PATENT SPECIFICATION

605,748

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COMPLETE SPECIFICATION

Improvements in Helicopter Rotor Blade Spar Tubes

I, NILS JACOB GILLE, Sandviken, Sweden, subject of the King of Sweden, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in the manufacture of spar tubes for Auto-gyro (Registred Trade Mark) and helicopter rotor blades.

Tubes of this kind must be made in such a manner that the strength of each transverse section of the tube is equal to the loads which occur in practice. It has, however, proved to be especially difficult to obtain a reliable and resistant form of the spar tube end, for attachment to a fork element, fastened to the rotor head. These rotor spar tubes have hitherto been fastened to the fork elements with a plurality of bolts. This is, however, a disadvantage in that the tube is weakened at the mounting end, and inspection and replacement of the tubes is made more difficult.

According to the present invention this problem is solved by providing the tube at its root end with a flange of sufficient dimensions. The fork element which is fastened to the rotor head is, at the same time, made of such a form that it embraces the flanged end of the tube; the latter preferably abutting a corresponding shoulder inside the fork element. In this way a very reliable connection will be provided, which can quickly be dismounted, and the rigidity of which is not dependent on any bolts or like elements, but only on the strength of the material itself.

In the manufacture of the spar tubes in this form it has proved difficult to produce the flange by normal upset methods. Owing to the hardness of the steel employed, fractures would occur in the material when treated in such a way. The invention therefore relates to a method of producing such a tube, according to which method the tube is provided by cold-drawing with a thicker end, which is then machined to form a flange on the inner or outer side of the tube. The tube ends manufactured in this way have proved to satisfy even very great demands as to strength and rigidity.

In the accompanying drawing, Fig. 1 shows a fork element with a tube end inserted in it. 1 signifies the fork element and 2 the spar tube with the flanged end 3. As demonstrated in Fig. 1 the fork element is formed in such a manner that it embraces the end of the tube, and the flange 3 abuts a shoulder 4 inside the fork element. In order to keep the tube in this position, the flange and the fork may also be provided with registering holes 5, through which may be placed a securing pin or bolt.

Fig. 2 shows a tube end produced by the method of the present invention. The thicker part provided by cold-drawing is machined by turning or by any other method, so as to eliminate the lined part 6, after which process the desired flange 3 remains.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Method of manufacturing a helicopter rotor blade spar tube, which consists in providing the tube with a thicker end by cold-drawing and machining said end into the form of a flange.

2. A rotor blade spar tube manufactured according to the method claimed in claim 1.

Dated this 31st day of December, 1945.

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[*Price* 1/-]

Fig. 1.

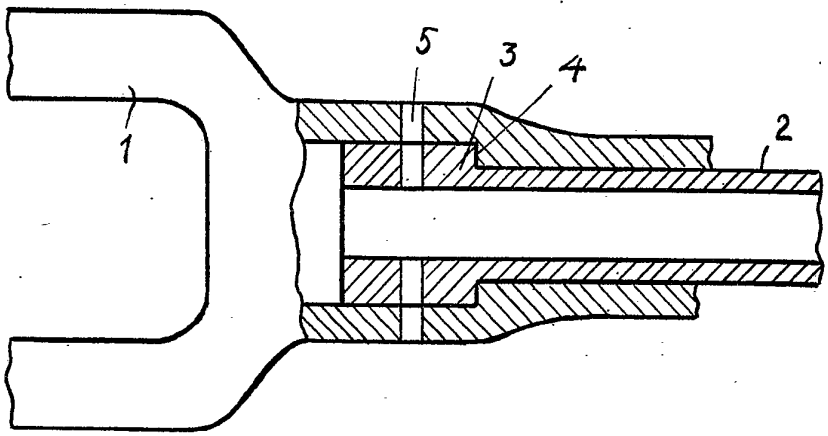
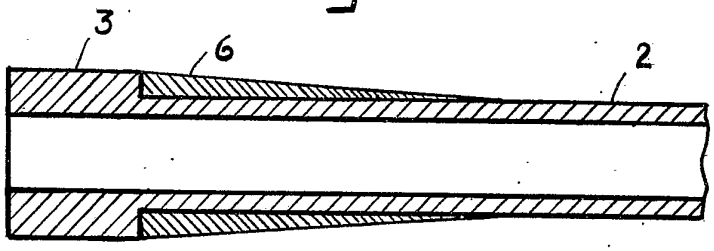


Fig. 2.



H.M.S.O.(Ty. P.)