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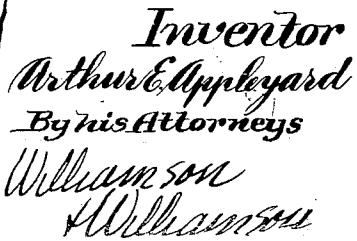
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MACHINE FOR HANDLING SLABS

Filed May 25, 1931

6 Sheets-Sheet 1



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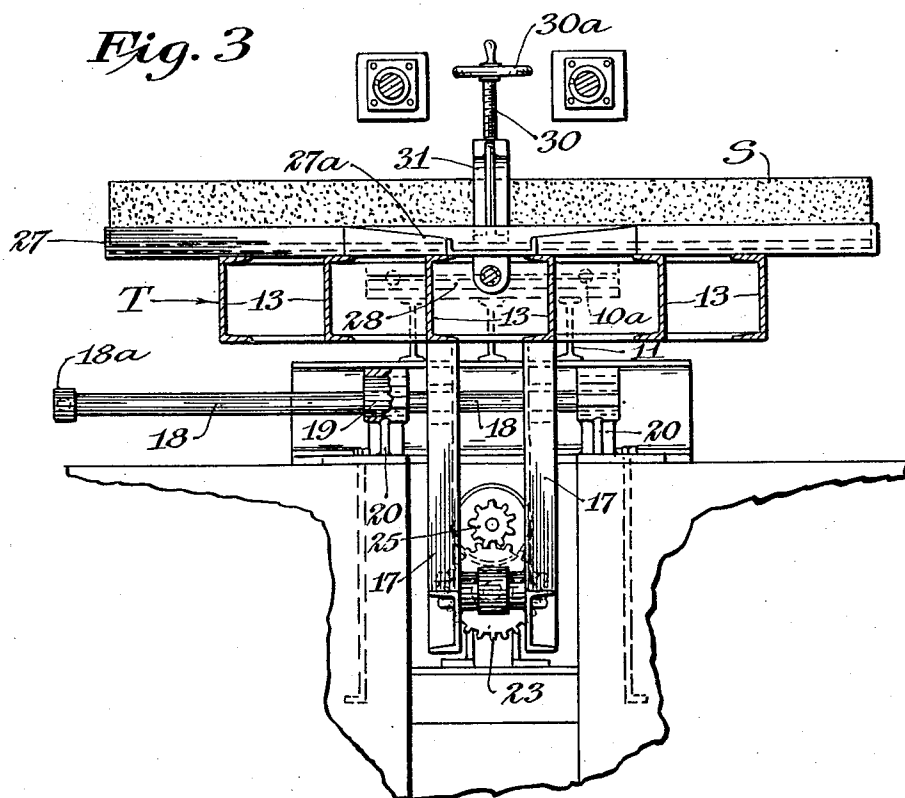
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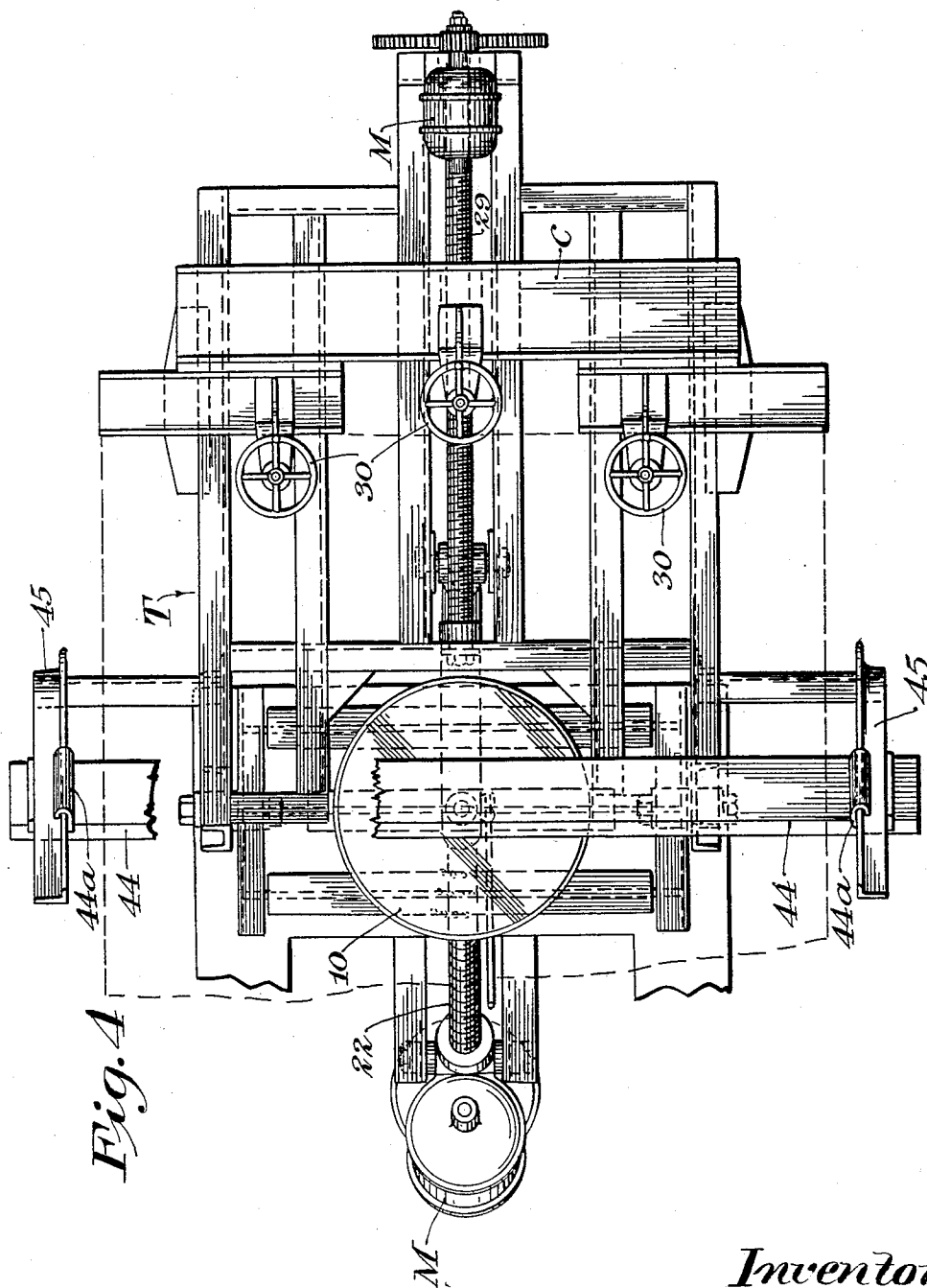
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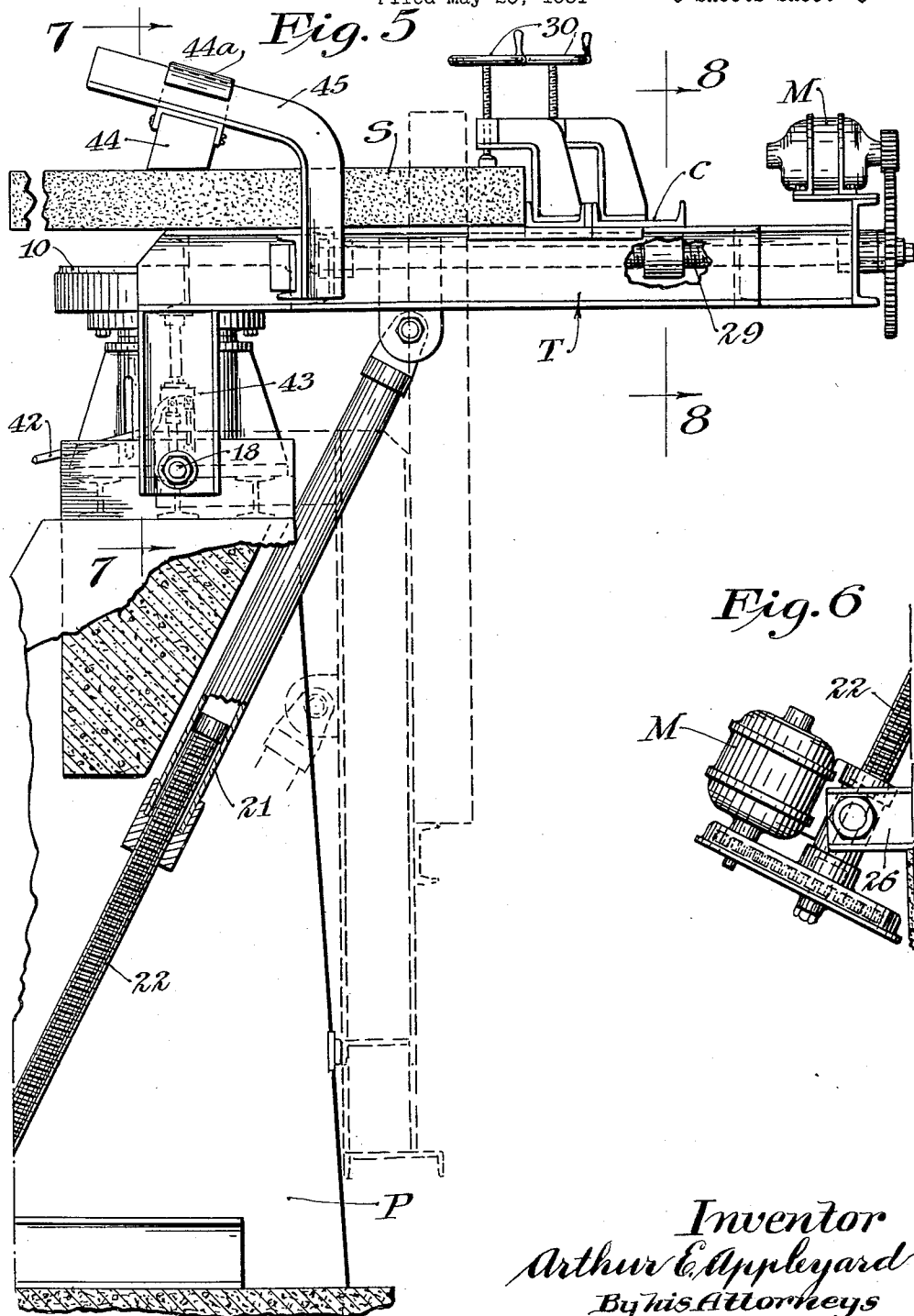
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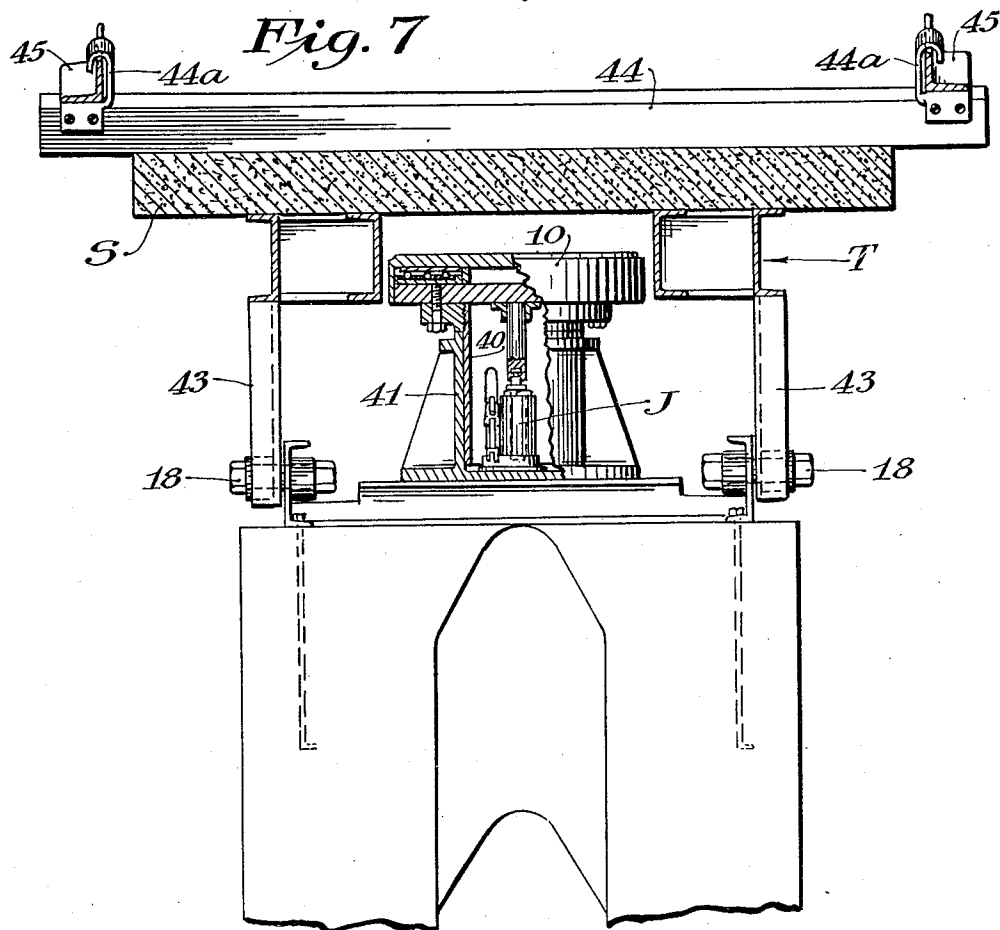
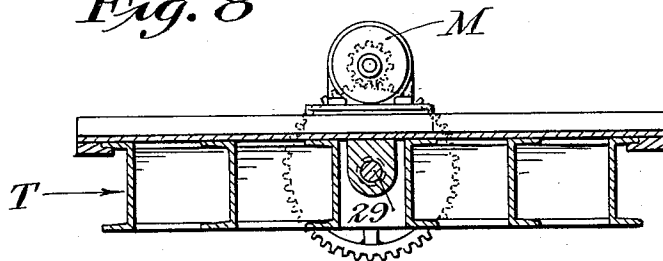


Fig. 8



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UNITED STATES PATENT OFFICE

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MACHINE FOR HANDLING SLABS

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This invention relates to machines for handling heavy stone slabs to facilitate the finishing or working of the edges thereof.

It is an object of my present invention to provide a highly efficient machine for receiving, manipulating and tilting heavy slabs of material, such as granite or other stone, to enable the edges of the material to be successively disposed in upright position to facilitate the finishing and working thereof.

More specifically it is an object of my invention to provide a machine of the class described wherein mechanism such as a turn table is provided for receiving and revolving a slab flat-wise upon a vertical axis in combination with a tilt table for receiving the material from one side of the turn table and tilting the same to edge-wise position.

It is a further object to provide a machine of the class described which is adapted to receive and handle slabs varying widely in thickness and in area and which may be operated rapidly to shift the position of a slab and to tilt the slab into a position for finishing or working upon two opposite edges thereof.

These and other objects and advantages of the invention will be more fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views, and in which:—

Fig. 1 is a plan view of one form of my invention;

Fig. 2 is a view showing most of my machine in side elevation with a slab of stone positioned on the turn table, some portions being broken away and others shown in section;

Fig. 3 is a cross section taken on the line 3—3 of Fig. 2;

Fig. 4 is a top plan view of another form of my invention with some portions broken away;

Fig. 5 is a view showing most of the machine shown in Fig. 4 in side elevation with a slab of stone secured to the tilt table, some portions being broken away;

Fig. 6 is a fragmentary elevation showing the motor, driving connection with the tilting screw shaft and the pivotal mounting for the motor, which details are not shown in Fig. 5;

Fig. 7 is a cross section taken on the line 7—7 of Fig. 5, and

Fig. 8 is a cross section taken on the line 8—8 of Fig. 5 showing the carriage for supporting the clamping mechanism on the tilt table and the means for driving the same.

In the form of the invention illustrated in Figs. 1 to 3 inclusive, a suitable foundation F is provided which may be constructed of concrete or other material, and upon which the several mechanisms of my machine are supported. Foundation F defines a rectangular pit P for accommodating my tilt table and said pit has an elongated extension P' at one end thereof for accommodating the operating mechanism for the tilt table.

A horizontal turn table 10 is suitably mounted above the forward end of pit P. As shown, said turn table is mounted on a base 11 which is supported from a pair of heavy I-beams 12 traversing the side walls of the foundation. A suitable ball race 10a is interposed between the turn table and its base 11, to facilitate the turning of the table.

A tilt table indicated as an entirety by the letter T is mounted above pit P and is adapted to surround the rear portion of the turn table and may constitute a skeleton frame comprising a series of parallel longitudinal channel members 13 disposed edgewise and connected at their rear ends by means of a cross beam 14 in the form of a channel. Two of said tilt table members 13 are disposed at the longitudinal central portion of the table and are inset some distance from the forward ends of the other longitudinal members and are connected therewith by suitable means such as the heavy plates or webs 15. Short cross beams 16 (as shown in Fig. 1) rigidly connect the forward portions of the side pairs of channel members 13. A pair of heavy tilting beams 17 which may be in the form of channels are rigidly secured at their upper ends to the centrally disposed pair of channel members 13. Beams 17 depend

from the tilt platform T and decline at an acute angle to the top of the tilt table. The medial portions of the two tilt beams are pivoted on a heavy horizontal shaft 18 which
 5 traverses the side walls of the foundation F and which is provided at portions disposed outwardly of the beams 17 with eccentrics 19 journaled in heavy bearings 20 supported from the foundation F. Shaft 18 extends
 10 beyond one of the bearings 20 and is provided with an operating lever 18a by which it may be oscillated to operate the eccentric and in so doing elevate the tilt platform to a position substantially flush with the level of the
 15 turn table 10.

Tilt table T is swingable upon the axis of shaft 18 and motor operated mechanism is provided connected with the lower ends of tilting beams 17 for effecting and controlling the tilting. As shown, said tilting mechanism comprises a sleeve 21 pivotally connected at its rearward end to the lower ends of beams 17 and threadedly engaging at its forward end a screw shaft 22 the outer
 25 or rear end of which carries a piston 22a working within said sleeve. Screw shaft 22 is fixed at its forward end to a gear 23 pivotally mounted on a motor bracket 24 and is meshed with a driving pinion 25 of a motor
 30 M which is secured to the upper flange of said bracket. Bracket 24 is pivotally mounted on trunnions 24a, for swinging movement on a pedestal 26 which may be anchored to a suitable shoulder provided in the forward end of the pit extension P'. A clamping
 35 carriage C is mounted on the tilting table T for longitudinal movement thereon and as shown comprises a cross beam 27 traversing the longitudinal channels 13 of the tilt table and supported thereon and having rigidly secured thereto a triangular platform 27a which carries a depending follower 28 guided between the centrally disposed channels 13 and having internal threaded engagement
 45 with an operating screw shaft 29 which extends longitudinally of the tilt table and is suitably journaled in end portions thereof and which is provided at its rear end with an operating crank 29a. Carriage C has
 50 mounted thereon one or more clamps or other suitable attaching means, which as shown, comprises a vertical worm shaft 30 having threaded engagement with an overhanging support 31. The worm shaft is provided
 55 with a hand wheel 30a at the upper end thereof and a clamping disk 30b at the lower end thereof. It will be noticed, by reference to Fig. 2, that the forward edge of the cross beam 27 of the carriage is positioned a short
 60 distance rearwardly of shaft 30 and constitutes a step 27b for abutting and engaging one edge of a slab S.

In Fig. 2 the vertically tilted position of tilt table T and the associated parts is indicated in dotted lines. To cushion the tilting

of the slab I provide suitable bumpers 32 which may be attached to the forward ends of horizontal shafts 32a supported from an upright standard 33. Coil compression
 70 springs 34 surround said shafts and are interposed between the bumpers and the standard.

Operation

In operation, with the parts disposed as shown in the full lines in Figs. 1 to 3 inclusive, a slab of material S is placed upon the turn table 10, usually handled by suitable means such as a crane or derrick and positioned as nearly as possible centrally of the turn table. The slab may then be turned
 80 with the table manually to bring an edge thereof in the desired relation with the tilt table T. The tilt table is next raised by means of the eccentric lift, comprising eccentric 19, shaft 18 and lever 18a. Carriage C
 85 is then adjusted by manipulation of the worm wheel 29a to dispose the step 27a of the carrier in abutment with the rearward edge of the slab. The clamp or clamps 30 are then applied rigidly connecting the slab with the tilt table. The tilt table may then be swung or tipped to the desired position by operating driving motor M, which of course results in the swinging of the heavy tilting beams 17 through the connection of sleeve 21 with the lower ends thereof. In vertical position the tilt table and slab secured thereto will appear as indicated in the dotted lines in Fig. 2. It will be noted that the longitudinal edges of the slab will then be disposed vertically in
 90 position to be finished or worked on by stone cutters or workmen standing in pit P.

To enable the other edges of the slab to be worked it is only necessary to reverse the operation of motor M, returning the tilt table to normal horizontal position, lower the tilt table by means of the eccentric lever, disengage the clamps and turn the slab upon the turn table to a proper position for exposing the desired edges when the slab is again tilted.
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It will be seen that the machine may be quickly and easily controlled and will handle very heavy slabs of material efficiently and quickly enabling edges to be successively disposed in proper position for finishing and cutting.
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The form of my invention illustrated in Figs. 4 to 8 inclusive is similar in many respects and in general function to the form first described.
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Instead, however of vertically adjusting the position of the tilt table to relieve the weight of the slab from the turn table, the turn table is constructed for vertical adjustment by means of a hydraulic jack built into the base thereof. The tilt table T of the said second form of my invention is constructed from suitable heavy beams spaced apart and secured together by means of cross beams and having a recessed portion in the forward end
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thereof for partially surrounding the turn table 10. Turn table 10 as clearly shown in Fig. 7 is mounted on a suitable ball race which is supported from a heavy vertical sleeve 40, said sleeve being slidably mounted for vertical movement in a pedestal or base 41 mounted on the foundation of the pit structure. Sleeve 40 may be raised and held in a desired vertically adjusted position by means of a suitable hydraulic jack indicated as an entirety by the letter J and controllable by means of a lever 42 which projects outwardly from the forward portion of the base 41.

The second form of my invention is also provided with a carriage C mounted for longitudinal movement on the tilt table T and provided as shown with three slab engaging clamps 30. The movement of this carriage is effected by means of a worm 29 journaled in the tilt table extending longitudinally thereof and as shown driven by means of a motor M mounted at the rear of the tilt table. The pit and foundation for this second form of my invention are necessarily deeper than in the first form since the tilt table swings on a heavy non-adjustable pivot shaft 18 on which heavy depending legs 43 of the tilt table are journaled. The tilting of the table T and maintenance of the same in the desired adjusted position is effected by means of a threaded sleeve and screw connection driven by a motor M pivotally mounted on a suitable bracket which may be secured to the foundation adjacent the bottom of pit P, see Figs. 5 and 6. As shown the worm or screw 22 threadedly engages a portion of sleeve 21, said sleeve being pivotally connected at its upper end to an intermediate portion of tilt table T.

In addition to the clamps 30 mounted on carriage C, additional means are provided in association with the tilting platform for securing the slab of material. To this end I provide a pair of inclined forwardly extending arms 45 between which is slidably and removably positioned a wedge timber 44, said wedge timber carrying a pair of sliders 44a. It will be obvious that by forcing the wedge timber rearwardly upon arms 45 the same may be brought into clamping relation with a slab disposed upon the tilting platform.

Operation

In this second form of the invention the turn table 10 may be first raised by means of a hydraulic jack J to dispose the top thereof at a level slightly above the normal horizontal level of tilt table T. The slab or heavy piece of material may then be disposed flat-wise upon the turn table and turned manually by means of the table to properly dispose the edges for reception of the clamps of carrier C. Carrier C may then be adjusted longitudinally of tilt table T by properly operating the actuating motor M and the

worm wheel clamps may be tightened to cause the slab to be rigidly secured to the tilt table. Further means for securing the medial portion of the slab are provided in the adjustable and transverse wedging clamp 44 which is slidably mounted upon the inclined arms 45 secured to the forward portion of the tilt table. It is of course necessary to lower the turn table 10 by means of jack J before the slab can be secured to the tilt table.

The tipping of the tilt table is effected by proper operation of the motor M which drives the screw or worm 22.

From the foregoing description it will be seen that in both forms of my invention I have provided a strong efficient machine for successively handling and manipulating heavy slabs of material, to adjust the same for properly disposing the edges thereof for finishing or working the same.

It will, of course, be understood that various changes may be made in the form, details, proportions and arrangement of the parts, without departing from the scope of my invention, which, generally stated, consists in a device capable of carrying out the objects above set forth and in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. In a machine for handling heavy slabs, a turn table, a tilt table disposed in juxtaposition to said turn table, means for effecting vertical adjustment between said turn table and said tilt table and means for tilting said tilt table.

2. In a machine for handling heavy slabs, a turn table, a tilt table disposed in juxtaposition to said turn table, means for vertically adjusting one of said tables, means for securing a slab to said tilt table and means for swinging said tilt table on a substantially horizontal axis.

3. In a machine for handling heavy slabs, a turn table, a tilt table disposed in juxtaposition to said turn table, means for vertically adjusting one of said tables, means for retaining said tilt table in horizontal position, means for securing a slab to said tilt table, and power actuated means for tilting said tilt table.

4. In a machine for handling heavy slabs, a turn table, a tilt table disposed in juxtaposition to said turn table, means for vertically adjusting one of said tables, a carriage mounted on said tilt table for adjustment longitudinally thereof, said carriage including an element for engaging a slab of material and means for tilting said tilt table.

5. In a machine for handling heavy slabs, a foundation having a pit formed therein, a turn table mounted on the top of said foundation across a portion of said pit, a tilt table also mounted across the top of said founda-

tion in juxtaposition to said turn table, means for vertically adjusting one of said tables, means associated with said tilt table for securing a slab thereto and means for swinging said tilt table on a horizontal axis to dispose a substantial portion thereof within said pit.

6. The structure set forth in claim 5, wherein said tilting means comprise a worm drive connected with said tilt table eccentric of its tilting axis and having a swivelly mounted bracket in which the opposite end thereof is journaled.

7. In a machine for handling heavy slabs, a foundation having a pit formed therein, a turn table mounted across the upper portion of said foundation, a tilt table also mounted across the upper portion of said foundation above said pit and adapted to be disposed in substantially horizontal position, means for vertically adjusting one of said tables, said tilt table having its forward end partially surrounding said turn table, means for securing a slab to said tilt table, and means for swinging said tilt table on a horizontal axis to position a substantial portion of said table with a slab secured thereto within said pit.

In testimony whereof I affix my signature.

ARTHUR E. APLEYARD.