

June 30, 1931.

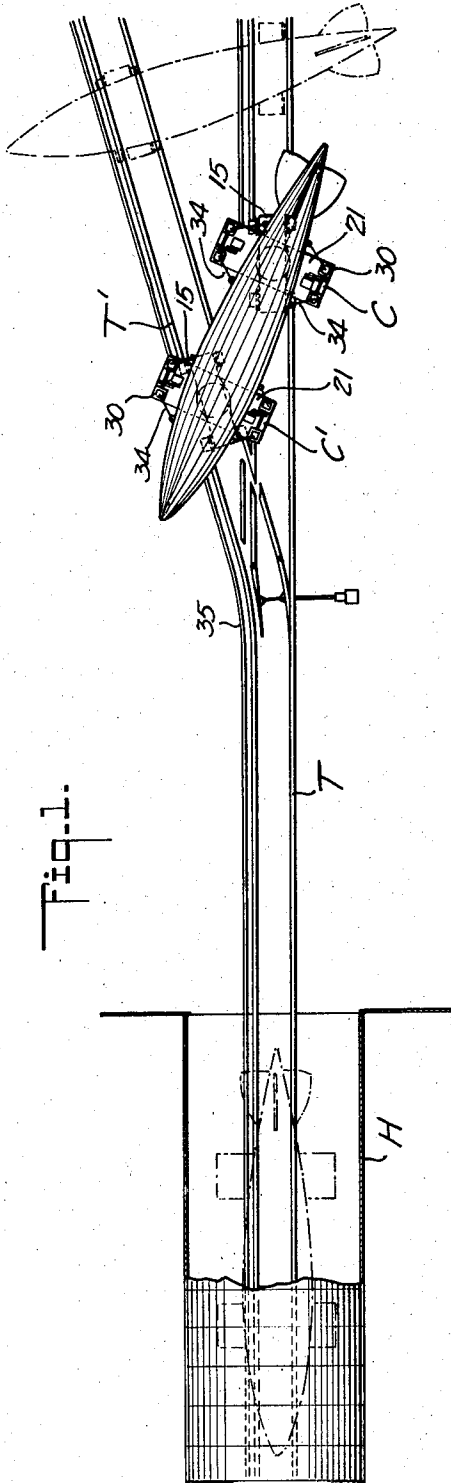
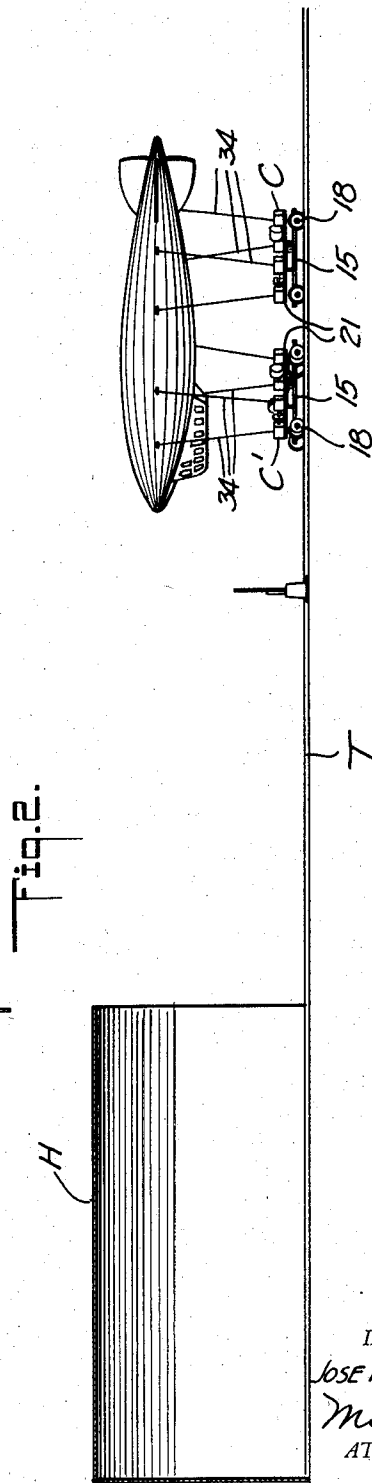
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1,812,237

MOBILE MOORING APPARATUS

Filed Nov. 9, 1929

2 Sheets-Sheet 1



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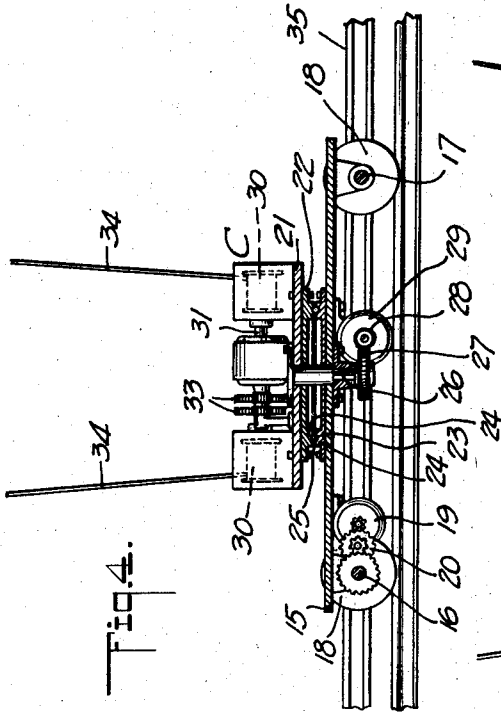
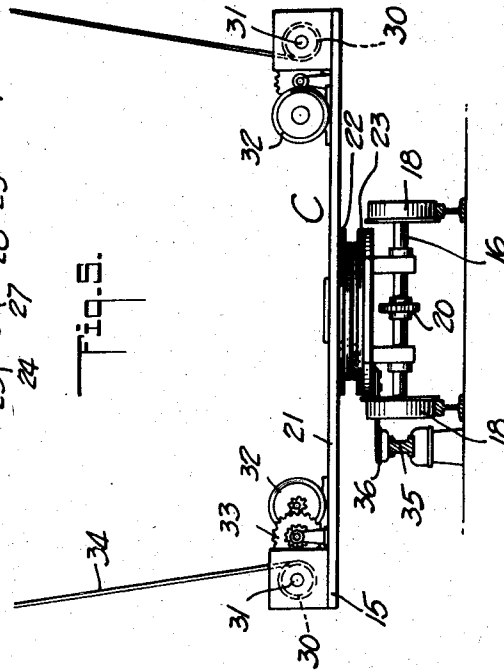
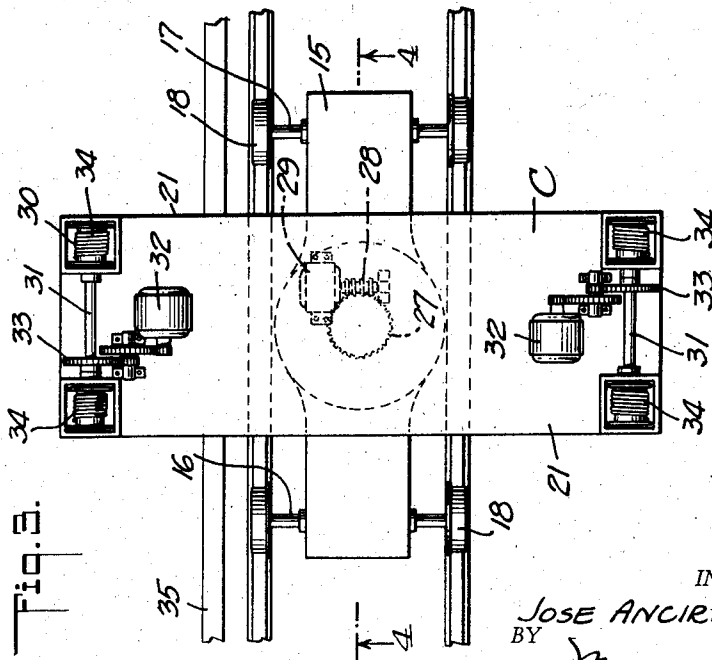
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MOBILE MOORING APPARATUS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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MOBILE MOORING APPARATUS

Application filed November 9, 1929. Serial No. 405,995.

My invention relates to airships of the lighter than air type, commonly referred to as dirigibles, and it has to do with the ground handling of airships.

5 It is a purpose of my invention to provide an apparatus located on the ground and which is adjustable to accommodate itself to any angular position which an airship may occupy as it is lowered to the apparatus inci-

10 dent to mooring of the ship to the apparatus; an apparatus which is movable over the ground with the airship moored thereto to convey the ship to or from a hangar, and incident to conveying the ship into the

15 hangar, repositioning the ship when necessary in order that the ship be positioned in parallelism to the hangar that it may be entered into the hangar without possible damage thereto, and incident to withdrawal

20 of the ship from the hangar to position the ship to the most advantageous position for an easy take off; and the apparatus being power operated to the end of greatly reducing the number of men constituting the

25 ground crew.

I will describe only one form of mobile mooring apparatus embodying my invention and will then point out the novel features thereof in a claim.

30 In the accompanying drawings:

Fig. 1 is a view showing in top plan one form of mobile mooring apparatus embodying my invention in association with an airship and a hangar.

35 Fig. 2 is a view showing the apparatus in side elevation and in applied position to an airship, and with the hangar in vertical section.

40 Fig. 3 is an enlarged view showing in plan one of the carriages embodied in the apparatus and in position on one of the tracks.

Fig. 4 is a vertical sectional view taken on the line 4-4 of Fig. 3.

45 Fig. 5 is a sectional view taken on the line 5-5 of Fig. 3.

In carrying out my invention, I provide two or more wheeled carriages designated generally at C and C', and as these carriages are identical in construction as well as the parts associated therewith, a description of one will suffice for the two carriages illustrated in the present embodiment of my invention.

As best illustrated in Figs. 3, 4 and 5, each carriage comprises a frame 15 carrying axles 16 and 17 provided with wheels 18, the axle 16 being driven by a motor 19 operatively connected thereto through a train of gearing 20. A turn-table 21 is mounted on the frame 15 of the carriage by the provision of companion disks 22 and 23 fixed, respectively, to the turn-table and the frame and having their confronting faces provided with annular ribs 24, having grooves providing race-ways for ball bearings 25. A vertical shaft 26 is journaled in the disks 22 and 23 and in the frame 15, its upper end being secured to the turn-table 21, while its lower end is provided with a worm wheel 27 which constantly meshes with a worm 28 fixed to the shaft of a motor 29, the latter being carried at the under side of the frame 15, as illustrated. It will be understood that by means of the motor 29 the shaft 26 may be rotated to actuate the turn-table 21 in order to produce a circumferential adjustment of the turn-table on the carriage.

The turn-table 21 is shown as of rectangular form, with winches 30 arranged in pairs at the opposite ends of the turn-table. The reels of the winches of either pair are fixed to a common shaft 31 adapted to be driven by a motor 32 through an intermediate train of gearing 33, the motor 32 being of the reversible type in order that the winches may be driven in either direction to wind or unwind the cables 34 to or from the reels. These cables are provided at their free ends with suitable means by which they may be attached to the opposite sides of an airship for mooring the ship to the turn-table, the

particular form of such means being immaterial so long as they effectively secure the cables to reinforced parts of the ship and at intervals spaced along the length of the ship, as illustrated in Figs. 1 and 2. It is essential that the two carriages be mobile in order that when an airship is moored thereto it may be conveyed from one point to another. However, in the present embodiment of my invention I have shown the two carriages as mounted on tracks, and which tracks are in definite relation to a hangar in order that the carriages may be operated to move over the tracks, and thus in definite paths to convey the airship to and from the hangar. In the present instance, I have shown a main track T which extends into the hangar H and for a sufficient distance therebeyond to permit the two carriages to be moved to positions suitable for attachment to an airship. For the purpose of effecting lateral adjustment of one carriage with respect to the other in order that the two carriages may be accommodated to any angular position an airship may occupy incident to its being moored to the carriages, or incident to a release of the airship when taking off, a branch track T' is provided. This branch track is in diverging relation to the main track T, and by means of a switch S either one carriage or the other may be deflected from the main track to the branch track as will be understood.

Any conventional means may be employed for supplying current to the motors 19, 29, and 32, and as the particular means forms no part of the present invention, none has been illustrated except to the extent of showing a third rail 35 at one side of the tracks T and T' engaged by a contact arm 36 carried by the frame 15 of the carriage. It will be understood that the contact arm 36 serves to collect current from the rail 35, and through suitable connections such current may be conducted to the several motors.

The operation of the apparatus is as follows:

When mooring an airship to the carriages, it will be appreciated that, the position to which an airship may be moved above the tracks of the apparatus is dependent upon the direction and intensity of the prevailing wind. Should it be possible to maneuver the airship to a position directly above and in parallelism with either the main track T or the branch track T', the two carriages are moved to one track or the other, and by connecting the cables 34 to the airship, with the turn-tables at right angles to the carriage frames either by hoisting the cables through ropes lowered from the airship, or by constructing the cables in sections, parts of which are permanently attached to the airship so as to be lowered for connection with those parts of the cables mounted on the reels of the winches, the cables can be manipulated through opera-

tion of the winches to exercise a downward pull sufficient to draw the airship downward into proximity to the carriages and to a level which will permit of the airship being moved into the hangar. Should the airship be at a slight variance to the parallel, with the cables attached to the airship, it can be moved to a true parallel position above the carriages by circumferential adjustment of the turn-tables to a position at right angles to the carriage frames. However, should it be only possible to position the airship at an angle with respect to the tracks T and T', it is then necessary to position the apparatus so that one carriage is on the main track while the other is on the branch track, as illustrated in Fig. 1. The precise location of the carriages on the tracks is of course determined by the angular position of the airship with respect to the tracks, as will be understood from a consideration of another position which an airship may assume as illustrated in dot and dash lines in Fig. 1. Once the carriages are disposed beneath the airship, the turn-tables are adjusted to occupy positions at right angles to the major axis of the airship, so that by subsequent connection of the cables to the airship, it may be drawn down into proximity to the carriages for conveyance into the hangar. In moving the carriages toward the hangar, that carriage on the branch track T' will ultimately move onto the main track T so as to occupy a position in advance or at the rear of the other carriage to align the airship with the main track so that it can be conveyed straight into the hangar. It will be understood that incident to such an operation, it is of course necessary to readjust the turn-table 21 so as to assume positions at right angles to the main track T.

In conveying the airship from the hangar incident to a take off, the carriages are moved along the main track T, and if it is desirable or necessary to position the airship at an angle with respect to the main track, either one carriage or the other is switched to the branch track. A similar adjustment may be effected by manipulation of the turn-tables 21 with both carriages on the main track. Through adjustment of the turn-tables, the angular position of the airship may be increased in respect to the main track where the two carriages are disposed, respectively, on the main and branch tracks. In this manner, the airship may be moved to any desired or required position to facilitate an easy take off, once the cables are disconnected from the airship.

Although I have herein shown and described only one form of mobile mooring apparatus embodying my invention, it is to be understood that various changes and modifications may be made herein without departing from the spirit of the invention and the spirit and scope of the appended claim.

I claim:

In a mobile mooring apparatus for dirigibles, a wheel carriage having a frame, an elongated turntable mounted for rotative movement on said frame, winches on the turntable and arranged in pairs at opposite ends thereof, cables on the winches, and a pair of
5 motors on the turntable one for each pair of winches, each motor being operatively connected to the two winches for rotating the
10 latter simultaneously and in either direction to wind or unwind the respective cables.

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