June 18, 1935. R. H. CROUCH 2,005,647

DOVETAIL ATTACHMENT FOR DOVETAIL MACHINES

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Fig. 2.

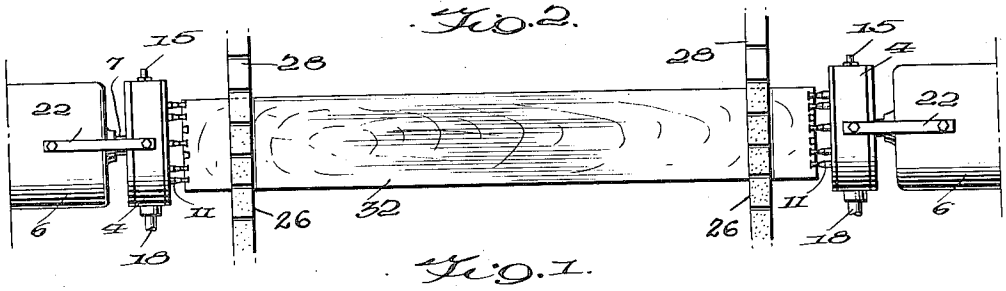


Fig. 1.

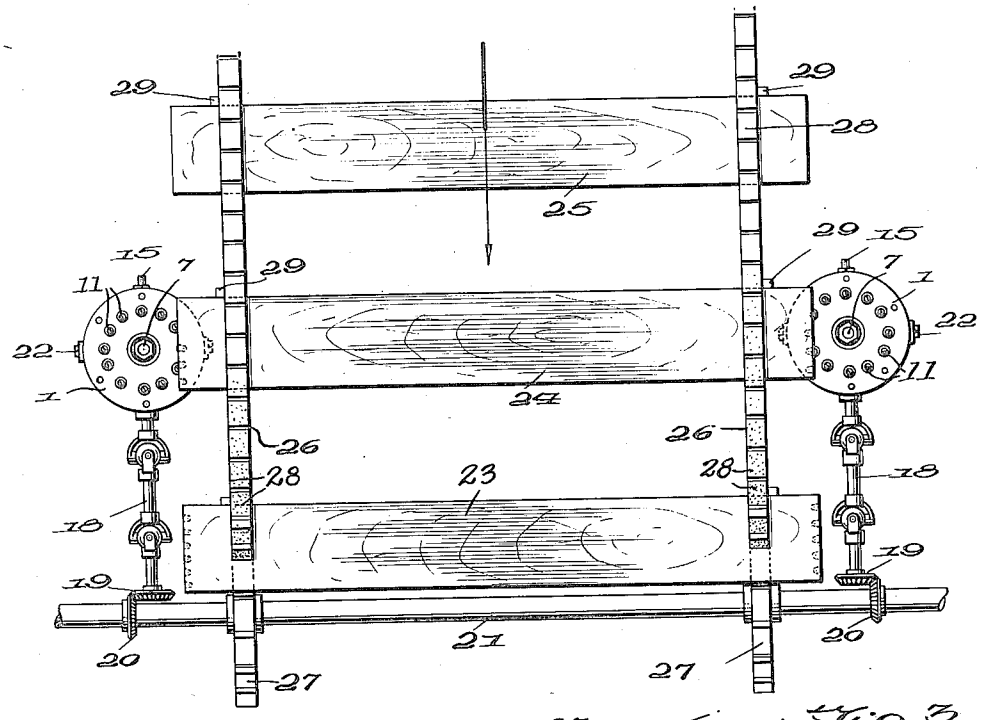


Fig. 4.

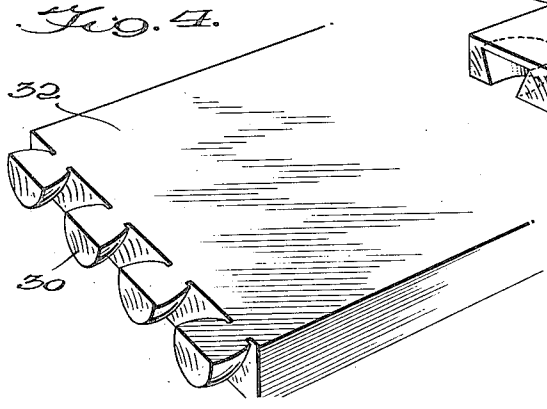
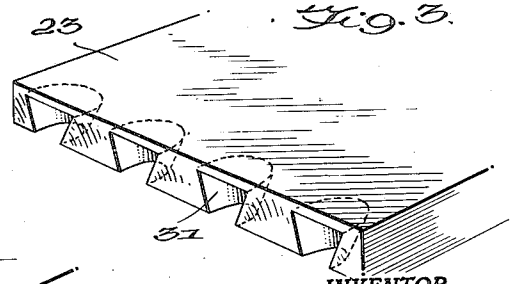


Fig. 3.



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DOVETAIL ATTACHMENT FOR DOVETAIL MACHINES

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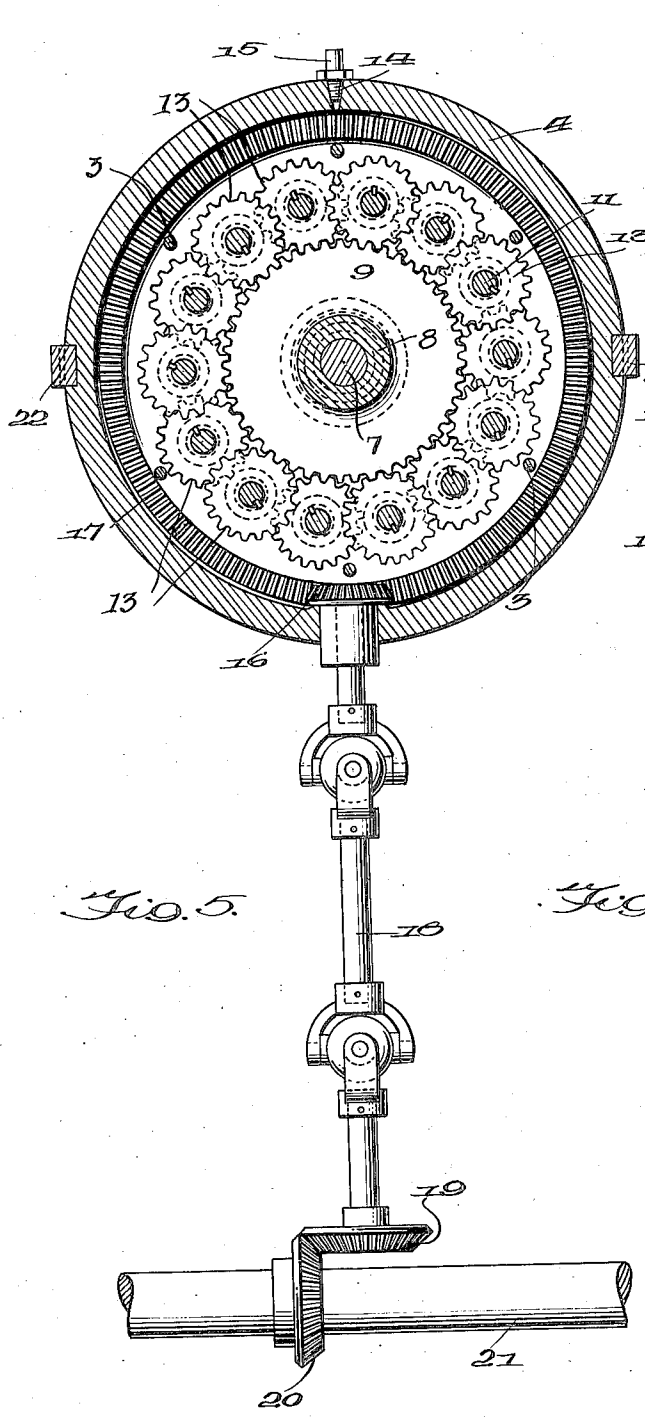

Fig. 5.

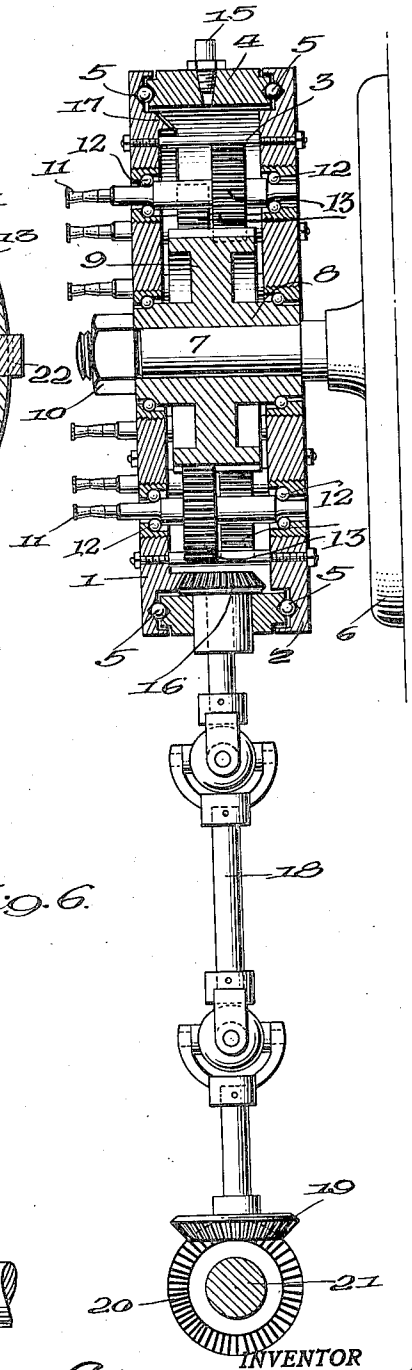

Fig. 6.

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DOVETAIL ATTACHMENT FOR DOVETAIL MACHINES

Filed June 17, 1933 4 Sheets-Sheet 3

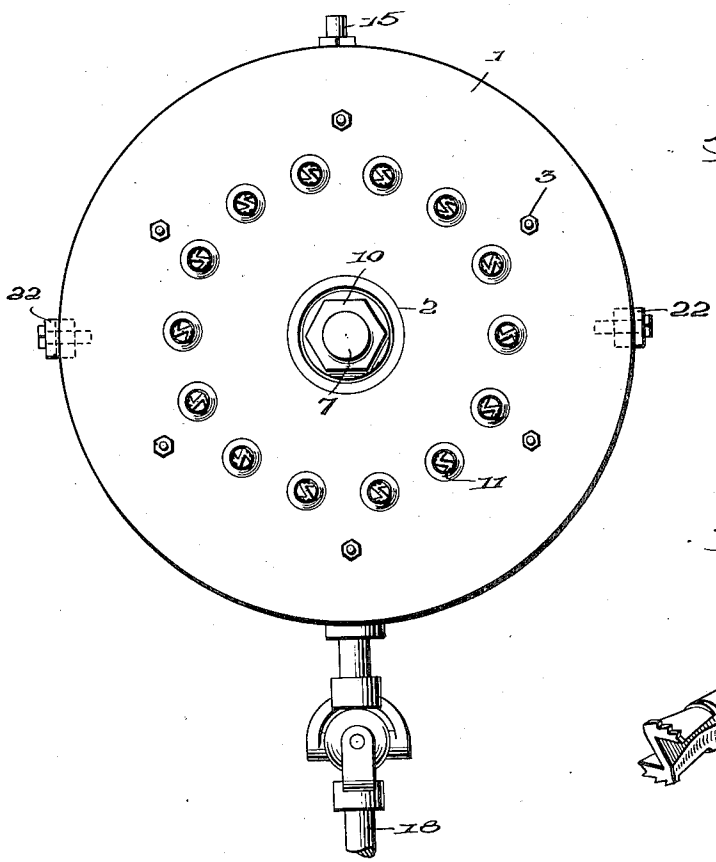

Fig. 7.

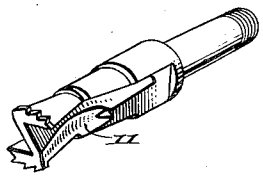

Fig. 9.

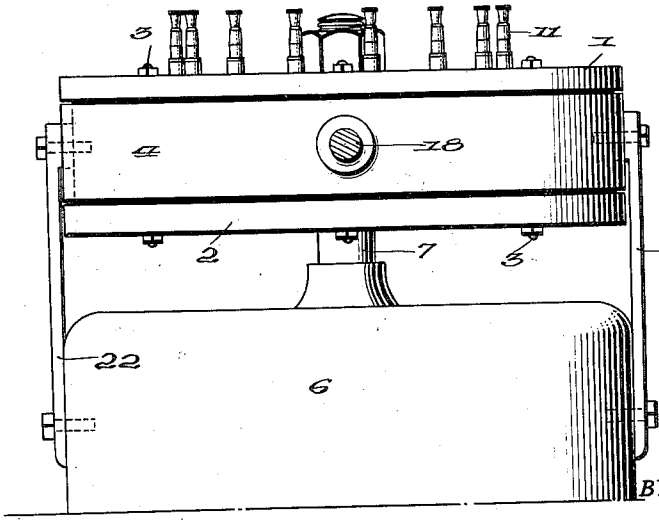

Fig. 8.

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DOVETAIL ATTACHMENT FOR DOVETAIL MACHINES

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Fig. 10.

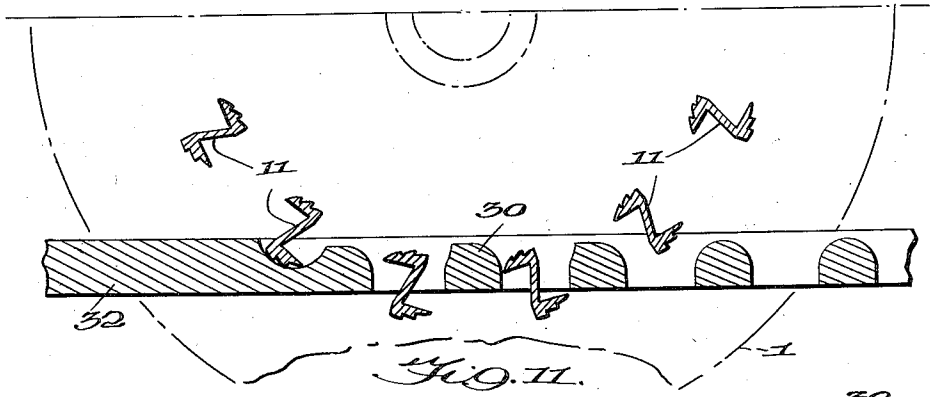


Fig. 11.

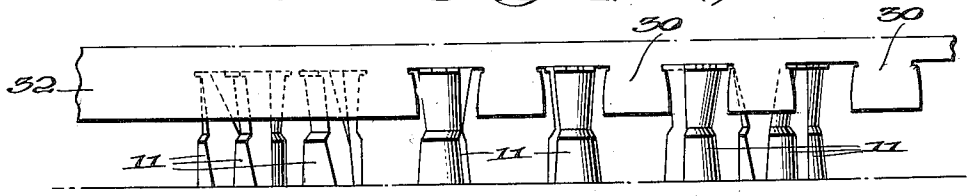


Fig. 12.

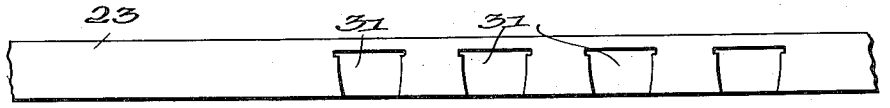
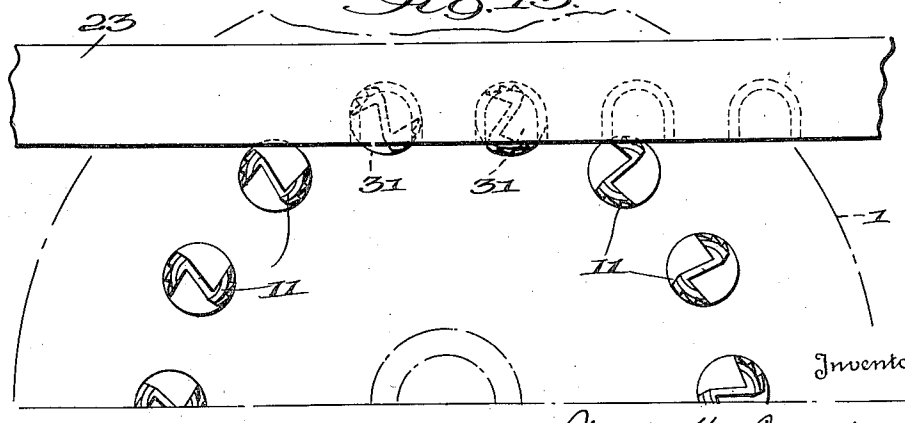


Fig. 13.



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Patented June 18, 1935

2,005,647

UNITED STATES PATENT OFFICE

2,005,647

DOVETAIL ATTACHMENT FOR DOVETAIL MACHINES

Richard H. Crouch, Pulaski, Va.

Application June 17, 1933, Serial No. 676,376

15 Claims. (Cl. 144—87)

My invention relates to an improvement in dovetail attachments for dovetail machines, and method.

Heretofore two machines have been required to cut the male and female sections of a dovetail joint.

My object is to provide a machine which will cut both male and female sections of a dovetail joint by a simple slight adjustment of the cutters.

This is accomplished, for example, by setting the cutter-head at different angles, say at right-angles or perpendicular to each other, although for different joints the angle might be varied to suit the requirements.

The invention consists of a plurality of cutters rotatably supported in a cutter-head casing, and the latter being adjustable to different angles in order to make male and female dovetail cuts, and the cutters being driven preferably by a flexible universal jointed shaft from the main shaft.

In the accompanying drawings:

Figure 1 is a fragmentary top plan view showing the cutters in the particular adjustment for simultaneously cutting the female section of the dovetail joint at opposite ends of the drawer or box section;

Figure 2 is a similar view showing the cutter-head turned to cut the male section of the dovetail joint;

Figure 3 is a perspective view of the end of a strip of wood showing the cut made when the cutter-head is in the adjustment shown in Figure 1;

Figure 4 is a similar view showing the cut made when the parts are adjusted to the position shown in Figure 2;

Figure 5 is an enlarged section through the cutter-head showing the master-gear secured on the armature shaft at the center and the cutter-gears surrounding the same within the outer drum casing;

Figure 6 is a sectional view on the same scale, taken at right-angles to the view shown in Figure 5;

Figure 7 is a view looking at the face of the cutter-head;

Figure 8 is a side view showing the cutter-head attached to the motor;

Figure 9 is a perspective view of one of the cutters;

Figure 10 is a partially diagrammatic view showing how the cut is made through the end of the strip to form the male section;

Figure 11 is an elevation or view at right-angles to Figure 10;

Figure 12 is a side view showing the cut made for the female section; and

Figure 13 is a partially diagrammatic view at right-angles to Figure 12 showing the cuts made for the female section.

A cutter-head is composed of a top drum 1 and bottom drum 2 held together by bolts 3, with an intermediate casing 4, which is stationary, and around which the top and bottom drums rotate. The ball-bearings 5 are interposed between the drums 1 and 2 and casing 4 to insure smooth running of the cutter-head.

The cutter-head is carried by the motor 6, and the armature shaft 7 of the motor extends through the hub 8 of a master-gear 9 (see Figure 6) to which the shaft is rigidly secured by a nut 10, this method of attachment being preferred to facilitate the removal of the cutter-head when occasion may require it.

A gang of cutters 11 are arranged in a circle around the master-gear 9, and they are journaled at each end by means of ball-bearings 12 in the top and bottom drums 1 and 2 respectively, their cutting ends protruding the required distance above the top drum as viewed in Figure 6. Small gears 13 are secured to the shanks of these cutters 11, and the teeth of these smaller gears mesh with the teeth of the master-gear 9 by which latter they are all simultaneously driven in the same direction at uniform speed.

The top and bottom drums 1 and 2, and casing 4, form a practically oil-tight casing about the gears and cutters, and the open spaces therein are kept filled with grease, oil or any lubricant through the inlet 14 which is closed by a plug or suitable device 15.

The cutter-head thus constituted, save the casing 4 which is stationary, is rotated through a bevel-gear 16, the teeth of which mesh with the large circumferential bevel gear 17 on the inner face of the top drum 1.

The gear 16 is secured on the end of a flexible universal jointed shaft 18, which has a bevel-gear 19 on its opposite end intermeshed with the gear 20 secured on the main drive-shaft 21 by which it is driven. Thus all of the gears encased within the cutter-head are driven through the armature shaft 7, imparting the required speed to the cutters 11 and the drums of the cutter-head carrying the cutters, and the smaller gears are rotated in an orbit about the casing by means of the main drive shaft 21 from which the power is taken off by the universal flexible shaft 18 and transmitted through bevel gears 16 and 17 to rotate the top and bottom drums 1 and 2.

The casing 4 of the cutter-head is rigidly secured to the motor 6 by the side bars 22, of which two are shown, see Figures 7 and 8.

The material to be fashioned into joints is represented by the strips 23, 24 and 25, as viewed in Figure 1. These are fed in the direction indicated by the arrow in Figure 1 by the usual endless sprocket-chains 26 and 27, the upper sprocket chain being made up of rubber blocks 28, which press down upon the material and grip it firmly to insure proper feed.

Stops 29 are carried by the lower chains 27 to carry the material perpendicular thereto through the machine in order to present the ends simultaneously to the cutters.

The adjustment of each of the cutter-heads to the position shown in Figure 1, in which the armature shaft 7 is vertical, sets the cutters for cutting the female joint illustrated in Figure 3; and with the adjustment shown in Figure 2 in which the armature shaft is horizontal, the cutters 11 are cutting the male section, with tenons 30 adapted to enter and be secured in the mortise 31, when the joint is formed. Thus the same cutter-head shifted from vertical to horizontal, and in so speaking I am referring to the relative positions of the shaft 7, cuts either the male or female section of the dovetail joint. The strip 32 shown in Figure 2 is the strip shown in Figure 4 with the tenons 30 formed thereon.

The means for shifting the position of the motor, and with it the cutter-head, to the different positions shown in Figures 1 and 2 is well-known in the various types of dovetail machines on the market, such as Jenkins double-cut-off saw in which the motor armature shaft carries a saw instead of a cutter-head.

It will be observed that the same main shaft 21 which rotates the cutter-heads also drives the lower conveyer-chains 27 as illustrated in Figure 1.

In Figures 10 to 13, I have attempted to show in enlarged diagrammatic views the positions of the cutters 11 in the formation of the mortise and tenons 30 and 31.

Thus it will be seen that a single cutter-head at each end of the machine is adapted to cut either sections of the dovetail joint according to the position in which it is adjusted, and the feed of the strips 23, 24, 25 or 32 is synchronized with the presentation of the cutters in the formation of these dovetail joints. All of this I believe has never hitherto been successfully accomplished, and it will be readily understood that the accomplishment of these results in a single machine will cut the expense approximately in half, and at the same time the counter-part dovetail sections are cut with precision, and as rapidly as the machine can be fed.

It will be gathered from the foregoing, and when operations are analyzed, that when the cutter-head is disposed as illustrated in Figure 1 above the motor 6 that the cutters enter the material to be fashioned substantially in the direction of the plane of the material as viewed in Figure 3, whereas when the cutter-heads are disposed as shown in Figure 2, the cut is transversely through the plane of the material extending from one side of the latter to the other, leaving a formation such as illustrated in Figure 4.

In other words, one cut is into the material (see Figure 3) and the other is through the material (see Figure 4).

I claim:

1. A dovetail attachment for dovetail machines including material feeding means, cutter-heads carrying a plurality of cutters adapted to form both male and female sections of a dovetail joint, means mounting the cutter-heads for adjustment of the cutters to different positions relative to the feeding means for cutting male and female sections.

2. In a dovetail attachment for a dovetail machine, the combination of a rotary head having one or more cutters rotatably mounted therein, and means for turning said head comprising a universally jointed flexible shaft so constructed and arranged as to maintain a driving connection to said head during adjustment of the head to different angular positions of the cutters for cutting male or female sections of a dovetail joint.

3. In a dovetail attachment for a dovetail machine, the combination of a rotary head having one or more cutters rotatably mounted therein, and independent means for rotating said cutter or cutters and head, one of said means comprising a universally jointed flexible shaft so constructed and arranged as to maintain a driving connection during adjustment of the head to different angular positions of the cutters for cutting male or female sections of a dovetail joint.

4. A cutter-head including rotary drums secured together, and an interposed central stationary casing, cutters rotatably supported in the drums, independent means for rotating the cutters and the drums, one of said means having a universally jointed flexible shaft which admits of the cutter-head being placed in various angular positions whereby to cut counterpart joints in the ends of strips to be dovetailed together.

5. In a dovetail machine, the combination of an annular casing, two drums spaced apart by the casing, said drums being secured together and rotatably connected with the casing, two shafts, one extending centrally through the drums and the other through the casing, a gear secured on each of said shafts, a gear on one of the drums with which the gear extending through the casing meshes, a plurality of cutters rotatably supported in the two drums and having gears thereon which mesh with the gear on the shaft extending through the center of the drums, and independent means for transmitting rotary motion to the two shafts, whereby the drums are rotated with respect to the casing and the cutters are rotated in the drums.

6. In a dovetail attachment for dovetailing machines, the combination of an annular casing, two drums spaced apart by the casing, said drums being secured together and rotatably connected with the casing, two shafts, one extending centrally through the drums and the other through the casing, a gear secured on each of said shafts, a gear on one of the drums with which the gear extending through the casing meshes, a plurality of cutters rotatably supported in the two drums and having gears thereon which mesh with the gear on the shaft extending through the center of the drums, and independent means for transmitting rotary motion to the two shafts, whereby the drums are rotated with respect to the casing and the cutters are rotated in the drums, one of said shafts being universally jointed whereby the angle of the cutters may be changed according to the cuts to be made in the material fed to the cutters.

7. In a dovetail attachment for dovetail machines, the combination of material supporting means, a dovetail cutter, and means mounting

said cutter for selective adjustment to an approximately horizontal or an approximately vertical position relative to the supporting means for cutting male and female sections respectively of a dovetail joint.

8. In a dovetail attachment for dovetail machines, the combination of means for supporting material in normal positions, a dovetail cutter, and means mounting said cutter for selective adjustment to an approximately horizontal or an approximately vertical position relative to the material supporting means for cutting male and female sections respectively of a dovetail joint.

9. In a dovetail attachment for dovetail machines, the combination of means for supporting material in normal positions, a dovetail cutter for cutting female and male sections of a dovetail joint, and means mounting said cutter for swinging adjustment between an approximately vertical position, where the female sections are cut, and an approximately horizontal position, where the male sections are cut.

10. In a dovetail attachment for dovetail machines, the combination of a material supporting surface, a cutterhead having one or more cutters mounted therein for cutting female and male sections of a dovetail joint, and means mounting the cutterhead for adjustment between an approximately vertical position, where the female sections are cut, and an approximately horizontal position, where the male sections are cut.

11. In a dovetail attachment for dovetail machines, the combination of a material feed device, a cutter-head having a plurality of cutters mounted therein for individual rotation and bodily movement in an orbit, and means supporting said cutter-head in different male and female section cutting positions relative to the feed device.

12. In a dovetail attachment for dovetail machines, the combination of a material feed device, a cutter-head having a plurality of cutters mounted therein for individual rotation and bodily movement in an orbit, means supporting said cutter-head in different male and female section cutting positions relative to the feed device, and means synchronized with the feed device for moving the cutters in the orbit in the different adjusted positions thereof.

13. In a dovetail attachment for dovetail machines, the combination with a material supporting surface, of means for supporting a dovetail cutter selectively in an approximately horizontal or an approximately vertical position relative to the material supporting surface for cutting male and female sections respectively of a dovetail joint.

14. A dovetail attachment for a dovetail machine, including cutterheads carrying a plurality of cutters adapted to form both male and female sections of a dovetail joint, and means mounting the cutterheads for bodily adjustment thereof between an approximately vertical position, where the female sections are cut, and an approximately horizontal position, where the male sections are cut.

15. A dovetail attachment for a dovetail machine having material feeding means, cutterheads carrying a plurality of cutters arranged for cutting either male or female sections of a dovetail joint, and means mounting the cutterheads for bodily swinging adjustment thereof relative to the feeding means between an approximately vertical position, where the female sections are cut, and an approximately horizontal position, where the male sections are cut.

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