W. J. BODA.

MACHINE FOR MAKING PROPELLER BLADES.

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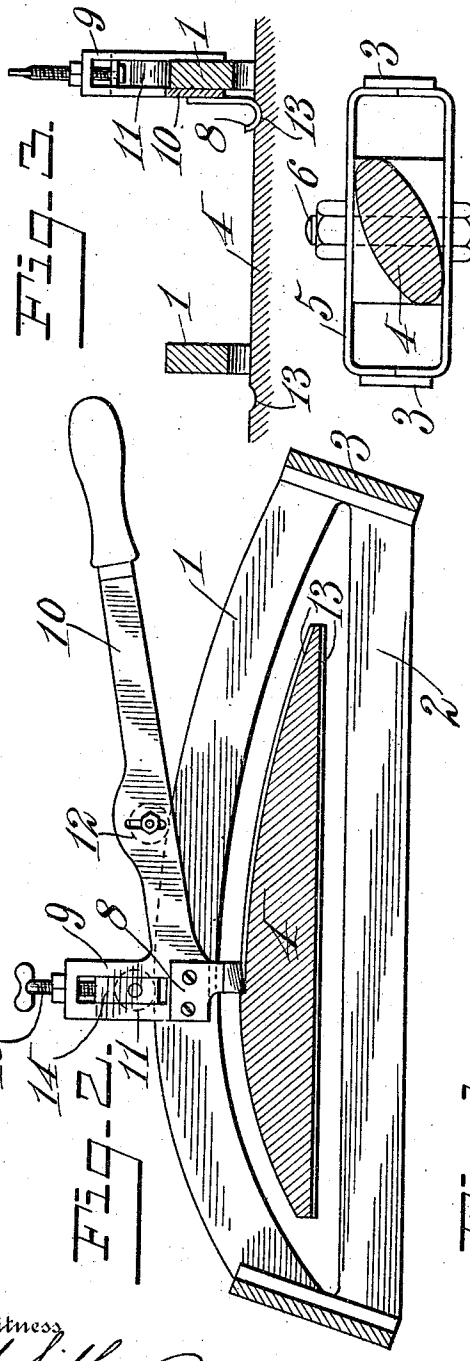


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 1.

Witness

M. Sibley

Inventor

Wm. J. Boda

By R. J. McCarty

his Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM J. BODA, OF DAYTON, OHIO.

MACHINE FOR MAKING PROPELLER-BLADES.

1,277,689. Specification of Letters Patent. Patented Sept. 3, 1918.

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To all whom it may concern:

Be it known that I, WILLIAM J. BODA, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Machines for Making Propeller-Blades, of which the following is a specification.

My invention consists of a machine by means of which the propeller blades of air-ships are accurately and expeditiously produced both as to shape, size and weight. The importance of accuracy in the construction of these propeller blades is well understood by those familiar with the requirement of the air-ship propeller. It is important that the propeller shall be evenly balanced. This means that there shall be equality of weight on each side of the axis of the propeller, and the shape of the blades shall be uniform so that the resistance due to the air shall be met by surfaces that are uniform in shape and size. Heretofore, it has been the common practice to use templets as guides or patterns in the formation of the propellers. It is well known that accuracy and uniformity in the construction of propeller blades is well-nigh impossible of obtainment by the use of templets to say nothing of the slowness of such method and the expense attending production. In the use of the templet method each templet is handled over and over many times without accomplishing the desired result, as guess-work is largely depended upon. It is the object of the present invention to provide means for turning out propeller blades for air-ships expeditiously and with accuracy. In the use of my invention a metal frame or jacket consisting of a series of transverse tracks is employed. The material from which the propeller is cut or formed is first machined so that about $\frac{3}{8}$ to $\frac{1}{2}$ inches of stock or material in the rough is left. This stock is placed in the metal jacket or frame, consisting as before stated of a series of transverse tracks. These tracks form guides upon which a knife travels across the stock. The tracks, or guide pieces as they may be termed, are shaped to conform to the shape of the propeller blade, the said tracks or guides are uniformly spaced apart, say two or more inches as may be desired. A knife in its travel over said tracks or guides cuts a series of transverse lines or grooves in the stock which gage the depth to which the stock is to be removed between the grooves in forming the propeller blade. The material left between the gage lines is removed by ordinary planing down to the level of the gage lines.

For a more full and complete understanding of my invention, reference is made to the accompanying drawings, of which Figure 1 is a top plan view of my improved machine for gaging the amount of material to be removed from stock in the construction of air-ship propellers. Fig. 2 is a cross-section somewhat enlarged on the line 2—2 of Fig. 1. Fig. 3 is a detail view showing a portion of the length of stock from which a propeller blade is being formed, two of the cross tracks or knife guides are shown in section, and the knife in position on one of said tracks, and Fig. 4 is a section on the line 4—4 of Fig. 1. In a detail description of my invention similar reference characters indicate similar parts in the description and drawings. 1 and 2 designate two series of transverse tracks or guides arranged in pairs, one track of each pair being curved and the other straight, conforming in both instances to the two sides of the propeller blade. As shown in Fig. 1 there is a plurality of pairs of tracks so formed, the ends being united to a frame 3. The stock 4 from which the propeller blade is made, is as before stated, first machined and given the outline of a propeller to prepare it for the operation of the gage knife. As shown in Fig. 1 half of the stock from which the propeller is to be made is broken away and the other half is in position in the jacket or frame. It is held in such position by means of a clamp 5 which is tightened by a bolt 6 which passes through the axis of the propeller, the end of the propeller or stock from which the propeller is to be cut is held at the end of the jacket or frame by a suitable clamp 7. There are also two side holding devices 7′ which engage the sides of the stock near the end. It will be apparent that other ways may be devised for holding the propeller stock in position to be acted upon by the gaging knife. The knife blade 8 is secured to a frame or carriage 9 from which an operating handle 10 extends. The said carriage has two sides which extend down over the two sides of the tracks 1 and 2 and serve to guide the same. The knife, it will be observed reaches down on one side of the

track in a position to engage the stock 3. Within the carriage 9 and the handle 10 are two rollers 11 and 12 which ride on the tracks. These rollers are provided with adjusting means by which the position of the knife carriage is determined. The knife is moved over the tracks 1 and 2 from the operating handle 10 and in such movement the transverse gage grooves 13 are cut in the stock. The knife carriage is removed from one track to another in the process of cutting these gage grooves and it will be apparent from Fig. 1 that the said gage grooves correspond to the number of tracks. It will be observed from Fig. 2 that the gage line or groove in the straight side of the propeller is cut by moving the knife over the straight tracks 2. In this view, the knife is being guided over one of the curved tracks and is cutting a gage line or groove in the rounded side of the propeller. It is to be understood that the tracks 1 necessarily vary in their contour one from the other, and this is true also of the tracks 2. This essential variation in the shapes of the tracks 1 and 2 is due to the variation in the form or contour of the propeller blade and it will be understood that the tracks are of the proper form to guide the knife at different points of the blade. After the stock 3 is removed from the gaging machine, Fig. 1, there will be indicated on both sides thereof a series of gage grooves or lines 13. The material between these lines is planed down to the depth of said grooves with the result that there is a uniformity in weight and shape of the propeller blade on both sides of the axis thereof and therefore a proper balance. Uncertainty and inequality are avoided in the construction of the blades and the work of manufacture is greatly expedited. The roller 11 before referred to is mounted in a frame 14 which frame is guided in the carriage 9. The said roller 11 is adjusted by a thumb screw 15 to compensate for any variation in the height of the knife due to sharpening the same as occasion may require, also this adjustment of the knife may be for the purpose of increasing or decreasing the thickness of the finished propeller blade.

Having described my invention, I claim:

1. In a device of the character specified, a jacket adapted to inclose stock from which propeller blades are made, and consisting of two series of transverse guide tracks between which the stock is placed, said tracks conforming to the contour or shape of the propeller blade, and a marker adapted to be moved over said tracks and to cut transverse grooves across the stock, said grooves serving to indicate the depth to which the material between the grooves is to be removed in the formation of the blade.

2. In a device for gaging the amount of material to be removed from stock in the manufacture of propeller blades, the combination of two series of transverse guide tracks between which the stock is secured, the tracks of each series being varied in their shape with respect to each other, and the shape of the tracks of one series being varied as compared with the tracks of the other series, a carriage movable over said tracks, and a knife carried by said carriage and adapted to cut a series of transverse gage lines in the stock from which the propeller blades are made.

3. In a device of the character specified, a frame consisting of two series of transverse guide tracks conforming to the shape of a propeller blade and between which the stock from which the propeller blade is formed is held, a carriage movable over said tracks, and a knife mounted on said carriage and adapted to cut a series of gage grooves on both sides of the stock from which the propeller blade is formed.

In testimony whereof I affix my signature.

WILLIAM J. BODA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."