W. E. BOEHCK.

TIERING MACHINE.

APPLICATION FILED JULY 11, 1919.

1,342,982.

Patented June 8, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

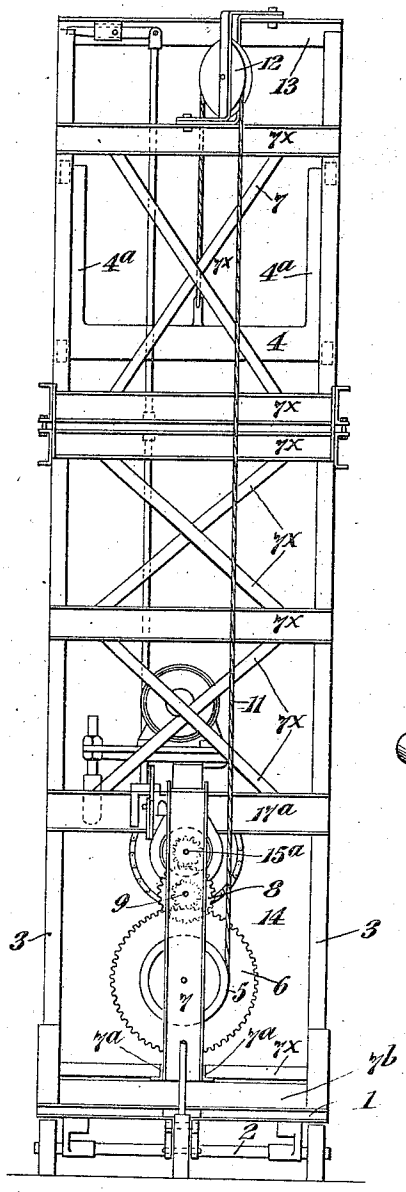


Fig. 2.

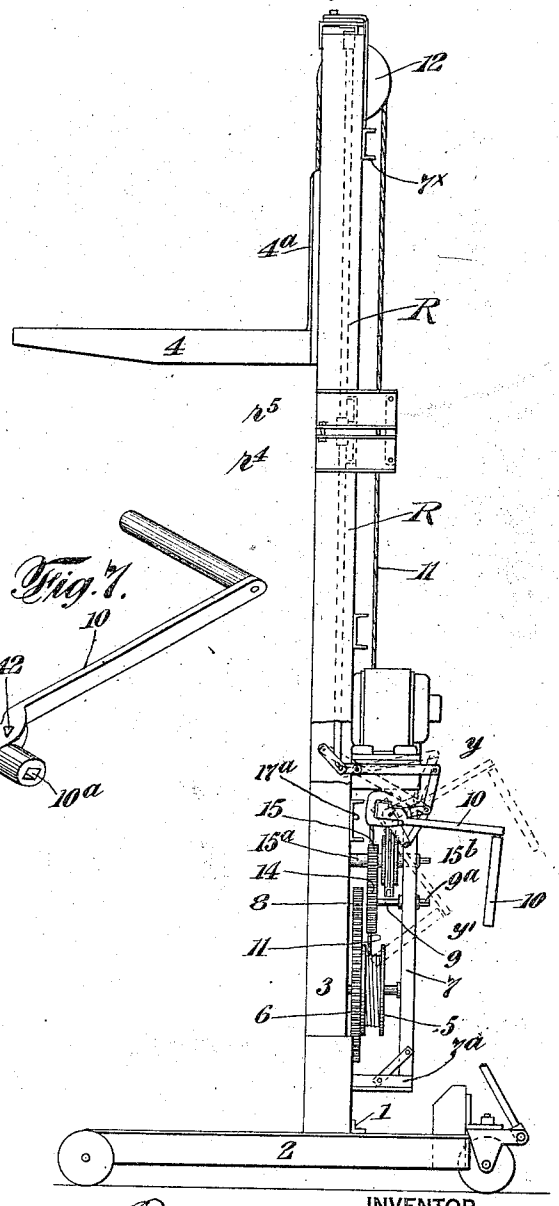


Fig. 7.

INVENTOR

William Ward Boehck

BY

Edward F. Beach

ATTORNEY

W. E. BOEHCK.

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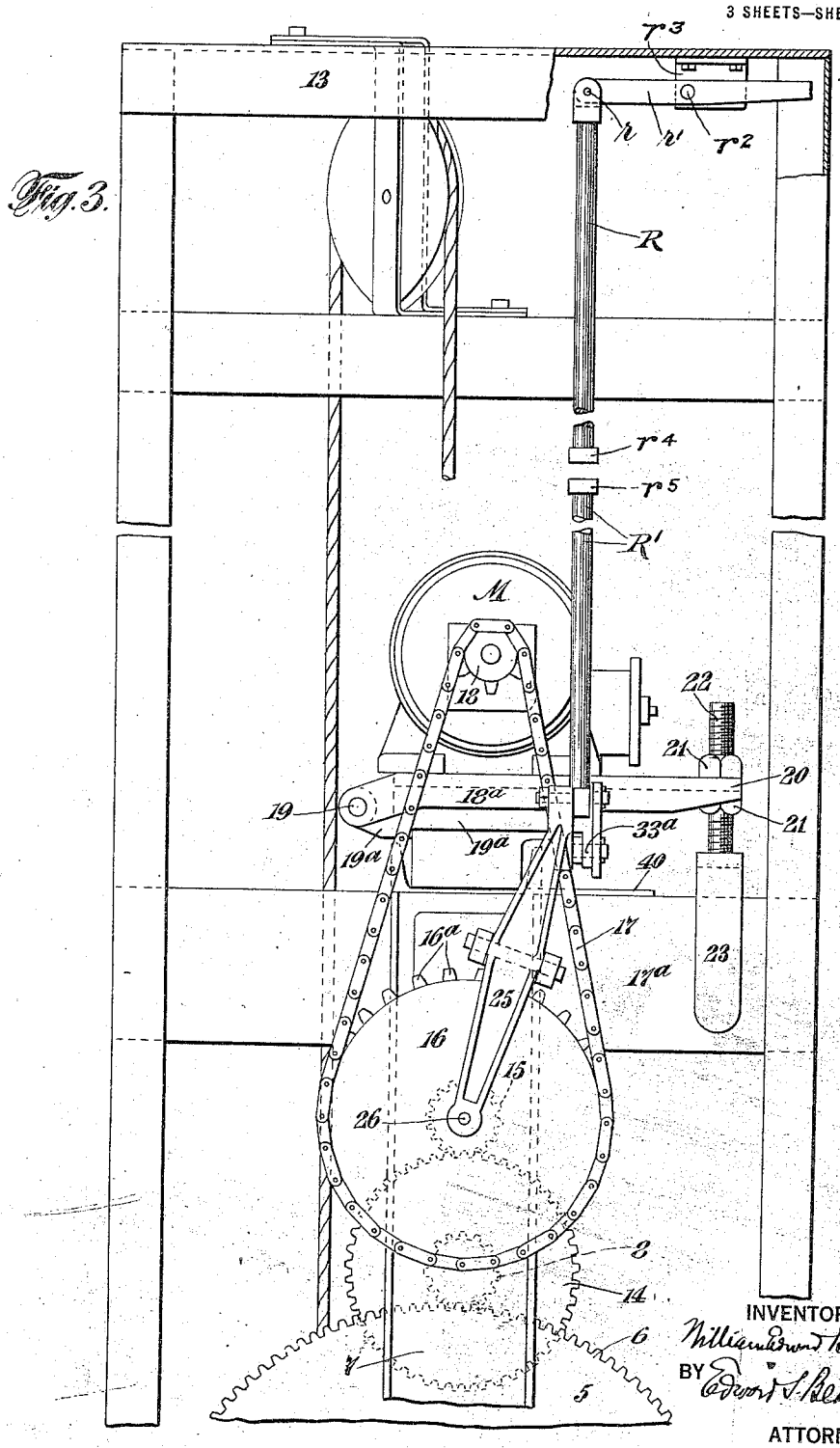
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3 SHEETS—SHEET 2.

Fig. 3.



INVENTOR

William Brown Boeheck

BY Edward S. Beach

ATTORNEY

W. E. BOEHCK.

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3 SHEETS—SHEET 3.

Fig. 4

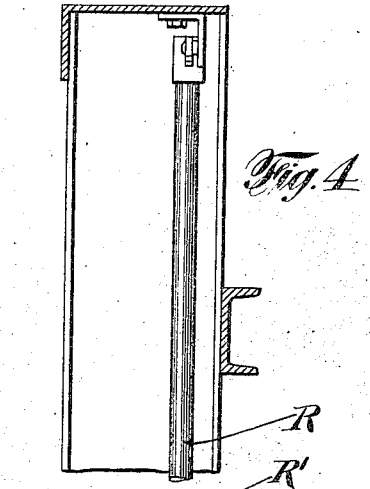
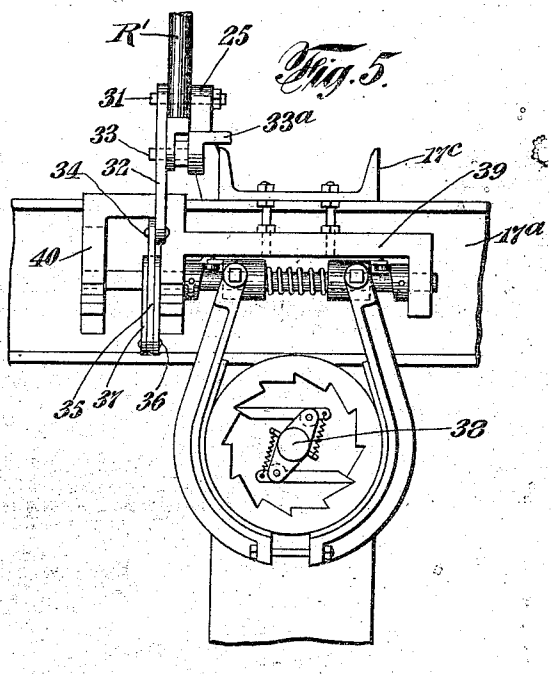


Fig. 5.



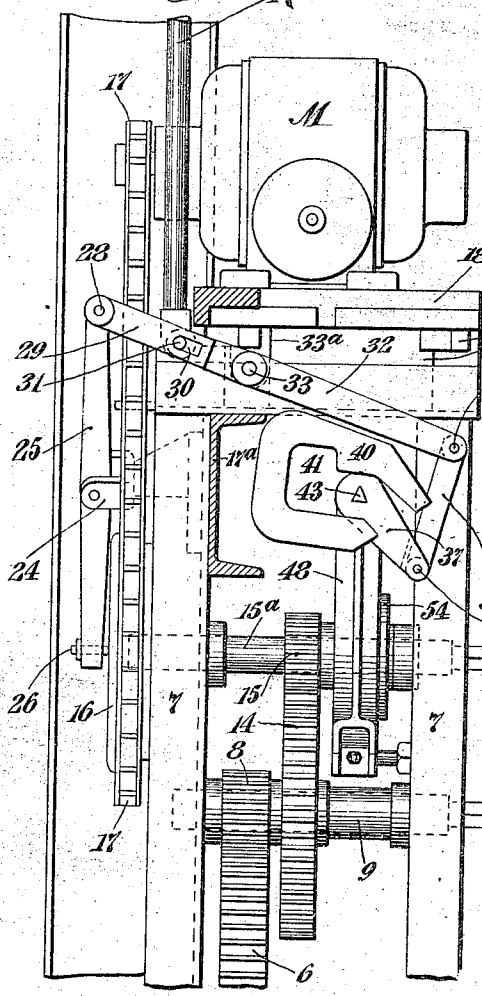
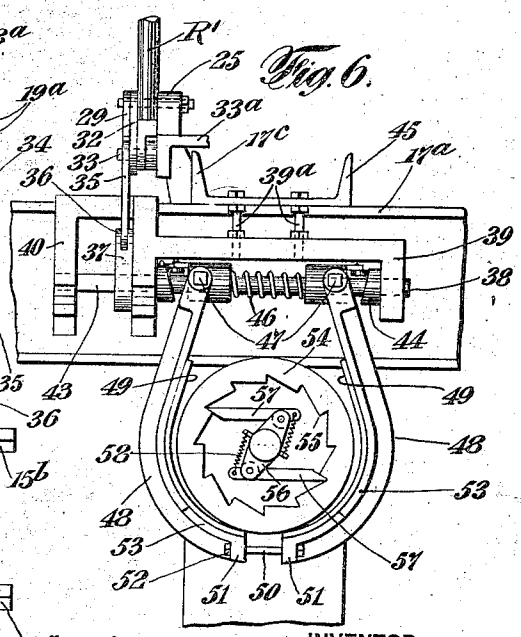


Fig. 6.



INVENTOR

William Edward Boeckh

BY

Edward S. Bleach

ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM EDWARD BOEHCK, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO REVOLVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TIERING-MACHINE.

1,342,982. Specification of Letters Patent. Patented June 8, 1920.

Application filed July 11, 1919. Serial No. 310,080.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD BOEHCK, recently a subject of the Emperor of Germany, and not a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Tiering-Machines, of which the following is a specification.

This invention relates to a tiering machine for the purposes stated in my United States Patent No. 1,044,008 of November 12, 1912, as well as in various other patents which show vertically-traveling load-carrying platforms operatively mounted on uprights. The main objects of the present invention are set forth in the statement of its advantages, below.

In the accompanying drawings forming a part hereof and illustrating the invention,

Figure 1 is a rear elevation and

Fig. 2 a side elevation of my improved tiering machine.

Figs. 3 and 4 are respectively rear elevational and side views enlarged, of portions of my new platform-actuating mechanism.

Figs. 5 and 6 respectively show end elevational views of a brake mechanism, Fig. 5 showing the brake in braking position, and Fig. 6 showing the brake in non-braking position.

Fig. 7 is a perspective of a hand crank, detached.

In that form of the invention now set forth, the base or bed 1 of the tiering mechanism is shown on a truck 2. The rear corner portions of the bed each support an upstanding guide-frame 3 alined and spaced apart at the rear of the bed. The elevating or load-carrying platform 4 is slidably mounted on the guide-frames 3 as heretofore and as shown for example in my said patent which also shows the present revoluble cable drum 5 with its gear 6 intermeshed with a pinion. An upstanding cable drum and gear shaft supporting frame having front and back members 7 spaced apart is supported at the bottom of the members 7 by cross frame members 7^a, the upper ends of which are connected by a frame member 17^c. The upstanding side frames 3 are connected by a frame member 17^a which lies between the upper end of the frame members 7 and adjacently the back of the front member 7. The frame members 7^a are supported by a transverse frame member 7^b. Above the frame members 7 the upstanding guide-frames 3 are transversely connected by other cross frame members 7^x with diagonal braces 7^{xx} to give requisite stiffness to the vertical guide-frames 3.

The frame members 7 carry the cable drum 5 with its spur gear 6 which meshes with the spur-toothed pinion 8, the shaft 9 of which is journaled in the front and back frame members 7 and is squared at its accessible rear end 9^a for application when desired of a hand crank 10, shown detached in Fig. 7, and which may be used for manually turning the cable drum and thereby lifting the platform by taking up the cable 11 one end of which is secured to the drum and the other end of which is secured to the platform as heretofore; the cable between the drum and the platform running over a pulley 12 carried by the cross-head 13 which unites the upper ends of the upstanding guide-frames 3.

My new platform-actuating mechanism which comprises the revoluble cable drum, its gear and said pinion, permits the platform to be lifted by either hand power or the power of a motor; and to be lowered by gravity, whereby a quick return to loading position is automatically obtainable notwithstanding an operative connection of the platform with the motor shaft.

The pinion shaft 9 is provided with a spur gear 14 adjacent the pinion 8 and this spur gear is in mesh with a pinion 15 on a brake shaft 15^a journaled in the frame 7 parallel with and above the shaft 9. The brake shaft 15^a is called the top shaft of the machine. Its rear end is squared at 15^b for application of the crank 10 when desired.

At its front end this top shaft 15^a carries a multiple-disk clutch 16 of well-known construction but which in accordance with this invention is provided with a peripheral sprocket 16^a carried by one of its members. An endless sprocket chain 17 extends from said sprocket upwardly over a sprocket 18 on the shaft of an electric motor M which is mounted (Fig. 3) on a horizontal base 18^a an end of which is pivoted at 19 to a frame member 19^a, and has its free end portion 20

made tongue-shape and supported by the upper and under nuts 21 on a vertical screw 22 carried by a bracket 23 fixed to one of the cross-frame members 17^a. By this constructional feature the sprocket chain 17 may be readily tightened by adjustment of the nuts 21. A U-bracket 24 carried by the cross-frame member 17^a to which the bracket 23 is fixed, has pivoted between its arms a clutch compression lever 25. The lower end of this lever has a pin 26 which is adapted centrally to engage the clutch disk opposite the front end of the top shaft 15^b for compressing the disk members of the clutch against one another. The upper end of lever 25 is pivoted by a stud 28 to the front of the toggle link member 29 having a lengthwise-slotted opening 30 in which there extends a pin 31 projecting laterally from a supplementary toggle link member 32 which is pivoted between its ends on a cross pin 33 carried by a bracket 33^a that is a part of the casting 19^a. The pin or stud 31 is carried by the lower end of a vertical reciprocable rod R′ coöperating with a rod R which extends upwardly and is pivoted at r to the front end of the lever r' which is pivoted at r^2 to a lug r^3 carried by the cross head 13, the front end of the lever r' projecting into the path of the load-carrying platform 4 so that when the platform comes into contact with the front end of the lever r' the toggle link levers 29 and 32 will be brought into alinement, at which time (Fig. 4) the pin 26 will compressibly engage the friction clutch to compress its plates, and at which time the front end of the toggle link lever 32 will be depressed. The rear end of the toggle link lever 32 has pivoted to it at 34 a dependent link 35 the lower end of which is pivoted at 36 to a rocker arm 37 on an end of a brake shaft 38 which is mounted at right-angles to and above the top shaft 15^b.

The brake-carrying shaft 38 is journaled in the arms of a bracket 39 and which at one end terminates at a distance from such arms in a recessed projection 40, its recess 41 being open at its rear end, and shaped to permit the application of the head of the hand crank 10, which is provided at its head portion with a triangular recess 42, to the polygonal projection of shaft 38 through the rocker arm 37 of brake-carrying shaft 38. The space at x between the projection 40 and the opposed end 39^a of bracket 39 forms a guideway for the head of the hand crank when it is connected with the polygonal projection 43, the sides of the crank head then being movable with the projection 40 at one side and the rocker arm 37 at the other side of it. The hand crank 10 has in its head portion an arm provided with a squared recess 10^a for application when desired to the squared shaft ends above mentioned. The bracket 39 is connected by vertical bolts 39^a with the horizontal web of the channel iron frame member 17^c which extends at right-angles to the frame members 7 and at its rear end rests on the upper end of the rear member 7 and at its front end on a transverse frame member 17^a and also on the upper end of the frame member 7.

The brake-carrying shaft is provided between the arms of the bracket 39, in which it is journaled, with a pair of cams 44 spaced apart one from another and each fixed to the shaft 38, which between the cams is provided with a pair of slide collars held apart by a coil spring 46 around the shaft with each end abutting against one of the slide collars, each slide collar being provided with an arm carrying a dependent roller the periphery of which is in contact with the cam surface as shown in the Boehck and Germond Patent No. 1,197,597 of Sept. 12, 1916. To each collar, by a pin 47, a dependent curved brake shoe carrier 48 is pivoted, each carrier being formed with a brake shoe 49, the concave sides of the carriers 48 facing one another and having their lower ends spaced apart and connected by a bolt 50 which is loose in the holes through the rib portions 51 through which the bolt extends, with a head 52 at the outward side of a laterally projecting rib 53 with which each carrier is formed and of each of which a rib portion 51 is a downward extension. The brake shoes and carriers partially inclose the periphery of a brake disk 54 loose on the brake-carrying shaft 38 and formed with a lateral recess the interior wall of which is provided with annular series of inwardly projecting ratchet teeth 55. Fastened upon the projecting end of the brake shaft 38 within said recess is a pawl carrier 56 which turns with the shaft, the carrier being secured midway between its ends to the pawl carrier and the latter having pivoted to it at each end a pawl 57 that is controlled by a coiled spring 58 one end of which is connected to the pawl carrier and the other end to the heel of the pawl.

The mode of operation is as follows:

The platform may be elevated by hand if the crank or tool 10, which is a controlling implement, is placed on shaft end 9^a or on shaft end 15^b. When used to turn shaft 9, a faster lifting speed and less lifting capacity are obtained than is the case when the tool 10 is used to turn shaft 15^a. In neither of these cases can the shafts 9 or 15^a be turned by the crank to lower the platform, because of the engagement of the pawls 57 with the teeth of the internal ratchet 54. In each of the above uses, the platform may be raised to any desired elevation below the top of the guide frames 3, cranking or rocking either the shaft 9 or 15 by use of tool 10 being arrested whenever

desired. The pawls and ratchet teeth in engagement hold the platform at its selected elevated position. In each of the above instances the tool 10 is to be removed and placed on the polygonal projection of the brake-carrying shaft 38 as shown by full lines in Fig. 2, such full lines indicating the neutral position of the tool. By then raising the tool 10 into its upper dotted line position y, shown in Fig. 2, the brake-shoe carriers are relieved, moving the shoes out of braking contact with the periphery of the internal ratchet. Thereupon the platform will descend under regulated control exercised by the operator using the brake. The full line position of the tool 10 shown in Fig. 2 and referred to as the neutral position is the neutral position as far as the control mechanism is concerned. In the cranking up movement the pawl teeth the ends of which are beveled, slide over the ratchet teeth.

For raising the platform by power, tool 10 is pushed down into its lower dotted line position y' (Fig. 2), thus rocking the rocker lever 38 downwardly into the position shown in Fig. 4, and thereby bringing the toggle levers 29 and 32 into alinement and effecting a compression of the clutch plates, whereupon the continuous rotation of the sprocket of the motor shaft turns the shaft 15 and thereby gives cable-take-up movement to the cable drum, lifting the platform. At the same time, the under rod R′ is lifted owing to the bringing into alinement of the toggle links 29 and 32; and when the under rod R′ is lifted into its highest position, its upper end is brought into gentle contact with the under end of the upper rod R. The under end of the upper rod R is indicated by r^4 and the upper end of the under rod R is indicated by r^5 (Fig. 2). When the platform reaches its highest point one of its two vertical guide webs 4^a that works within a guide frame 3, contacts with the free end of the lever r' with the result that the upper rod R is depressed against the opposed upper end of the under rod R′, thereby forcing the toggle links downwardly and out of alinement and relieving the pressure of pin 26 on the disk clutch; whereupon the shaft 15 stops rotating but allows the motor to continue in its rotation. The platform is by this construction prevented from striking heavily or unduly against the cross head 13 which would result in damage to the apparatus. When the toggle levers are thus depressed out of alinement, the tool 10 on the polygonal projection is moved upwardly from its lower position into its said neutral or full line position (Fig. 2). The platform can not now descend because the pawls 57 are now in positive engagement with the teeth of the internal ratchet, and the brake carriers are in braking position as shown in Fig. 5. To lower the platform thus lifted by power and sustained in its upward position by the positive connection of the pawls with said ratchet teeth, or from any position below its uppermost position, the operator raises tool 10 into its uppermost position y (Fig. 2) and controls the descent of the platform as previously described in connection with the hand operation.

The cams 44 are shaped to hold the brake jaws in braking position when the tool 10 is in either its neutral position or in its lower position y', and to allow the spring 46 to force the sleeves away from each other and thereupon bring the brake shoe carriers out of braking position when tool 10 is raised into its upper position y.

The practical advantages of this invention lie in the fact that my new tiering machine is operable by either manual or electric power, one or the other, at will. If used as a power machine it may be made so as to have an efficiency corresponding to the highest efficiency of purely power-operated tiering machines; and at will may be used as a merely manually operated tiering machine.

What I claim is—

1. In a tiering machine, the combination of a guide frame for a reciprocating load-carrying platform; such platform; and platform lifting and lowering mechanism comprising an electric motor operatively connected with platform lifting and lowering means also comprised in said mechanism; and other means operatively connected with the platform lifting and lowering means for use in manually lifting and lowering the platform.

2. In a tiering machine, the combination of a guide frame for a reciprocating load-carrying platform; such platform; and platform lifting and lowering mechanism comprising an electric motor operatively connected with platform lifting and lowering means also comprised in said mechanism; other means operatively connected with the platform lifting and lowering means for use in manually lifting and lowering the platform; and mechanism for automatically arresting the ascent of the platform, such mechanism comprising an actuating lever forming a part of the platform lifting and lowering mechanism.

3. In a tiering machine, the combination of a guide frame for a reciprocating load-carrying platform; such platform; and platform lifting and lowering mechanism comprising an electric motor operatively connected with platform lifting and lowering means also comprised in said mechanism; other means operatively connected with the platform lifting and lowering means for use in manually lifting and lowering the platform; and mechanism for automatically arresting the ascent of the platform at the limit

of its ascent, such mechanism comprising an actuating lever forming a part of the platform lifting and lowering mechanism.

4. In a tiering machine, the combination of an electric motor; a power-transmitter rotated by the motor; a rotary disk clutch mechanism provided with a power-transmitter; power-transmission means operatively connected with the power-transmitter; a cable drum operatively connected with the rotary disk clutch mechanism for rotating the cable drum; a load-carrying platform operatively connected with the cable drum; a guide for the platform; and mechanism for automatically arresting the ascent of the platform at the limit of its ascent; a pivoted disk clutch actuating lever operatively positioned for forcing the clutch disks into clutching relations and also operatively connected with means for automatically arresting the platform in its ascent; and said means.

5. In a tiering machine, the combination of a guide frame for a load-carrying platform; such platform; a cable drum; a cable connecting the drum and platform; a platform lifting and lowering mechanism operatively connected with the cable drum and comprising an electric motor; means operatively connecting the motor with the cable drum to permit the cable drum to be rotated to take up and pay out the cable; and other means constructed to permit the cable drum to be rotated manually for paying out the cable in lowering the drum; mechanism for automatically arresting the ascent of the platform; a brake mechanism operatively connected with the cable drum for controlling its cable-paying-out movement at the will of an operator; and means for automatically holding the platform in an elevated position.

6. In a tiering machine, the combination of an upstanding platform-guiding frame; a load-carrying platform slidably mounted on said frame; a motor; a revoluble disk-clutch mechanism comprising a sprocket wheel and pinion; a cable drum, a clutch lever and a brake mechanism each carried by the framework of the machine, together with operating connections therefor; the cable drum being operatively connected with the pinion of the disk clutch mechanism by intermediate gearing; such intermediate gearing; a sprocket on the motor shaft; a sprocket chain connecting said sprockets; mechanism for automatically arresting the ascent of the platform at the limit of its ascent, such mechanism comprising a member connected with the clutch lever; and a mechanical connection between the clutch lever and the brake mechanism.

7. In the combination set forth in claim 6, the brake mechanism being constructed for manual operation.

8. In the combination set forth in claim 6, a tiltable frame on which the motor is mounted; means for tilting such frame for tightening or loosening the sprocket chain; and other means for locking such frame in a tilted position.

9. In a tiering machine, the combination of an upstanding frame having a base and constructed to guide a load-carrying platform and to carry an electric motor and a platform lifting and lowering mechanism; with a movable platform mounted on said upstanding frame; a platform lifting and lowering mechanism; an electric motor mounted on said frame above and operatively connected with the lifting and lowering mechanism; and an automatically-actuated mechanism in the path of the platform for arresting the ascent of the latter; a disk clutch mechanism forming a part of the platform lifting and lowering mechanism; and clutch-actuating mechanism.

In testimony whereof I have hereunto set my hand this 30th day of June, 1919.

WILLIAM EDWARD BOEHCK.