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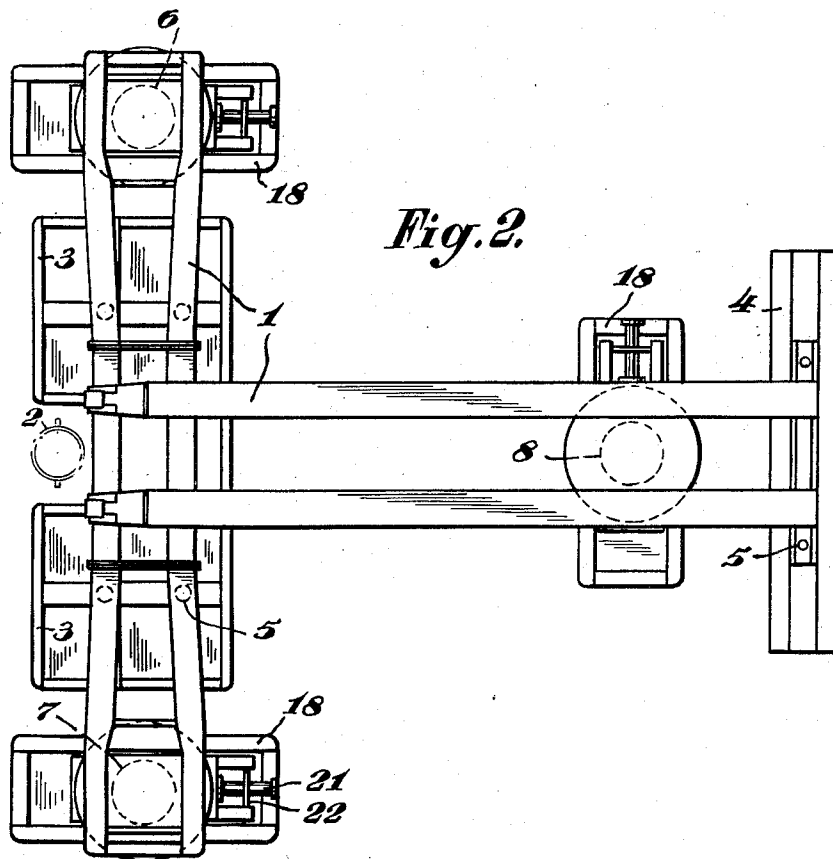
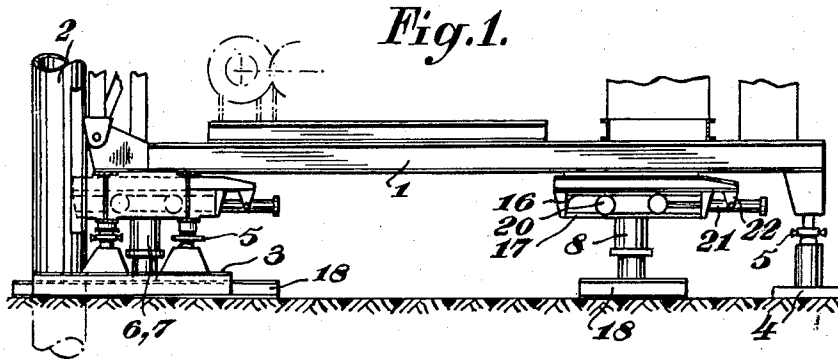
A. P. JOURDAIN

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MACHINE TURNABLE AND SHIFTABLE IN ALL DIRECTIONS ON THE
GROUND, PARTICULARLY FOR DRIVING PILES AND THE LIKE

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4 Sheets-Sheet 1



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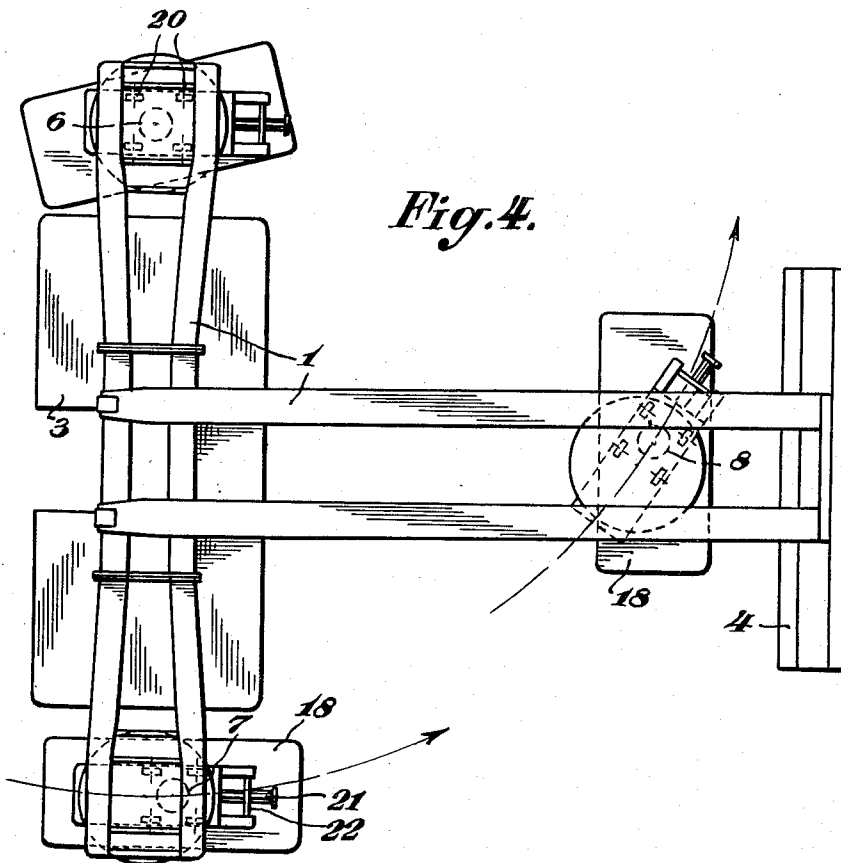
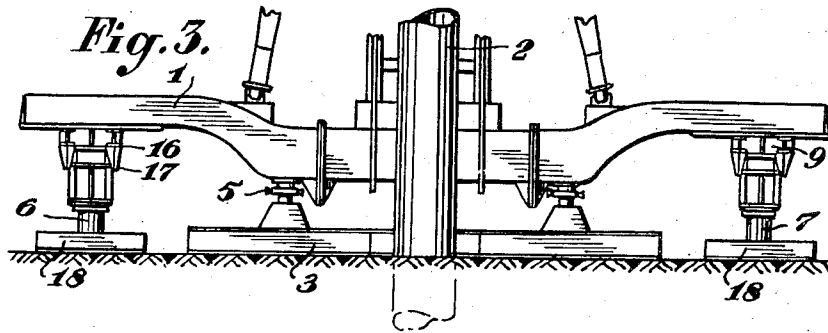
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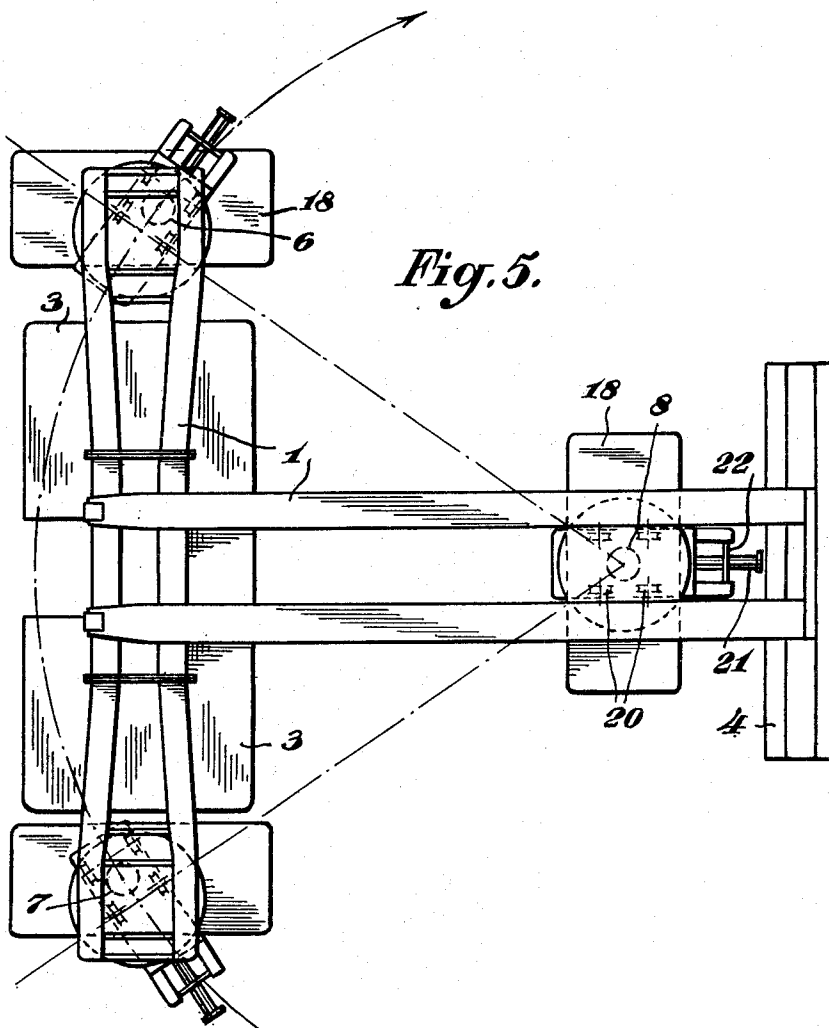
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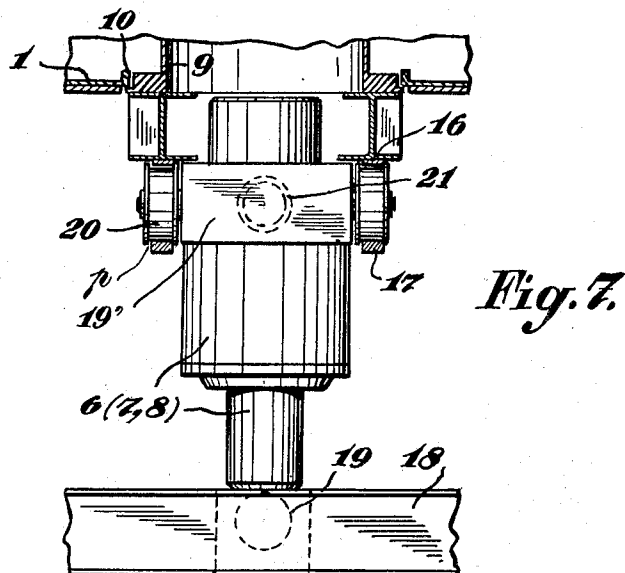
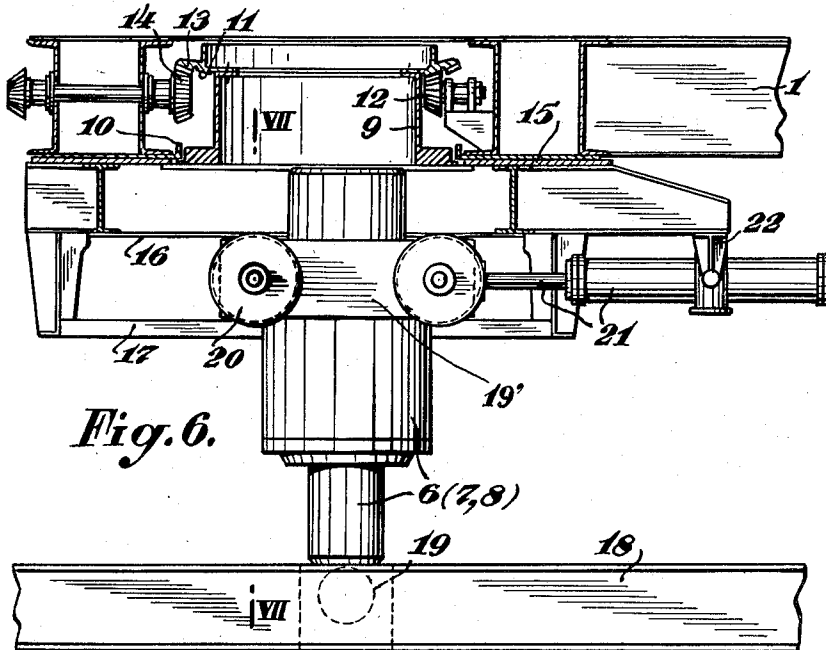
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MACHINE TURNABLE AND SHIFTABLE IN ALL DIRECTIONS ON THE GROUND, PARTICULARLY FOR DRIVING PILES AND THE LIKE

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6 Claims. (Cl. 180—8)

This invention relates to a machine which is capable of being turned and shifted in all directions on the ground and which is particularly adapted for driving and/or withdrawing piles, tubes or the like. In its broadest aspect, the invention applies to any heavy machine capable of moving directly on the ground by its own means, in every direction. More specially, the invention has for its object to provide a machine of the type specified, wherein all movements may be effected in a simple and swift manner, while securing perfect stability of the machine in every position thereof.

Machines are known which are provided with a mechanism for performing translatory displacement of the machine on the ground, as well as with a rolling track cooperating with means for lifting the machine for the purpose of producing angular movement of the machine on said track.

An object of the invention is to provide a machine with means permitting translatory movement and angular movement of the machine, while ensuring a perfect stability of the machine during all movements which may be simply and rapidly effected.

In accordance with one embodiment of the invention, the machine is provided with a plurality of lifting jacks, each of which is suspended for horizontal translatory movement with slight transverse play on a track integral with a turret which is mounted on the platform of the machine so as to be rotatable about a vertical axis.

The machine, being lifted by said jacks, can perform a translatory movement when the three tracks carried by the turrets are parallel, and can perform an angular movement about one of the jacks if the tracks of the other jacks are brought into a position substantially tangent to corresponding circles the centre of which is located on the axis of the first jack.

Further features and advantages of the invention will appear from the disclosure of one example of carrying out the invention, as will be given hereinafter with reference to the accompanying diagrammatical drawings, in which the various components which are not essential for the understanding of the invention have been omitted.

Figure 1 is a side view of the lower section of a machine specially designed for driving and/or withdrawing piles, tubes and the like.

Figure 2 is a plan view of the said lower section of the machine, the components supported upon the platform of the machine being omitted.

Figure 3 is an end view of the machine.

Figures 4 and 5 are plan views illustrating two ways of shifting the machine angularly.

Figure 6 is a view drawn to a larger scale, partly in vertical section of a directing turret, with the corresponding lifting jack; and

Figure 7 is a sectional view according to line VII—VII of Fig. 6.

The machine includes a platform 1 which is substantially formed by an assembly of longitudinal and cross

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girders and supports the runner adapted to guide a pile or a tube 2 to be driven into or pulled out from the ground. The platform further carries the engine, the winch, the pump and other units required for the various steps to be performed. When such steps are being carried out, the machine bears on the ground through the medium of supporting means which are properly dimensioned and positioned so as to secure the required stability of the machine, such supporting means comprising e. g. assemblies of girders 3 and 4 arranged at the front and at the rear. The supporting assembly 3 is made with a recess where a pile or a tube will be located. The supporting assemblies are connected to the platform by suspension springs, not shown, and their position with respect to the platform may be adjusted by means of screw jacks 5 acting as adjustable abutments.

At the ends of the cross girders of the platform and adjacent the ends of the longitudinal girders of the latter there are arranged three lifting jacks 6, 7, 8, said jacks being each suspended from a turret mounted for rotation about a vertical axis in the platform 1, the arrangement being such that each jack is capable of performing a limited horizontal movement with respect to the corresponding turret. A connection of this type is shown more specially in Figures 6 and 7. The connection includes a turret 9 which is rotatably mounted in a guide member 10, rigid with the platform 1, the said turret being suspended on rollers 12, through the medium of a flange 11 integral with the turret and acting as a rolling path at the top portion of the turret, the said rollers, which are e. g. four in number, being mounted on the platform. A toothed rim is rigid with the turret and is driven by a pinion 14 pertaining to a gear mechanism mounted on the platform. The turret 9 is rigid with a structure including a horizontal web 15 extending laterally under a horizontal web of the platform 1, and two parallel frames each formed of two vertically spaced track members 16, 17. As a result, the whole assembly 15, 16, 17 rotates in one with the turret 9. The lifting jack 6 (7 or 8) corresponding to each turret, and which will generally be a hydraulic jack, includes a lower member the end of which is secured to a plate 18 by means of a ball-and-socket joint 19, whereby the plate may adjust itself correctly on the surface of the ground. The upper member of the jack is rigidly secured to a carriage 19' provided with four rollers 20 arranged between the track members 16 and 17, the diameter of the said rollers being slightly smaller than the vertical spacing of the track members. The mutual guiding action of the track members and the rollers is such as to allow for a slight relative transverse movement therebetween. The carriage is coupled, e. g. by means of a pivotal connection, to one member of a shifting jack 21, such as a hydraulically or pneumatically operated jack, the other member of the jack being secured, for instance by means of a pivotal connection, to a bracket 22, integral with the turret structure 9, 15, 16, 17. Both the jacks 21 and 6, 7, 8 are of the double acting type. The piping for the driving fluid has not been shown in the drawings.

It will be seen that, when the plates 18 are cleared from the ground, in which case the machine will rest upon its supporting members 3, 4, then each turret will bear through the medium of the rim 11, upon the rollers 12, while the whole of the jack 6 (7 or 8) and the plate 18 is suspended on the tracks 17 through the medium of the rollers 20. Inversely, when the machine is lifted by the jacks 6, 7, 8, in which case the latter bear upon the plates 18, while the supporting members 3, 4 are cleared from the ground, then the turret will bear upon the rollers 20 through the medium of the track members

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16, the said turret then supporting the platform 1 by means of the webs 15. It will be understood that the position shown in Figure 1 will only be assumed momentarily since the plates 18 and the supporting members 3, 4 are lifted each in turn.

When a pile or a tube 2, for instance, is being driven or pulled out, the machine will bear upon its supporting members 3, 4. When it is required to shift the machine to a plate where a further pile or tube is to be driven or pulled out, all the necessary steps may be performed readily and quickly.

Indeed, when it is required to shift the machine in a straight line, all the turrets are so directed that all the track members 16, 17 are parallel to the desired direction. Locking means of any type may be provided for locking the turrets momentarily in the desired position. The plates 18 are lowered on the ground and the machine is raised by means of the jacks 6, 7, 8. When the shifting jacks 21 are now operated the machine will be shifted in a straight line, the magnitude of such displacement being limited by the track members 16, 17. The machine is then lowered to the ground, the plates are lifted, the carriages are brought to the opposite ends of the track members 16, 17 by the jacks 21 and the machine is lifted again so that it will be possible to perform another shift in a straight line, as above described.

When it is desired to modify the angular position of the machine, the latter may be caused to swivel about any one of its lifting jacks, two possible ways being shown in Figures 4 and 5. When plates 18 are in the lifted position, two of the turrets are caused to swivel until the track members 16, 17 of each turret are substantially perpendicular to the line joining the axis of the third lifting jack to the axis of the respective turret. The plates 18 are then lowered and the machine is raised by means of the lifting jacks. All that need be done then is to operate the shifting jacks 21 of the two respective turrets, with the result that the machine will be caused to swivel about the axis of the shifting jack of the third turret, as indicated by the arrows in Figures 4 and 5. While this movement is being performed, the track members 16, 17 of the said two turrets are rolling upon the rollers of the carriages which are integral with the lifting jacks and, in so doing, the said track members describe a small arc. Considering that the magnitude of relative displacement of the track members and of the carriages is small with respect to the radius of the arc, i. e. the distance between the said track members and the center of the jack which has been selected as rotational center, the said arc and the tangent thereto nearly merge into each other. Therefore, only a small transverse play p of the carriages with respect to the guiding track members is required.

It will be understood that the invention is not limited to the example disclosed and illustrated, since several constructional changes may be made therein without departing from the spirit of the invention.

I claim:

1. A machine capable of being turned and shifted in all directions on the ground, particularly adapted for manipulating piles, tubes and the like, comprising a

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platform, supporting members secured to said platform, a plurality of jacks spaced on said platform, a foot-plate provided on each of said jacks and adapted to bear on the ground, a plurality of turrets, each of said jacks being connected to one of said turrets, each of said turrets united to said platform and rotating about a vertical axis, one portion of each of said turrets being a horizontal web laying under a corresponding web of said platform, first means connecting jacks to said turrets to allow horizontal relative movement between said jacks and said turrets, and second means provided for effecting an angular displacement of each of said turrets with respect to said platform when the associated of said foot-plates is cleared from the ground.

2. A machine as claimed in claim 1, in which each of said second means comprise a flange forming a circular rolling path through the medium of which each of said turrets is suspended on rollers carried by said platform.

3. A machine as claimed in claim 2, in which each of said second means comprises a toothed rim integral with a turret and in mesh with a pinion carried by said platform and driven from a gear mechanism mounted on said platform.

4. A machine as claimed in claim 1, in which each of said first means comprises a carriage secured to the associated of said jacks and rollers cooperating with rolling track members integral with said turrets, associated of said rolling track members being spaced vertically from each other by a distance which is slightly larger than the diameter of said rollers, said rollers being guided with a slight transverse play between such spaced track members, said carriage being substantially parallel to said track members.

5. A machine movable on the ground comprising a platform, a plurality of turrets positioned in spaced distribution on said platform, supporting members secured to said platform and supporting said platform on the ground, a plurality of jacks coupled to said turrets for bearing on the ground, said turrets being each rotatable about a vertical axis, coupling means coupling said jacks to said turrets for allowing linear motion of said jacks with respect to said platform, and means for rotating said turrets with respect to said platform when the jacks are off the ground and the machine is supported by the supporting members.

6. A machine as claimed in claim 1 wherein said first means comprises a track member integral with each turret and allowing a rectilinear horizontal movement with a small transverse play of the corresponding jack whereby to allow an angular movement of the platform about one of the jacks if the track member of the other jacks are brought into a position substantially tangent to corresponding circles the center of which is located on the axis of the first jack.

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