

UNITED STATES PATENT OFFICE.

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REVERSIBLE FAN FOR COOLING SYSTEMS.

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This invention relates to cooling fans wherein the blades are adjustable as to inclination so that they may be set with their pitch directed forwardly or rearwardly of the plane of rotation of the fan, whereby the said fan may be caused to direct air forwardly or rearwardly thereof as required or may be so set in a neutral position in which but little air displacement takes place. Such a device is described in my pending application, Serial No. 721,725, filed June 23, 1924, and this invention has for its object to provide an improved method of controlling or setting the inclination of the fan blades in order that adjustments thereof may be easily and readily effected in a simple and efficient manner.

A further object is to provide for the adjustment of the blades through the medium of a member extending axially of the fan shaft whereby very positive and easy actuated adjustable means is rendered possible without complexity of moving parts.

Still further objects subsidiary to or resulting from the aforesaid objects or from the construction or operation of the invention as it may be carried into effect, will become apparent as the said invention is hereinafter further disclosed.

In carrying the said invention into effect, I may mount the blades of the fan in a hub within which is arranged a movable member adapted by its movement to effect the adjustment of the extent and direction of the angular disposition of the fan blades, a shaft upon which the said hub is mounted and which is in turn mounted in a suitable support, and an actuator extending through said shaft and connected with said movable means for the operation thereof, said actuator being adapted when rotated to impart reciprocal movement to said movable member; and means for remotely controlling the rotation of said actuator.

All of which is more particularly described and ascertained hereinafter, by way of example, having reference to the accompanying drawings, wherein—

Figure 1 is a vertical section of a fan device embodying the said invention, show-

ing the same as being mounted on a suitable support, the parts of the said device being indicated in fragmentary form;

Figure 2 is a fragmentary end elevation of the fan with the end plate removed therefrom;

Figure 3 is a detail perspective view with the blade shifting block removed; and

Figure 4 is a fragmentary detail perspective view of the inner end of one of the blade spindles.

Similar characters of reference indicate similar parts in the several figures of the drawing.

1 indicates an engine provided with a fan support 2, carrying an arm 3 in which is mounted a fan spindle 4. Rotatably mounted upon the said fan spindle 4 is a fan pulley 5 to which is secured by means of bolts 6 a hollow fan hub 7 having an approximately rectangular bore and closed at its outer end by a plate 8, the spindles 9 of the fan blades 10 being radially journaled in the walls of the said hub 7.

The said spindles are provided at their ends within the said hub with disks 11 shouldering against the inner walls of the said hub and provided on their inner faces with offset pins or projections 12 which enter recesses 13 formed in the outer surfaces of a rectangular block 14 around which the said disks 11 are located. This block 14 is reciprocable between the said disks lengthwise of the hub so that such reciprocable movement of the said block will result in the turning of the said disks and incidentally the fan blades in one or other direction, so that the extent and direction of such inclination of the said blades may be varied by a movement of the said block 14.

It is desirable that the said block may be actuated preferably from a point substantially remote from the said fan to effect such adjustment of the fan blades and that the method of such actuation should be such that it may be positively effected and adapted to be easily secured in any position of adjustment; and for such purposes of actuation of the said block 14, I indicate the fan spindle 4 as being tubular and also hav-

ing an enlarged bore 15 in its inner end, the said tubular spindle having a rod or actuator 16 passing therethrough, which rod is secured at its outer end by the nut 17 to the
5 said block 14. The inner end of the said rod 16 which projects from the inner end of the spindle 4 is provided with a sprocket 18 over which passes a chain 19 engaging a further sprocket 20 carried by a rod 21 which
10 may extend to any suitable point of operation, and which will upon rotation result in the rotation of the said rod 16 by reason of its being geared thereto in the manner described.

15 Mounted upon the rod 16 and within the enlarged bore 15 of the spindle 4 is a drum 22 having a spiral groove 23 therein and the said spindle 4 is provided with a pin 24, the inner end of which enters the said
20 groove 23 whereby the said drum is caused to reciprocate within the spindle when the said drum is rotated with the rod 16 by the rotation of the rod 21, and as the block 14 is secured to the end of the said rod 16 and
25 the said rod reciprocates with the said drum 22, this motion is transmitted to the said block and the rotation of the fan blades in one or other direction results. Consequently, the adjustment of the fan blades may be
30 effected simply by the rotation of the rod 21 in one or other direction, and to such extent as may be desired, and any means may be provided for retaining the parts in their adjusted position, such, for example, as by

the said rod 21 being frictionally engaged 35 by its support or bearing 25 to an extent resisting movement of the said rod other than when deliberately effected.

It will be seen that the construction admits of the use of ball bearings 26 in the 40 block 14, and ball bearings 27 and 28 in the pulley 5 so that a very easy running device may be secured, and it will also be apparent that the interior of the pulley and the hub may be packed with grease or other suitable 45 lubricant to further increase the free running properties of the said device.

This invention may be developed within the scope of the following claim without departing from the essential features of the 50 said invention, and it is desired that the specification and drawing be read as merely illustrative and not in a limiting sense, except as necessitated by the prior art.

What I claim is:—

55 In a reversible fan for the cooling systems of internal combustion engines, a fixed pulley spindle, a pulley mounted on said spindle, a tubular fan hub mounted on said pulley, adjustable pivotal plates journaled in said 60 hub, a rod slidably mounted in said spindle and adapted to rotate said plates, a drum carried by said rod and having a spiral groove, a pin carried by said spindle and extending into said groove, and means for 65 turning said rod.

In testimony whereof I affix my signature.
JOHN E. STOCK.