

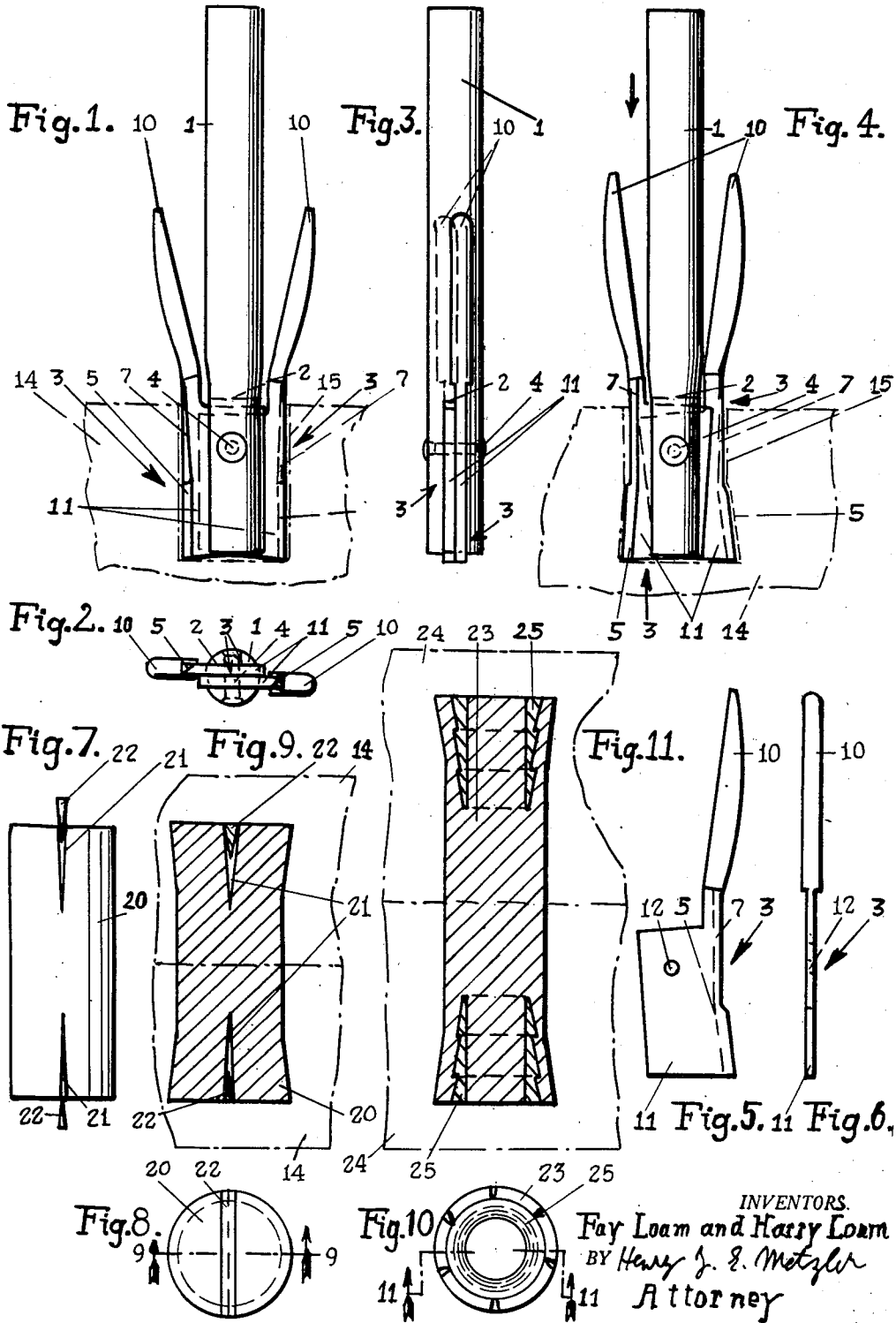
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DOVETAIL COUNTERSINKING TOOL FOR DOWEL CONNECTIONS

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DOVETAIL COUNTERSINKING TOOL FOR DOWEL CONNECTIONS

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1 Claim. (Cl. 145—114.5)

The present invention relates to improvements in devices for drilling holes into wood, plastic material, light metal, compositions and the like. More specifically our invention relates to a new and improved drill for the making of holes for dowel connections such as are being used widely in the making of furniture, frames, boats, toys and many other articles.

If nails, bolts or other metal connectors are used in the making of furniture, boats, pier constructions or the like, the hard material of these metal connectors is subjected to less wear than the wood or the like, of which consist the members connected to each other by the metal connectors. Thus the holes in the wood or the like through which said metal connectors are extended are being enlarged by the friction of the metal on the wood, or by corrosion, resulting in a constantly weakening bond between the metal connectors and the wood or the like. Therefore, dowel connections are frequently preferred. The hitherto known dowel connections comprise cylindrical dowels which are provided with glue or any other adhesive and are inserted into cylindrical holes in the pieces which are to be joined to each other. This arrangement has the disadvantage that it is necessary to wait a day or longer for the complete drying of the glue or adhesive before the article can be used; moreover, dampness or humidity may cause a loosening of these dowel connections. So-called "compressed" dowels, which are supposed to expand after they have been inserted into the dowel holes, are not fully reliable and have been proven to be ineffective in about one-third of all cases where they have been used.

Therefore, one object of the present invention is the provision of a device of the character described which will make it possible in a very simple manner to drill holes each of which has a cylindrical upper portion and a reverse taper lower portion, and which we prefer to call "dovetail countersunk holes," so that dowels may be inserted therein in such a manner as to increase the ends thereof, thus making practically inseparable dowel connections, which—when exposed to dampness of water—will not be weakened but will even be strengthened by the swelling of the wood.

Another object of the present invention is the provision of a device of the character described which can be used in connection with drill presses or portable drills at speed ranges from about three hundred to two thousand five hundred revolutions per minute, which are simple in use, requiring no special skill, and which can be manufactured inexpensively, but which also are reliable in operation, sturdy, durable, and well adapted for withstanding the rough usage to which devices of this type usually are subjected.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangements of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing a preferred form of the invention has been shown.

In said drawing:

Figure 1 is a front view of a preferred embodiment of our invention as it appears at the beginning of a countersink drilling operation;

Fig. 2 is a bottom plan view;

Fig. 3 is a side view;

Fig. 4 is a front view as Fig. 1 showing two parts of the device in positions which differ from their positions shown in Fig. 1, their positions shown in Fig. 4 being those which they assume at the end of a countersink drilling operation.

Fig. 5 is a detailed front view of a blade;

Fig. 6 is a detailed side view of the blade of Fig. 5;

Fig. 7 is a detailed side view of a dowel before use;

Fig. 8 is a detailed plan view of a dowel after insertion into holes drilled with our new and improved device;

Fig. 9 is a sectional view on the line 9—9 of Fig. 8;

Fig. 10 is a plan view of a modified dowel inserted into holes drilled with our device; and

Fig. 11 is a sectional view on the line 11—11 of Fig. 10.

Similar reference characters refer to similar parts throughout the several views.

In the drawing the numeral 1 denotes a shaft, which is shaped and dimensioned like a drill bit shaft, so that it can be inserted into the chuck of a drill press or a portable drill. The lower portion of the shaft 1 is provided with a slot 2 through which are extended a pair of oppositely disposed blades 3, which are pivoted to the slotted lower portion of the shaft 1 by means of a rivet 4 or a pivot pin, or the like. We prefer to provide each blade 3 with two cutting edges 5 and 7, which are angularly disposed to each other at an obtuse angle and the cutting edge 7 is slightly recessed from, and is somewhat narrower than the cutting edge 5. As may be seen in Figs. 1, 2 and 4, the edge portion 7 is recessed and narrowed, and this recessing and narrowing of the same insures against an unwanted widening of the upper cylindrical portion of the hole 15. An arm portion 10 is upwardly extended from an upper corner section of the flat main portion 11 of each blade 3, and a hole 12 (Fig. 5) is provided in each main portion 11 for extending therethrough the rivet 4. Thus the blades 3 which are perfectly balanced and identical to each other, can swing in the slot 2 from the position shown in Fig. 1 to that shown in Fig. 4. The swinging movement of the blades 3 is limited in both end positions, firstly by a resting of the arm portions 10 on the shaft 1, secondly by a resting of the upper edges of the flat main portions 11 of the blades 3 on the upper terminal of the slot 2 in the shaft 1.

The countersink drilling of a hole by means of our new and improved drill is carried out in the following manner: Into a piece 14 of wood or the like, as indicated by dash-and-dotted lines in Figs. 1, 4 and 9, is drilled firstly a cylindrical hole 15 (Fig. 1) by means of an ordinary drill. Then our dovetail countersink drill is inserted into the chuck of a drilling machine, such as a drill press or a portable drill and the slotted portion of the shaft 1, together with the blades 3, is inserted into the hole 15. When the drilling machine is started, the centrifugal forces acting on the arm portions 10 will spread them apart as far as possible, so that the lower ends of the main portions 11 of the blades 3 will be moved toward each other, thereby the blades 3 assuming the position shown in Figs. 1, 2 and 3, so that the main portions 11 can pass easily and freely to the bottom of the hole 15. The blades 3, as soon as they touch the bottom of the hole 15, will be caused by a downward pressure in the direction of an arrow 17 (Fig. 4) to assume the position shown in Fig. 4, so that the cutting edges 5 come into frictional engagement with the lower wall portions of

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the hole 15. Thereby a rotation of the drill, combined with the aforementioned pressure from above, will cause a milling of the lower portion of the hole 15, so that the same will become of an inverted countersunk or dovetail formation, as may be seen in Figs. 4 and 14, whereas the upper portion of the hole is cylindrical.

In connection with our new and improved drill we prefer to use dowels whose ends will expand while they are being driven into dovetail countersunk holes. In Fig. 7 one such dowel 20 is shown as it appears before use. Said dowel consists of a cylindrical piece of wood, or plastic material or the like, which has at its ends incisions 21. Into each incision 21 is extended an end portion of a wedge member 22. If a pair of pieces 14 are to be connected to each other, each one is provided with a dovetail countersunk hole in the manner referred to above, and an end of a dowel 20 is inserted into each hole. Thereupon the pieces 14 are forced one upon the other by means of one or more hammer blows or by means of a press or a vise or the like. While the dowel thus is being driven into said holes the wedge members 22 are being forced into the incisions 21, so that the end portions of the dowel expand and fit tightly into the dovetail countersunk portions of said holes, so as to connect the pieces 14 firmly to each other.

In Figs. 10 and 11 another type of wedge member is shown. Here a dowel 23 is used for connecting to each other a pair of pieces 24, which have dovetail countersunk holes. In this case the wedge members 25 consist of taper tubular members which during the pressing of the pieces 24 upon each other are being forced into the end portions of the dowel 23 causing the same to expand as may be seen in Figs. 10 and 11.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claim is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

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Having thus fully described our said invention, what we claim as new and desire to secure by Letters Patent is:

A dovetail countersink drill comprising a shaft, a pair of upright cutting members oppositely disposed to each other and having blade portions and upwardly from said blade portions extending arm portions, and a pivot pin extending through the shaft and the upper sections of the blade portions of said cutting members, the mass of the arm portions of said cutting members above said pin being greater than the mass of said blade portions beneath said pin causing said arm portions by the effect of centrifugal forces to be swung away from said shaft when the shaft is being rotated, so that said blade portions beneath said pin will swing toward each other, the lower end sections of said blade portions being parallelogram-shaped and having corner portions protruding beyond the lower end of said shaft so as to touch the bottom of a hole into which the dovetail countersink drill is inserted thereby causing a reversal of that movement of said cutting members which has resulted from said centrifugal forces, each of the blade portions of said cutting members having a laterally beyond said shaft protruding edge of which a lower section is outwardly angularly disposed at an obtuse angle to an upper section and is provided with a cutting edge, and said upper section being recessed from and of a lesser width than said lower section of said last mentioned blade edge.

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