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W. H. KEMPTON

FAN BLADE

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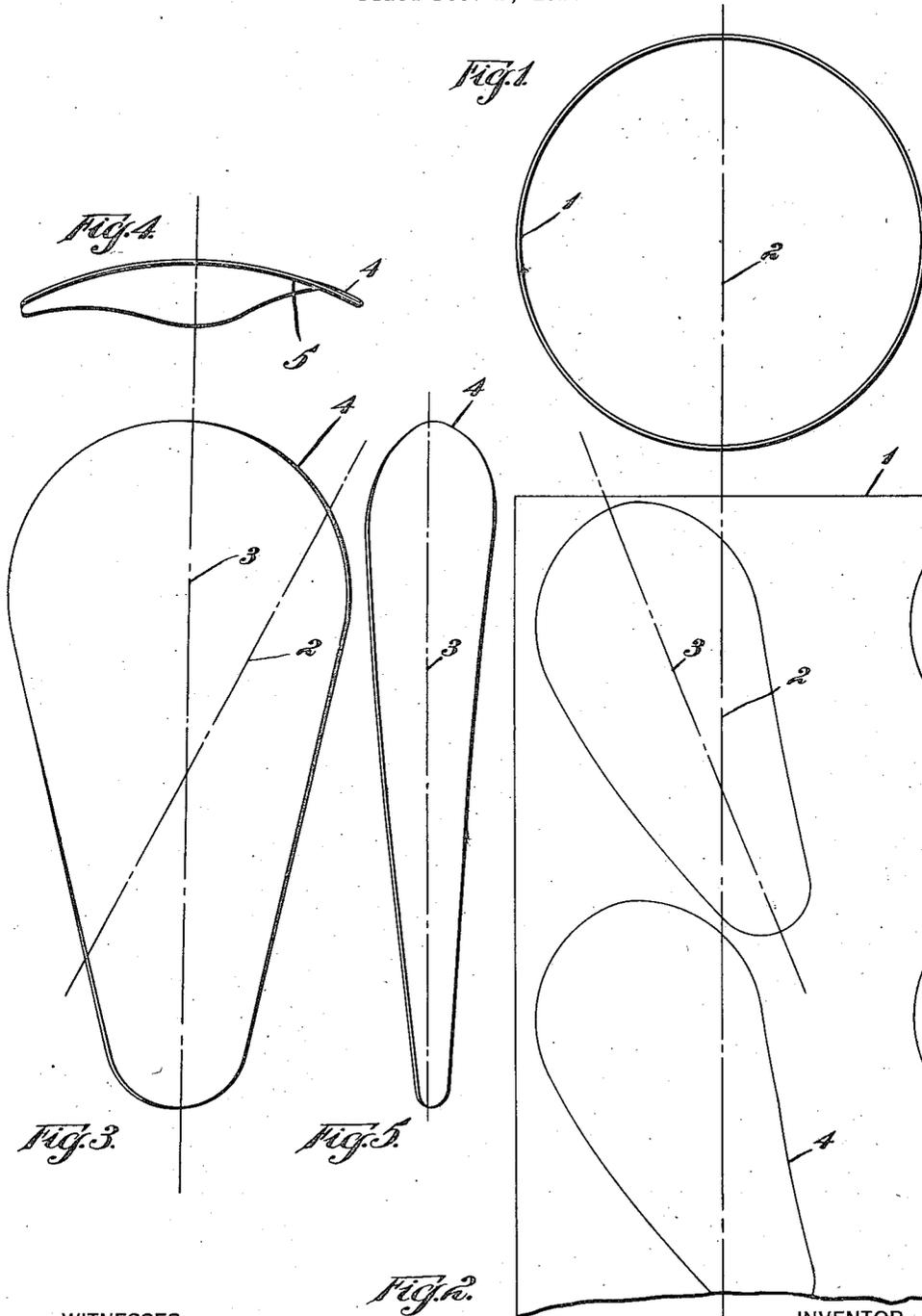


Fig. 3.

Fig. 5.

Fig. 2.

WITNESSES:

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INVENTOR

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WILLARD H. KEMPTON, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

FAN BLADE.

Application filed December 2, 1920. Serial No. 427,747.

To all whom it may concern:

Be it known that I, WILLARD H. KEMPTON, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Fan Blades, of which the following is a specification.

My invention relates to fan blades, more especially to fan blades formed of composite material such as woven fabric, paper and the like, and a hardened binder.

Heretofore, it has been customary to form fan blades by molding them singly in molds of suitable curvature and size. An absorbent sheet material, impregnated with a binder having the characteristics of fusing and then hardening under heat, was formed to the shape of the finished blade by punching or cutting, and a plurality of layers to form a predetermined thickness of the finished blade were assembled in the mold. Heat and pressure were then applied to form a unitary mass. This method required considerable labor and was expensive in that it was necessary to preform the material by punching, and the time consumed in molding was excessive, a large number of expensive molds being necessary to obtain quantity production.

My invention obviates these difficulties, it being among the objects thereof to form such articles economically and quickly.

My method comprises molding the material into sections of hollow cylinders or tubes and punching out fan blades having their axes at an angle to the axis of the curved material punched, forming the desired contour of fan blade.

In the accompanying drawings forming a part hereof and in which similar reference characters designate similar parts,

Fig. 1 is an end view of a hollow cylinder or tube of molded material,

Fig. 2 is a plan view of a tube showing the position of the blades with respect to its axis,

Fig. 3 is a plan view of a fan blade made in accordance with my invention, and

Figs. 4 and 5 are end and side views thereof, respectively.

A molded tube 1 or a section thereof of suitable thickness formed of fibrous material such as cloth, paper, and the like, and

a hardened binder, such as a phenolic condensation product, is placed in a punch press provided with a suitable die, so that the axis 2 of the tube or section is at an angle to the axis 3 of the die. By manipulating the die so that it comes in contact with the material or tube 1, segments or fan blades 4 are formed having their axes 3 at an angle to the axis of said tube or section.

In assembling the blades 4 on a hub, their axes are placed radial thereto so that the curved surface 5, when set in motion, advances to generate an air current.

Although I have described a specific method of forming fan blades in accordance with my invention, it is obvious to those skilled in the art that various changes in details of construction may be made without departing from the principles thereof. For instance, any suitable fibrous material may be employed in combination with suitable binders, or the material may be molded into a number of shapes having the proper curvature such as curved sheets, strips, hemispheres and the like.

My method of forming composite fan blades embodies distinct improvements over the prior art. It is simple and efficient and is especially adapted for quantity production, making it of considerable commercial importance.

I claim as my invention:

1. A method of forming composite fan blades which comprises providing a curved sheet of fibrous material and a binder and punching blades therefrom.

2. A method of forming composite fan blades which comprises providing a curved sheet of fibrous material and a binder and forming blades therefrom.

3. A method of forming composite fan blades which comprises providing a tube of fibrous material and a hardened binder and forming blades therefrom.

4. A method of forming composite fan blades which comprises providing a curved sheet of fibrous material and a binder and punching blades therefrom, said blades being punched with their axes at an angle to the axis of said curved sheet material.

5. A method of forming composite fan blades which comprises providing a section of a tube of fibrous material and a binder and punching blades therefrom, said blades

being punched with their axes at an angle to the axis of said tube section.

6. A method of forming composite fan blades which comprises providing a tube of fibrous material and a binder, and punching blades therefrom, said blades being punched with their axes at an angle to the axis of said tube.

7. A method of forming composite fan blades which comprises providing a curved sheet of fibrous material and a phenolic condensation product, and punching blades therefrom, said blades being punched with

their axes at an angle to the axis of said sheet.

8. A method of forming composite fan blades which comprises providing a curved sheet of textile fibres and a phenolic condensation product, and punching blades therefrom, said blades being punched with their axes at an angle to the axis of said sheet.

In testimony whereof, I have hereunto subscribed my name this 22nd day of November, 1920.

WILLARD H. KEMPTON.