler
& Woodworth
Attorneys.

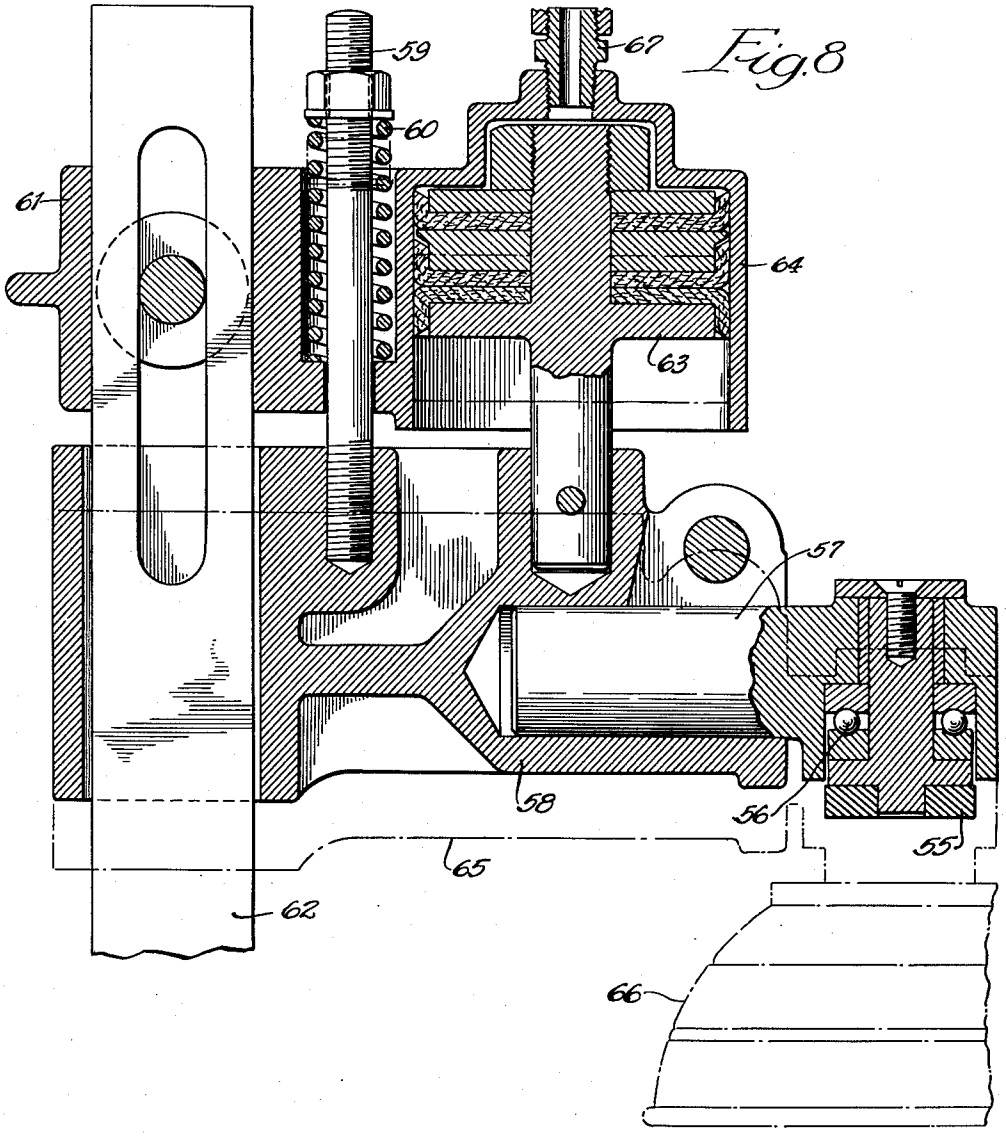
Witness:
L. L. Eckert

Feb. 8, 1938. R. ONSRUD 2,107,578

AUTOMATIC SHAPING MACHINE

Filed May 24, 1937 5 Sheets-Sheet 5

Fig. 8



Inventor:
Rudolph Onsrud,
By Rummler, Rummler
& Woodworth
Attorneys.

Witness:
H. L. Peterson

Patented Feb. 8, 1938

2,107,578

UNITED STATES PATENT OFFICE

2,107,578

AUTOMATIC SHAPING MACHINE

Rudolph Onsrud, Chicago, Ill., assignor to Onsrud Machine Works, Inc., Chicago, Ill., a corporation of Illinois

Application May 24, 1937, Serial No. 144,398

4 Claims. (Cl. 144—145)

This invention relates to machines for shaping or turning small circular or rectangular or other intermediate forms of regular or irregular outline, oval or elliptical, such as for example toy wheels, radio dial adjustment buttons having an integral indicating point, brush backs, etc.

An object of the invention is to produce a machine of this character having a pair of rotary work and pattern supports arranged to alternately come into operative position with reference to a cutter and a pattern guide. This enables the removal of completed articles and replacement of blanks while the machine continues its work. There are numerous other objects of the invention such as providing the new construction in the form of an attachment for application to a standard type of routing machine whereby the usefulness of the routing machine is extended to other classes of work than that for which these machines are normally used.

It is a further purpose of the invention to provide improved means controlled by the operator for effecting a shift of work supporting turn tables into and out of cooperative relationship with a rotating cutter and in connection with a coordinated automatic clamping and release means for the objects operated upon.

The objects of the invention are accomplished by means of a construction as illustrated in the drawings in which:

Fig. 1 is a perspective view of a router equipped with the improved shaping and turning mechanism.

Fig. 2 is a plan view of the attachment as indicated by the line 2—2 of Fig. 1 and with the supporting table of the router partly broken away.

Fig. 3 is a sectional detail taken on the line 3—3 of Fig. 2 and showing drive and clutch connections for separate work supporting turn tables.

Fig. 4 is a sectional detail to show the drive shaft for one of the turn tables and is taken on the line 4—4 of Fig. 5.

Fig. 5 is a sectional view through the two turn tables as indicated by the line 5—5 in Fig. 2.

Fig. 6 is a plan section showing a turn table drive means, and as indicated by the line 6—6 of Fig. 5.

Fig. 7 is a view in vertical section as indicated by the line 7—7 of Fig. 2, and shows a handle by which the turn table unit may be manually shifted.

Fig. 8 is an enlarged detail in vertical section as indicated by the line 8—8, Fig. 5, illustrating automatic clamping means.

Fig. 9 is a sectional detail taken on the line 9—9 of Fig. 2, showing the securing means for the attachment by which it is fastened to the work table of the router.

Fig. 10 is a face view of a clutch element, its supporting shaft being in section as indicated by the line 10—10 on Fig. 3.

Routing machines of the type shown in Fig. 1, but without the attachment are quite commonly in use on an extensive variety of work, but are not suitable for the rapid production of small, more or less circular or elliptical shaped articles which may be formed by rotating the work as guided by a pattern bearing against a fixed roller, and in connection with a high speed cutter.

The axis of the rotating cutter is fixed, but the cutter may be reciprocated axially into and out of operative position by a foot treadle. The foot treadle has linkage connections within the frame casting of the router, for shifting the cutter spindle up and down.

The turning and shaping attachment is a machine having an individual motor drive, independent of the drive means for the cutter spindle. There is a rigid base for the attachment which is clamped to the work table of the routing machine, and pivoted on this base is a sector-shaped casting or swing bracket which supports the motor and operating connections for the attachment. The rigid base of the attachment supports a small pneumatic ram comprising a fixed cylinder, with air pressure leads to its opposite ends, and a piston. The piston rod communicates motion to the swing bracket through a clutch operating lever. This arrangement is provided so that, as the swing bracket is moved to bring one of the work supporting rotary elements into cooperative relationship with the cutter, that element will be clutched to the drive and the other rotary work supporting element will be unclutched from the drive.

The air leads for the ram are connected with a foot-operated valve mechanism mounted on the floor.

The working of this machine is easily controlled. In preparing it for production of a specified article, patterns conforming to the outline of the article are first screwed down onto the turning supports. The proper cutter is placed in the chuck which may be lowered to the correct operating position by use of a foot treadle latchable in its set position. One of the rough blocks of wood or like material from which the manu-

factured articles are produced is placed on one of the pattern and work supporting turning devices, then this turning device is, by a movement of the swing bracket, brought into cooperative relation with the cutter as determined by a central fixed guide roller which the pattern engages.

The swing table may be operated by hand or by means of the pneumatic ram. In either case automatic action of the clutch takes place so that only the turning device in cooperative relation with the cutter will be rotated. As the first article is being formed another blank is placed on the other turning device. Pneumatic clamps are provided for securing the blanks to the turning devices, and these clamps have conduits leading to the valve device, whereby their action is synchronized with the action of the ram for the swing table.

In the case of making circular constructions, the form of which are determined by the form of the cutter, it is not necessary to use patterns, and in that case adjustable stops are positioned to control the limits of motion of the swing bracket.

The general purposes and construction of the machine as above outlined are attained by the use of a construction as detailed in the drawings.

The routing machine to which the attachment is applied is merely shown in outline, Fig. 1. The frame casting 1 of the router supports the customary work table 2 which is vertically adjustable by means of a hand wheel 3. A cutter 4 is secured by means of a chuck 5 to a vertically shiftable spindle unit 6, all as customary in this type of routing machine and with connections inside the frame structure 1 leading to treadle 7. The treadle adjustment is maintained by disengageable spindle lock 8. The spindle is usually driven by a belt drive from an electric motor, not shown, but mounted within the frame structure 1. Control switches and safety devices for the motor are also omitted from the drawings.

The turning attachment has a fixed base 10 which is secured to table 2 by the clamp elements 11 shown in sectional detail in Fig. 9. The base 10 supports a swing bracket 12.

The base 10 also supports a two-way pneumatic ram construction 13. Air under pressure is admitted to either head of the cylinder of the ram through conduits 14 and 15 having conduit connections 16 and 17 through the fittings 18 and 19, with a two-way valve construction 20 secured to the floor. The valve is operated by a rocker pedal 21 whereby air under pressure from a supply conduit 22 is permitted to pass along either conduit 16 or conduit 17 to the ram and determine the direction of movement of the piston in the latter.

The piston rod 23, Fig. 2, is pivoted to a swing table shift lever 24. The function of this lever is to swing the table for the purpose of bringing one or the other of the rotary work supports 25 and 26 to operative position with reference to cutter 4 and to, at the same time, operate a clutch 27, Fig. 3, for these work supporting tables so that the one which is in operative position is rotated and the one which is moved away from the cutter stops rotating. Thus, each table is at rest at the time of removal of the finished article and the replacement of a blank thereon.

The combined functions of the shift lever 24 are taken care of by pivoting this lever on a fixed post 28 supported on the swing table 12 and limiting the movement of the lever by a pin 30 extending from the swing table into a slot 31 in the lever. One arm of the lever carries a fork 32, Fig. 3, for engagement with the collar of clutch 27.

The drive shafts 33 and 34 for the rotary turn tables 25 and 26 are driven through worm gearings 35 and 36 and the clutch by drive shaft 37 to which the central clutch element 27 is splined, while the clutch elements 38 and 39 are rigid with the worms on sleeves loosely surrounding the shaft. Shaft 37 carries the pulley 40 which is driven through belt 41 by a pulley 42 carried by the shaft of motor 43. The motor is mounted on the swing table to move therewith.

Each turn table 25 and 26 is journaled for rotation in bearings shown in Fig. 5. These bearings consist of a lower post bearing 44 and an upper conical bearing 45. Each turn table carries a worm gear 46 meshing with a worm 47 on the respective drive shafts 33 or 34.

The turn tables 25 and 26 as shown in Fig. 5, support patterns 48 for engagement with a fixed guide roller 49 concentric with the cutter but carried by a bracket 50, Fig. 1, fixed to the frame casting 10. The bracket 50 with the frame casting 10 forms a guideway for an arm 51 of the swing table 12. The outer limits of movement of the swing table are determined by stops 52, Fig. 2, adjustable along arcuate guides 53 formed in brackets 50. A handle 54 projects upwardly from arm 51 so that the swing table may be moved by hand when desired. A detail of arm 51 is shown by Fig. 7.

Pneumatic clamps are provided for holding the work operated upon in position on turn tables 25 or 26 while the cutter is operating. One of these clamps is shown in detail by Fig. 8. Each comprises a pressure roller 55 mounted for rotation on thrust bearings 56, carried by arms 57. These arms are clamped to vertically movable slides 58. The slide castings 58 are suspended from bolts 59 resting on spring 60. These springs are supported on cylinder castings 61 which are adjustably secured on vertical posts 62 carried by swing bracket 12.

A piston 63 is supported on each casting 58 and fits a relatively fixed cylinder 64. The clamp is moved down against an article to be operated upon by admitting air under pressure to the cylinder above the piston. In that manner the piston and the parts attached thereto are thrust downwardly against action of spring 60. The lower position of the clamp is indicated by the broken lines 65, Fig. 8, and the clamped object is indicated by the broken lines 66.

The fitting 67 through which air is admitted communicates by a conduit 68 with one of the T-fittings 18 or 19, Fig. 2, having connections with the air supply through valve structure 20, Fig. 1. Because of these connections the clamps are synchronized in their operation with the ram 13 and as customary when the valve 20 is adjusted to admit air under pressure to one of the conduits 16 or 17, it allows for relieving the pressure on one side of the ram and from one of the clamps through the other conduit.

The working of the attachment is briefly as follows:

An essential is a cutter of proper form and diameter for the contour of the finished product and if the articles to be manufactured are not circular in outline it is necessary to use patterns on the turn tables 25 and 26. Adjustment of the clamp units on the post 62 is made according to the height of the article, and the cutter spindle is lowered to its operative position by treadle 7 and is latched in such position at 8, Fig. 1. A

blank from which an object is to be formed is placed on that turn table positioned away from the cutter. The circuits of the spindle motor and motor 43 are closed and the rocker 21 of the valve unit 20 is shifted. This causes the object to be operated upon to be clamped to its respective turn table and at the same time ram 13 operates to shift the swing bracket to bring the object into cutting position.

While this occurs lever 24 rocks as required to clutch the work supporting table to its respective drive shaft. As the work is rotated it may move in and out with reference to the cutter according to the pattern on the same table. The cutter normally is rotated at about 25,000 R. P. M. and about six to ten articles of simple design may be made per minute by well-timed operations of valve 20 and the removal and replacement of the stock.

I claim:

1. A machine of the class described comprising, a frame structure, a support pivoted for oscillation on said frame structure, a cutter spindle mounted for rotation in said frame structure, a pair of turn tables mounted for rotation in the said pivoted support, a motor on said support and drive connections between said motor and turn tables, a clutch in said drive connections for making the drive effective for either of said turn tables, means for shifting said support to bring one or the other of the turn tables into cooperative relation with the cutter spindle, and said means including a clutch shifting element to insure the automatic operation of said clutch on each shift of said supporting structure.

2. In a machine of the class described, a frame structure in which is mounted a cutter spindle, a support pivoted on said frame structure for oscillation relatively to said cutter spindle, a pair of turn tables mounted for rotation in said pivoted support, each of said turn tables being of conical form and resting in a conical bearing, means mounted on the frame structure having connections with said support for oscillating the support and bringing one or the other of the turn tables into operative relationship with the cutter spindle, said connections including a clutch operating lever, a clutch operated by said lever, and driving means for each of said turn tables under the control of the clutch.

3. An attachment of the class described comprising a stationary supporting means with clamps for securing said supporting means to the work table of a routing machine, a swing bracket pivoted on said support and carrying a pair of turn tables which may be alternately brought into cooperative relationship with the cutter spindle of the routing machine, means on said swing bracket for driving the turn tables, clamping means for securing work operated upon on each of said turn tables, a clutch in the drive means for connecting one or the other of the turn tables therewith, and interconnected means for simultaneously imparting movement to the swing bracket operating the clutch and operating the clamps.

4. A routing machine comprising a frame structure having mounted therein a rotary cutter spindle, a work table on said frame structure and attachments secured to said work table including a pivoted swing bracket in which is mounted for rotation a pair of turn tables and clamps for securing work operated upon on said turn tables, and means under manual control for alternately causing the drive of said turn tables and the operation of the clamps.

RUDOLPH ONSRUD.