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AUXILIARY SUPPORT FOR BALANCING APPARATUS

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Fig 1

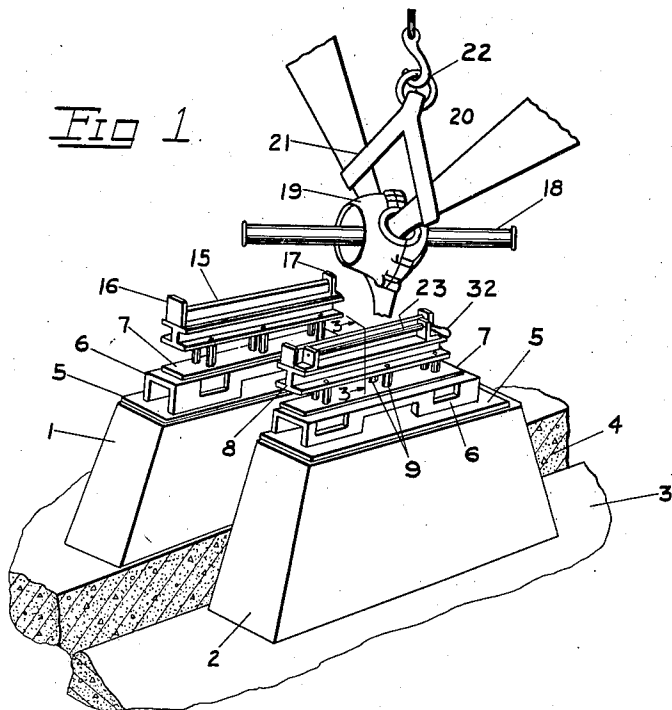


Fig 2

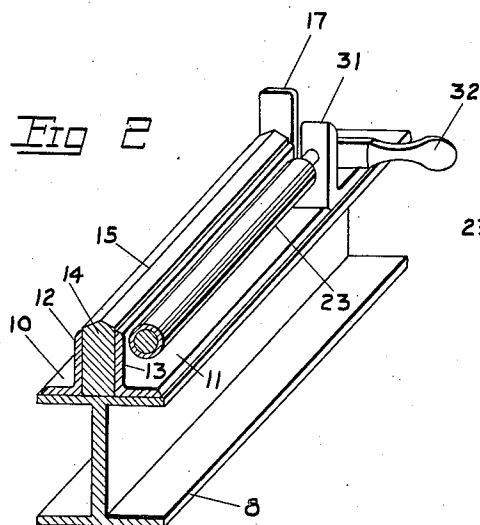
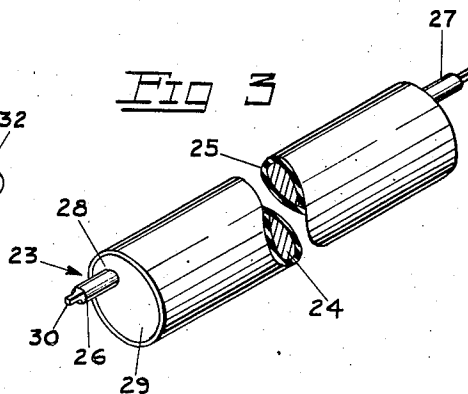


Fig 3



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AUXILIARY SUPPORT FOR BALANCING APPARATUS

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This invention relates to auxiliary supports and more particularly to those designed to prevent damage to knife-edge balancing rails and propeller balancing arbors.

In the aircraft industry, propellers must be balanced after their manufacture and before their installation in order to avoid rough running of the propeller and engine combination. The propellers are suitably freely rotatably supported. Weight is added, usually at the propeller barrel, which is in the nature of a hub surrounding blade pitch gears in the propeller. In this way, the individual blades of the propeller are equalized in weight to overcome any relative weight discrepancies in manufacture. Such propeller balancing arbors and the balancing members upon which they may be supported are usually constructed of a fine grade of steel and should be well protected. There is considerable danger of damaging the knife-edges of members employed to support the propeller arbors especially by inexperienced working personnel.

The principal object of the present invention is, therefore, to provide an auxiliary support for preventing damage to the knife-edges of propeller supporting members and to the accurately machined surfaces of propeller balancing arbors.

Other objects of the invention are to provide a simple, efficient, relatively inexpensive and serviceable auxiliary support for the noted purpose and to provide improved elements and arrangements thereof in apparatus of this character.

In accomplishing these and other objects of the invention, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawing wherein:

Fig. 1 is a perspective view of a propeller balancing stand showing an auxiliary support embodying the features of the present invention.

Fig. 2 is a perspective view of a portion of the stand substantially on the line 3-3, Fig. 1, showing a knife-edge supporting rail, and the relation of my auxiliary support thereto.

Fig. 3 is a detail perspective view of the cam element of my auxiliary support.

Referring more in detail to the drawing:

1 and 2, Fig. 1, designate balancing stands for propellers. The stands 1 and 2 may be of concrete or other suitably strong material and are suitably mounted in aligned relation on a concrete or other floor 3 at opposite sides of a well 4. A base plate 5 is suitably mounted on the upper ends on each of the stands 1 and 2 and channel irons 6 are secured to the base

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plates 5. Preferably superimposed on the channels 6 are base plates 7. I-beams 8 are mounted on the base plates 7 preferably in spaced relation, as by spacers 9.

As particularly shown in Fig. 2, the I-beams 8 support angle irons 10 and 11, the upstanding arms 12 and 13 of which bear against and support balancing rails 14 that are provided with knife-edges 15. Stop plates 16 and 17 are preferably mounted on the I-beams 8 at the ends of the knife-edge rails to limit the extent of rolling movement of a propeller balancing arbor 18.

The arbor 18 is adapted to have mounted thereon the barrel 19 of a propeller 20 which is to be balanced. The propeller may be suspended in a suitable manner as by straps 21 secured to a crane, as indicated by the ring, hook and cable assembly 22.

In order to cushion the shock of contact of the balancing arbor 18 with the knife-edges 15 of the rails 14 as the propeller is lowered into position on the balancing stands, I provide an auxiliary support, generally designated at 23, Fig. 3, in a position adjacent and generally parallel to each of the rails 14, though but one such auxiliary support is visible in Fig. 1. Each auxiliary support 23 may be generally considered a cam 24, and the following portions of the specification describe the structure and mounting of the one auxiliary support illustrated in the drawing. The cam 24 is preferably in the form of a cylindrical bar of a material having sufficient strength to initially support the weight of a propeller and arbor. A cushioning effect is preferably provided by covering the cam with a layer 25 of rubber or other suitably resilient material. Bearing studs 26 and 27 are provided on the cam 24 in an off-center relation to the axis thereof to form a low lobe portion 28 and a high lobe portion 29 on the cam. Suitable shapes 30 may be provided on the bearing studs to enable the studs to pass through apertures in bearing brackets 31 adjacent either or both of the stop brackets 16 and 17 that bound the knife-edge rails.

Suitable handles 32 are mounted on either or both of the bearing studs 26 or 27, the handles preferably being arranged on a low to high lobe plane of the cam to facilitate turning the cam, as and when desired.

The bearing studs are arranged on the brackets 31 at a suitable height to enable the high lobe portion 29 of the cam to contact the arbor 18 in advance of contact of the arbor with the knife-edge rails.

Operation

The operation of each auxiliary support employed in the apparatus constructed as described is as follows:

As a propeller is lowered onto the balancing stands as shown in Fig. 1, the handle 32 of the auxiliary support is raised relative to the position shown in Fig. 2, in such a manner that the high lobe portion of the cam 24 is in its uppermost position. This arranges the cam above the knife-edge 15 of the adjoining rail in such a manner that the resilient surface 25 engages the arbor 18 in advance of contact therewith on the balancing rail. In the preferred embodiment of my invention, the relation between the handle, or handles, 32, the stop plates 16 and 17, and the cam 24 is such that as the handle is raised and moves across a vertical position, it comes to rest against one of the stop plates, thereby bringing the high lobe portion 29 of the cam slightly past its uppermost position. With the cam in this position there is a binding action of the cam, which prevents the weight of the propeller from kicking the high lobe portion of the cam away from the arbor. The arbor is thus prevented from dropping upon the knife-edge of the rail. After the propeller balancing arbor rests on the cam, the handle 32 is turned slowly back to the position shown in Fig. 2 until the arbor rests on the knife-edge of the rail adjacent the auxiliary support.

The propeller may then be rotated within the limits of the stop brackets 16 and 17 in order to determine whether or not it is properly balanced. If it is desired to add weight to any of the blades of the propeller or to the propeller barrel, or barrel bolts, the cams 24 may be raised as heretofore described to lift the arbor off the knife-edges of the rails and thus avoid injury to such knife-edges.

It is apparent, therefore, that I have provided an auxiliary supporting structure that adequately protects the contacting surfaces of knife-edge rails and propeller balancing arbors and that is adaptable for use in many mechanical combinations requiring a cushioning effect between the contacting elements thereof.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

I claim:

1. In combination with a knife-edge balancing rail, an auxiliary support comprising a shaft having a resilient outer surface, said shaft having bearing studs at each end thereof in an off-center position, brackets mounted below each end of the knife-edge of said rail, said brackets being apertured to provide bearings, said studs being rotatably mounted in the apertures of said brackets, the diameter of the outer surface of said shaft and the location of said apertures being so proportioned and so arranged relative to the knife-edge of said rail that the resilient outer surface of said

shaft extends above the level of said knife-edge when said shaft is rotated in said bearings.

2. In combination with a propeller balancing standard having spaced, horizontal, knife-edge balancing rails arranged to support opposite ends of a propeller balancing arbor, an auxiliary support, having a supporting surface extending generally horizontally, mounted in a position parallel to at least one of said balancing rails and extending substantially along the entire length thereof, and means for alternately moving said support so that a portion of said supporting surface moves parallel with itself from a position below said knife-edge on said rail to a position above the same.

3. In combination with a substantially horizontal knife-edge balancing rail, an auxiliary support comprising a shaft having a relatively soft resilient outer surface, said shaft being substantially coextensive with and arranged adjacent and parallel to said rail; and means mounting said shaft for rotation about an eccentric longitudinal axis so constructed and arranged that rotation of said shaft places a portion of said surface above the level of the knife-edge of said rail or places all of said surface below the level of said knife-edge, whereby a load to be ultimately carried by said rail may first be carried by said shaft and then lowered onto said rail.

4. In combination with a substantially horizontal knife-edge balancing rail, an auxiliary support consisting substantially of a shaft having a relatively soft resilient outer surface, said shaft being substantially coextensive with and arranged adjacent and parallel to said rail; means mounting said shaft for rotation about an eccentric longitudinal axis so constructed and arranged that rotation of said shaft places a portion of said surface above the level of the knife-edge of said rail or places all of said surface below the level of said knife-edge, whereby a load to be ultimately carried by said rail may first be carried by said shaft and then lowered onto said rail, and a handle fixed directly to said shaft to rotate the same.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
667,835	Weiss	Feb. 12, 1901
1,610,718	Thomas	Dec. 14, 1926
1,651,272	Hapgood	Nov. 29, 1927
2,123,443	Taylor	July 12, 1938
2,201,369	Hem	May 21, 1940
2,347,002	Schofield	Apr. 18, 1944
2,382,665	Riopelle et al.	Aug. 14, 1945

FOREIGN PATENTS

Number	Country	Date
24,469	Austria	June 11, 1906