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BY A. P. C.

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MOUNTING OF ACCESSORIES ON AN AIRCRAFT

Filed May 10, 1938

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3 Sheets-Sheet 1

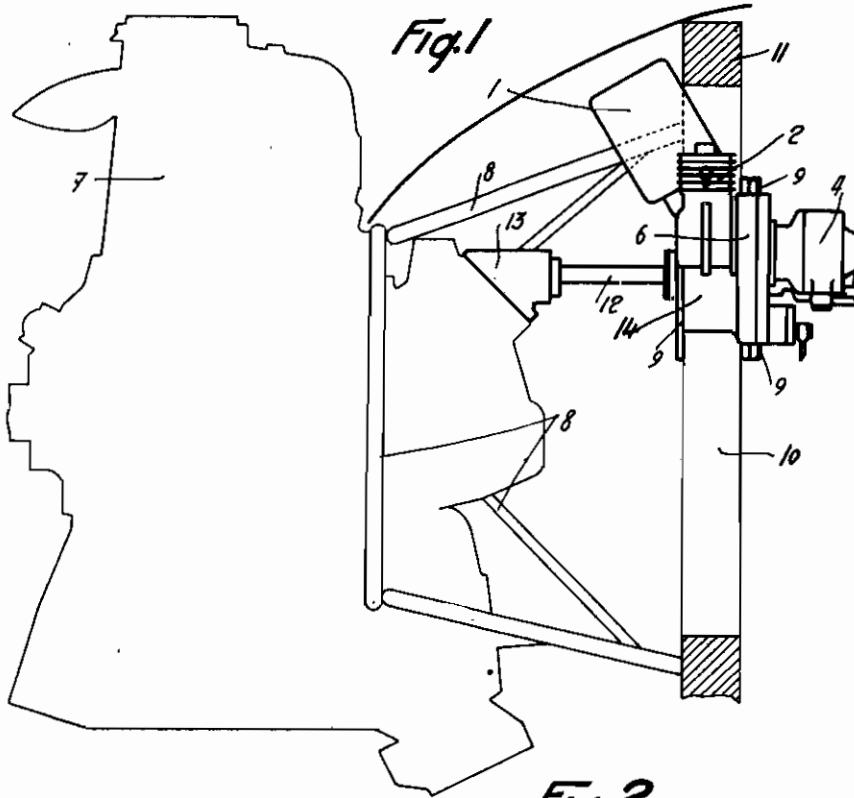
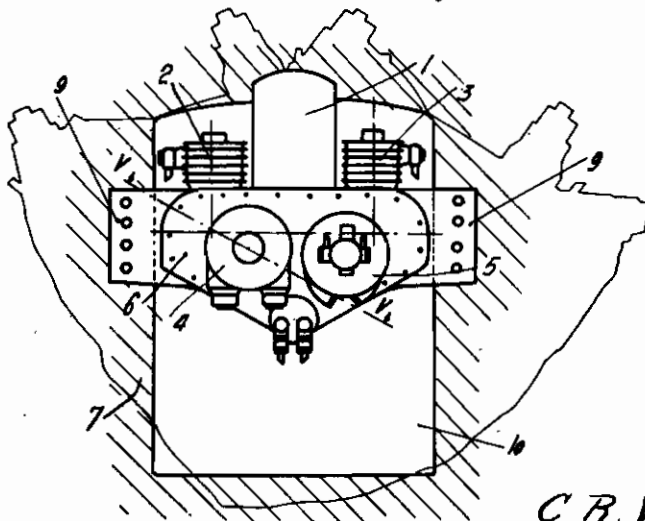


Fig. 2



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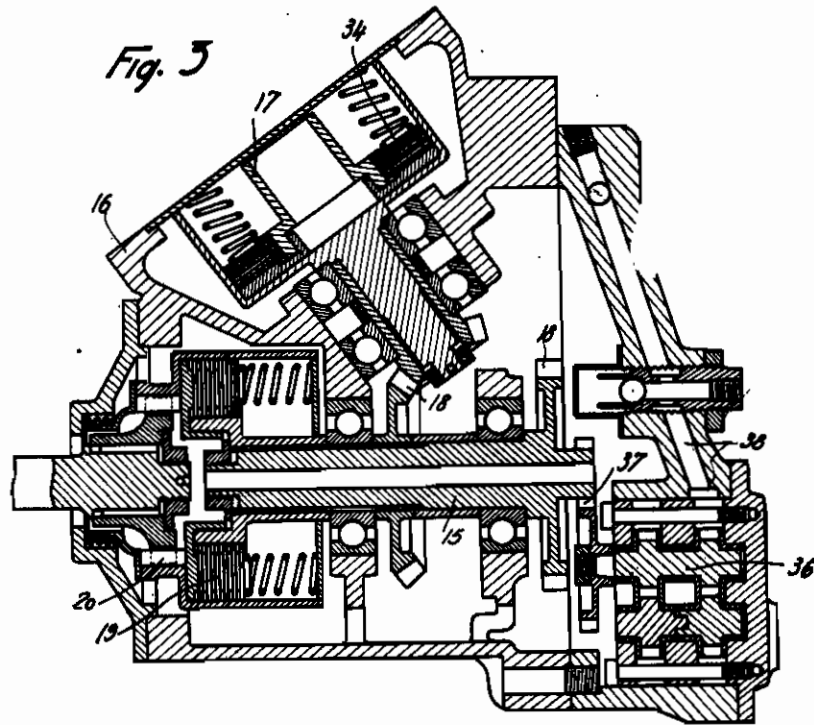
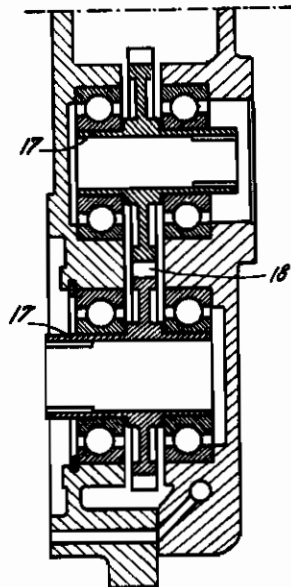


Fig. 5



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Fig. 4

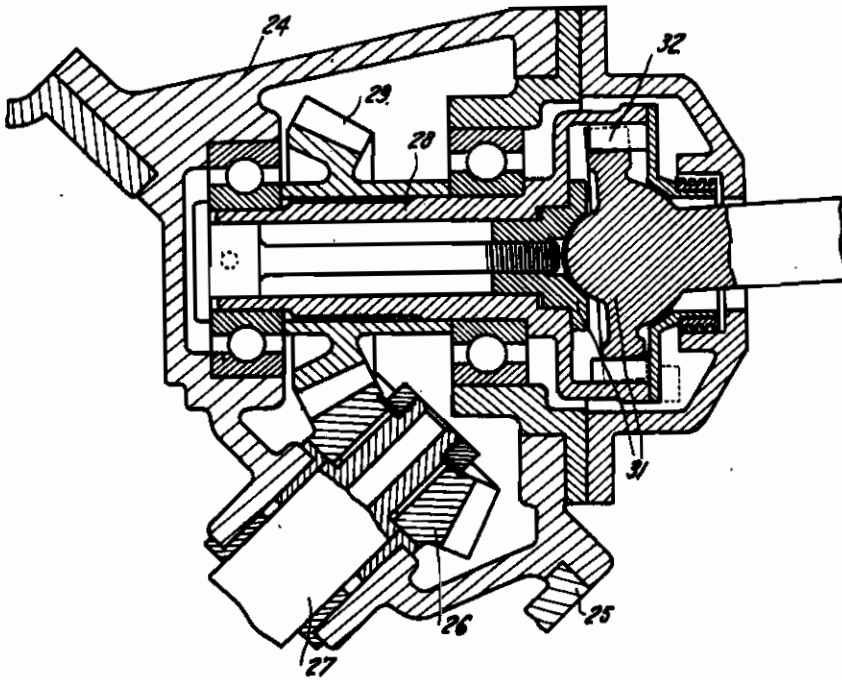
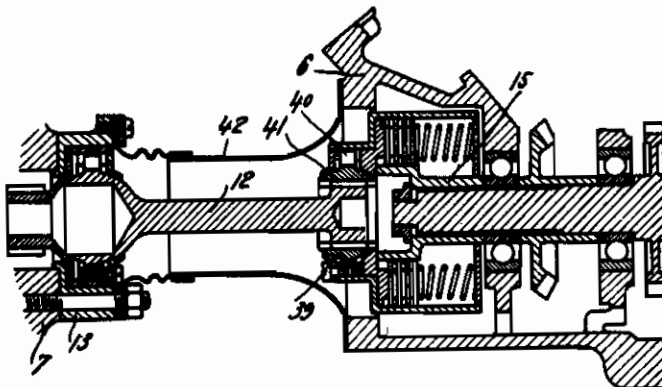


Fig. 6



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MOUNTING OF ACCESSORIES ON AN AIRCRAFT

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Application filed May 10, 1938

The present invention relates to the mounting of accessories on an aircraft.

It is known that modern aircraft are provided with a number of accessory apparatus such for example as high, medium and low pressure air compressors, vacuum pumps, electric generators, hydraulic pumps, etc., the operation of which is necessary for the operation of numerous instruments.

Hitherto such accessories have generally been directly mounted on the engine, but the multiplicity and variety of said accessories makes such a mounting more and more difficult. Furthermore, engine constructors are in that case obliged to provide on their engines brackets and driving devices which are not always used, in the case of multi-engine aeroplanes, for example. This therefore leads to making rear parts of engines different, according to the use on the aeroplane, and this is very disadvantageous as regards interchangeability.

It has also been proposed to drive these generators by means of electric motors or by auxiliary engines, but these solutions are generally heavy and costly.

The present invention proposes to overcome the above mentioned drawbacks and for this purpose it provides, in distinction to the foregoing, for the fixing of all or of a part of the accessory apparatus, which are not directly necessary for the operation of the engine, on the outside of a common movement take-off box which is independent of the engine and is fixed directly on the structure of the aeroplane, the movement take-offs of said box being driven by the engine through the intermediary of a common double cardan shaft which is preferably flexible or is associated with any other device allowing of oscillations of the engine and small longitudinal movements relatively to the accessories.

The engine in this case only requires to be provided with one remote control take-off for driving said movement take-off box.

By way of an example which is in no way limitative, an embodiment of the invention has been shown diagrammatically in the accompanying drawing, which embodiment has, in addition to the above defined peculiarities, other peculiarities which will be described hereinafter and more fully pointed out in the claims.

In the drawing:

Fig. 1 is a mounting diagram of accessories on an aeroplane in a manner according to the invention;

Fig. 2 is a corresponding partial view looking

in the direction of the arrow designated by / in Fig. 1;

Fig. 3 is a vertical section, on a larger scale, of the movement take-off box, along the axis of the drive shaft;

Fig. 4 is a similar view to Fig. 3 of the movement take-off on the engine;

Fig. 5 is a partial section along the line designated by V—V in Fig. 2;

Fig. 6 is a view of a modification of the drive shaft.

In this embodiment it has been assumed that five accessories are to be mounted, viz, an electric generator 1, a high pressure air compressor 2, a medium pressure air compressor 3, a vacuum pump 4 also serving as a low pressure compressor, a hydraulic pump 5 serving for example for supplying jacks not shown. Said five accessories are fixed on the outside of a case of a movement take-off box 6 which is directly fixed on the structure of the aeroplane in such a manner that it is independent of the engine 7 and carried by its supporting frame 8, by means of horizontal cross pieces 9 which are fixed at their ends on the edges of a window 10 provided in the fire-shield partition 11. The box 6 contains a suitable number of movement take-offs, five in this case, which are actuated by a common shaft 12 extending from a driving head 13 fixed on the engine above the movement take-off which is provided for this purpose on the back of the engine 7.

The movement take-off box 6 is itself composed of a substantially flat case having a vertical and substantially plane rear face and a front face comprising two plane vertical portions on either side of the central nose 14 serving as a housing for the main shaft 15. It is on said plane faces that the accessories are adapted to be mounted so that they cover the movement take-offs. The central nose 14 furthermore has at its upper part an inclined plane face 16 which serves as a support for the generator 1. The main shaft 15 drives the various movement take-off shafts 17 through the intermediary of suitable gears 18 and is itself driven, through the intermediary of a friction coupling 16 forming a torque limiting device, by the drive shaft 12. This latter engages endwise with the driving part of the coupling 19 through the intermediary of splines 20 having a slight play which enables the shaft 12 to take up a slight incline relatively to the shaft 19. Furthermore, the driving splines are shorter than the driven splines so that the shaft 12 can slide longitudinally. At its opposite end, the

shaft 12 penetrates into the driving head 13 which is formed by a case 24 fixed on the case 25 of the engine 7 above the movement take-off which is in this case formed by a bevel pinion 26 the shaft 27 of which is actuated by the engine 7. The case 24 supports a shaft 28 on which is fixed a pinion 29 meshing with the pinion 26 and said shaft 28 is connected to the shaft 12 by a swivel joint 31 and splines 32 similar to the splines 20. The shaft 12 is furthermore so dimensioned as to form a resilient shaft which damps the vibrations and the variations of torque of the engine.

On the movement-take-off 17 which is intended for driving the generator, is arranged a torque limiting device 34 which is adjusted in such a manner that it can only transmit the maximum torque required for normally driving the generator, this being done in order to protect the members of the movement take-off box from the effects of inertia of the rotor of the generator in the event of a sudden stoppage of the engine.

One of the two movement take-offs 17, which are arranged on the same side of the central nose 14, projects through the front face of the case of the box 6, and the other through the rear face.

The case of the box 6 furthermore contains a double gear pump 36 which is driven, through the intermediary of a gear 37, by the main shaft 15. One of the two gear couples of said pump 36 delivers through the pipe 38 and ensures the forced lubrication of the various members of the

movement take-off box as well as of those of the accessories which require lubricating; the other couple ensures the emptying of the case of the box 6 and the return of the oil to a reservoir not shown.

In the modification of construction of Fig. 6, a swivel joint 39 is provided to support the end of the drive shaft 12 at the entrance of the movement take-off box 6. In this case the two male and female parts are connected to each other by driving splines 40 which allow them a slight transverse play and the driving part is mounted on the shaft 12 by means of a splined sliding mounting 41. The shaft 12 is furthermore remotely surrounded by a protecting casing 42 having a flexible or resiliently deformable part.

Of course the invention is in no way limited to the constructional details described or illustrated which have only been given by way of example. Thus there may be any number of accessories and they may be distributed in any manner over the common movement take-off box. The swivel jointed modification shown in Fig. 6 can be used for the driving head which is fixed on the engine or again simultaneously on both ends of the shaft 12. The oil pump which forms an autonomous lubricating means for the movement take-off box may also be separately fitted on the outside of the case instead of being incorporated therein.

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