This invention relates to launching apparatus and landing platforms for aeroplanes. An important object of the invention is the provision of a practically operative launching device which may be employed in launching passenger aeroplanes, mail planes or large transport planes, which is of such character that this launching will not be interfered with by inclement weather.

A further and more specific object of the invention is to provide an inclined platform of considerable length which may be rotated to face the wind with its higher end, this platform having means for causing an aeroplane to take part of guided movement longitudinally thereof from the lower to the higher end whereby the aeroplane may be launched from the upper end of the platform at flying speed.

A further object of the invention is the provision of a platform having such launching mechanism, the launching mechanism being of such character that it will not interfere with the use of the platform as a landing field.

A still further object of the invention is to provide a novel and improved launching gear for use in launching the aeroplane.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein—

Figure 1 is a plan view of aeroplane launching and landing apparatus constructed in accordance with my invention;

Figure 2 is a longitudinal sectional view therethrough;

Figure 3 is a front elevation of the launching gear;

Figure 4 is a side elevation thereof;

Figure 5 is a detail view showing the mounting of the platform upon the supporting tracks.

Figure 6 is a detail view showing the tail skid support employed.

Referring now more particularly to the drawings, the numeral 10 generally designates a platform having a flat upper surface and of considerable length and breadth. A convenient size for the construction of such a platform is 300 x 1000 feet. Opposite ends of this platform are supported by a circular track 11, which is preferably arranged within a pit 12 of such depth that one end of the platform is level with the ground. The platform from end to end is given about a ten per cent pitch, so that the upper end thereof, with a platform of the length above set forth, would be approximately one hundred feet from the ground.

Beneath this upper end may be arranged hanger structures, generally designated at 13, the floor of which is disposed at ground level and accessible from the edge or side wall of the pit. Extending longitudinally of the platform from end to end thereof are tracks 14, which are preferably in the form of flat plates 15 projecting outwardly from the inner edges of parallel grooves 16 formed in and extending longitudinally of the structure. Between these tracks, a small groove or cable trough 17 is formed in the surface of the platform.

A launching car 18 is provided, this car comprising a body having extending downwardly therefrom at each side thereof a plurality of supports 19, each bearing upper and lower track engaging wheels 20 and 21 for engagement with the upper and lower surfaces of a track element 15. The wheels 20 serve to support the carriage while the wheels 21 prevent separation thereof from the surface of the platform and guide and support the carriage in its movement over the upper edge of the platform about which the carriage may pass to a position beneath the platform. This carriage has means for engaging the rear and outer portions of an under carriage of an aeroplane, so that this under carriage may be pushed forwardly and held against transverse slipping movements and, at the same time, the plane may rise therefrom or disengage itself therefrom when its speed becomes greater than the speed of the carriage. In the present instance, the carriage is disclosed as having mounted thereon at each side thereof a longitudinally extending shaft 22. These shafts have longitudinally spaced openings formed therein.
permitting attachment thereto of the forward lower ends of outwardly and upwardly extending thrust arms 23, which are adjustable as to length, as indicated at 24, and may be conveniently constructed from angle iron.

These arms are connected intermediate their ends by a transversely extending brace 29 which is adjustable as to length, so that the separation of the upper ends of the arms may be controlled. Extending transversely of the carriage is a shaft 26, to opposite ends of which braces 27 are secured by knuckle joints 28. The braces 27 are adjustable as to length, as indicated at 29, and have means at their upper rear ends whereby they may be connected to the thrust arms 23 to render the same rigid. The under portion of the carriage has depending therefrom a rigid arm 30, the lower end of which is secured to a cable 31 operating in the groove 17. This cable, at a point spaced a suitable distance rearwardly of the point of attachment of the arm 30, has secured thereto a flat plate 32 adapted for the reception of the tail skid 33 of the aeroplane. The thrust arms 23 engage behind the rear or under carriage struts of the aeroplane, so that when the cable is moved longitudinally, these arms will exercise a thrust upon the under carriage and accordingly will cause the aeroplane to move longitudinally.

It will be obvious that by moving the cable 31 with accelerated speed, the speed of the aeroplane may be increased to a launching speed, it being, of course, understood that the motors of the plane will be in operation during the launching period. Operation of the cable 31 is obtained by means of a motor 34, preferably arranged beneath the platform and reversely operating a drum 35 about which the cable is wound. The cable from the drum passes over pulleys 36 arranged at opposite ends of the platform and directs the cable into the trough 17.

In addition to the launching apparatus above described, I provide a central supporting turntable 37 for the platform and a motor for controlling the operation of this turntable. This motor may either be the motor 34 above described or a separate motor 38, as disclosed. It will be obvious that with the platform 10 faced into the wind, the platform may be conveniently employed either in launching or as a landing field for aeroplanes. Since the construction of the tracks does not provide any grooves which will interfere with the landing of the plane, a smooth platform is provided for such landings. This platform may be very readily kept clear of snow and ice by simply providing some means for heating the surface thereof. It will be obvious that due to the construction of the launching apparatus and the length of the platform provided for such launching, the plane may be started from rest and gradually brought to launching speed without any jerk or jar. It will also be noted that during the launching, the plane operates upon its own running gear, so that when it takes off either from the speed imparted thereto by the launching apparatus or from speed gathered from its propulsion mechanism, there will be no jerk or jar, such as is present in the catapult arrangements now employed for launching aeroplanes. By use of an apparatus of this character, all danger now attending launching and landing of aeroplanes during wet or windy weather can be eliminated.

Since the construction hereinafore set forth is capable of a certain range of change and modification without materially departing from the spirit of the invention, I do not limit myself to such specific structure except as hereinafter claimed.

I claim—

1. In launching and landing apparatus for aeroplanes, a platform of sufficient size to permit landing of an aeroplane thereon, said platform inclining from end to end, means for rotating the platform to direct the higher end thereof into the wind, a carriage shiftable from end to end of the platform and having means to releasably engage the under carriage of an aeroplane, guiding tracks for said carriage extending longitudinally of the platform, and wheels upon the carriage engaging the upper and lower faces of the tracks for preventing separation of the carriage from the tracks.

2. In launching and landing apparatus for aeroplanes, a platform of sufficient size to permit landing of an aeroplane thereon, said platform inclining from end to end, means for rotating the platform to direct the higher end thereof into the wind, a carriage shiftable from end to end of the platform and having means to releasably engage the under carriage of an aeroplane, guiding tracks for said carriage extending longitudinally of the platform, wheels upon the carriage having connection with the tracks preventing separation of the carriage from the tracks, there being a groove in the platform adjacent said tracks and paralleling the same, the carriage having an arm extending into said groove, and an endless cable having one run thereof disposed within the groove and to which the arm is secured.

3. In launching and landing apparatus for aeroplanes, a platform of sufficient size to permit landing of an aeroplane thereon, said platform inclining from end to end, means for rotating the platform to direct the higher end thereof into the wind, a carriage shiftable from end to end of the platform and having means to releasably engage the under carriage of an aeroplane, guiding tracks for said carriage extending longitudinally of the platform, wheels upon the carriage having coac-
tion with the tracks preventing separation of the carriage from the tracks, there being a groove in the platform adjacent said tracks and paralleling the same, the carriage having an arm extending into said groove, an endless cable having one run thereof disposed within the groove and to which the arm is secured, and a platform secured to said cable rearwardly of said carriage and adapted to receive the tail skid of an aeroplane engaged with the carriage.

4. In launching and landing apparatus for aeroplanes, a platform of sufficient size to permit landing of an aeroplane thereon, said platform inclining from end to end, means for rotating the platform to direct the higher end thereof into the wind, a carriage shiftable from end to end of the platform and having means to releasably engage the under carriage of an aeroplane, guiding tracks for said carriage extending longitudinally of the platform, and wheels upon the carriage having coaction with the tracks preventing separation of the carriage from the tracks, the engaging means of the carriage comprising outwardly and rearwardly inclining arms adapted to engage the outer rear faces of rear struts of the under carriage of the aeroplane.

5. In launching and landing apparatus for aeroplanes, a platform of sufficient size to permit landing of an aeroplane thereon, said platform inclining from end to end, means for rotating the platform to direct the higher end thereof into the wind, a carriage shiftable from end to end of the platform and having means to releasably engage the under carriage of an aeroplane, a plurality of vertically spaced rollers for said carriage, a drum beneath the platform, means for driving the drum, and a cable wound upon the drum and passed about opposite ends of the platform and over the upper surface of the platform to which said carriage is secured.

6. In launching and landing apparatus for aeroplanes, a platform of sufficient size to permit landing of an aeroplane thereon, said platform inclining from end to end, means for rotating the platform to direct the higher end thereof into the wind, a carriage shiftable from end to end of the platform and having means to releasably engage the under carriage of an aeroplane, a plurality of vertically spaced rollers for said carriage, a drum beneath the platform, means for driving the drum, a cable wound upon the drum and passed about opposite ends of the platform and over the upper surface of the platform to which said carriage is secured, and tracks for guiding the carriage preventing separation of the carriage from the platform.

In testimony whereof I hereunto affix my signature.

DONALD C. CARVER.