

April 20 , 1926.

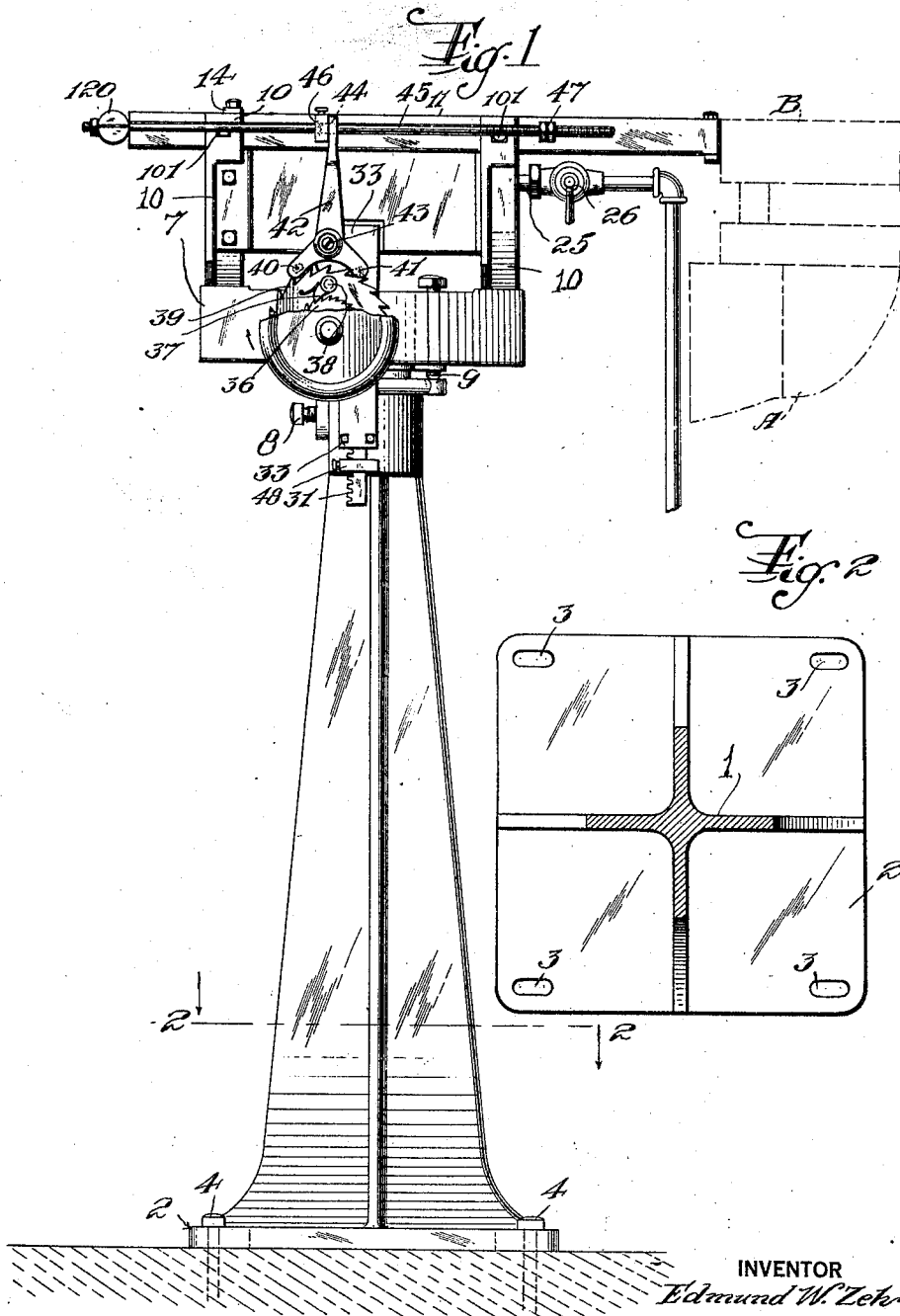
E. W. ZEH

1,581,774

TILE CLEANING AND STACKING MACHINE AND METHOD

Filed Sept. 24, 1924

4 Sheets-Sheet 1



INVENTOR

Edmund W. Zehr

BY _____

BY
Everett W. Cook,
ATTORNEYS

ATTORNEYS

April 20, 1926.

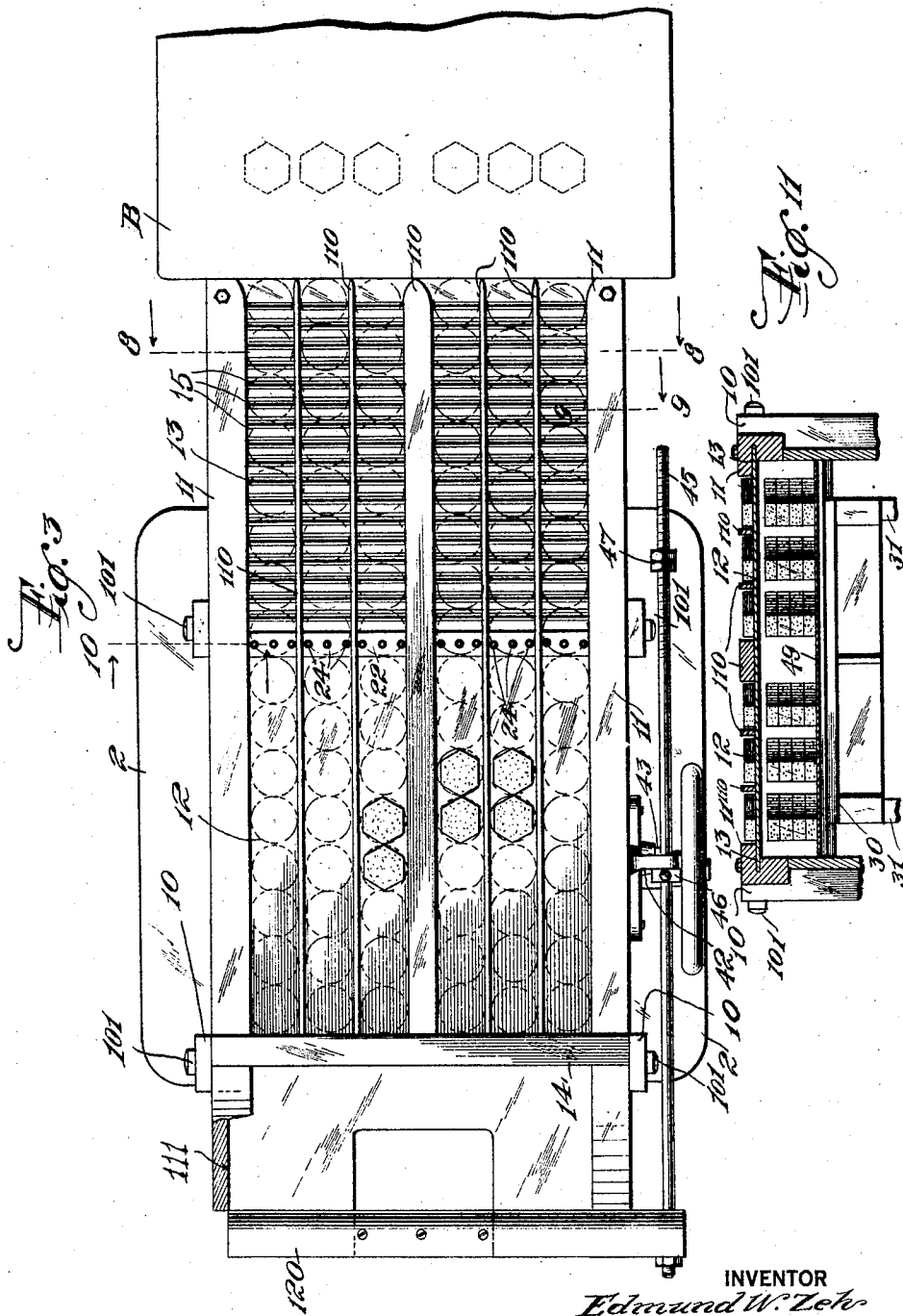
E. W. ZEH

1,581,774

TILE CLEANING AND STACKING MACHINE AND METHOD

Filed Sept. 24, 1924

4 Sheets-Sheet 2



INVENTOR
Edmund W. Zeh
BY *Everett W. Cook,*
ATTORNEYS

April 20, 1926.

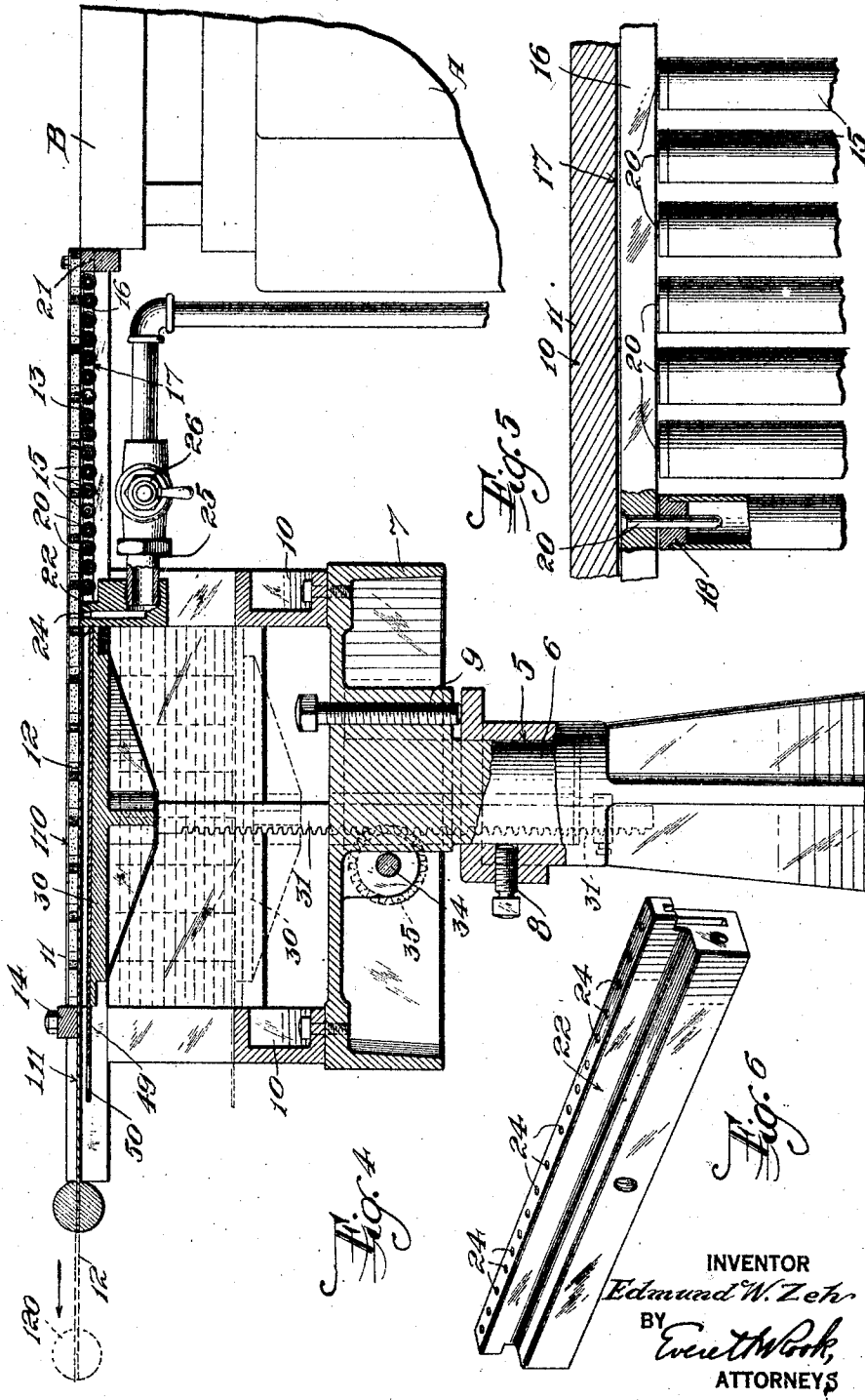
E. W. ZEH

1,581,774

TILE CLEANING AND STACKING MACHINE AND METHOD

Filed Sept. 24, 1924

4 Sheets-Sheet 3



INVENTOR
Edmund W. Zeh
BY
E. W. Zeh
ATTORNEYS

April 20, 1926.

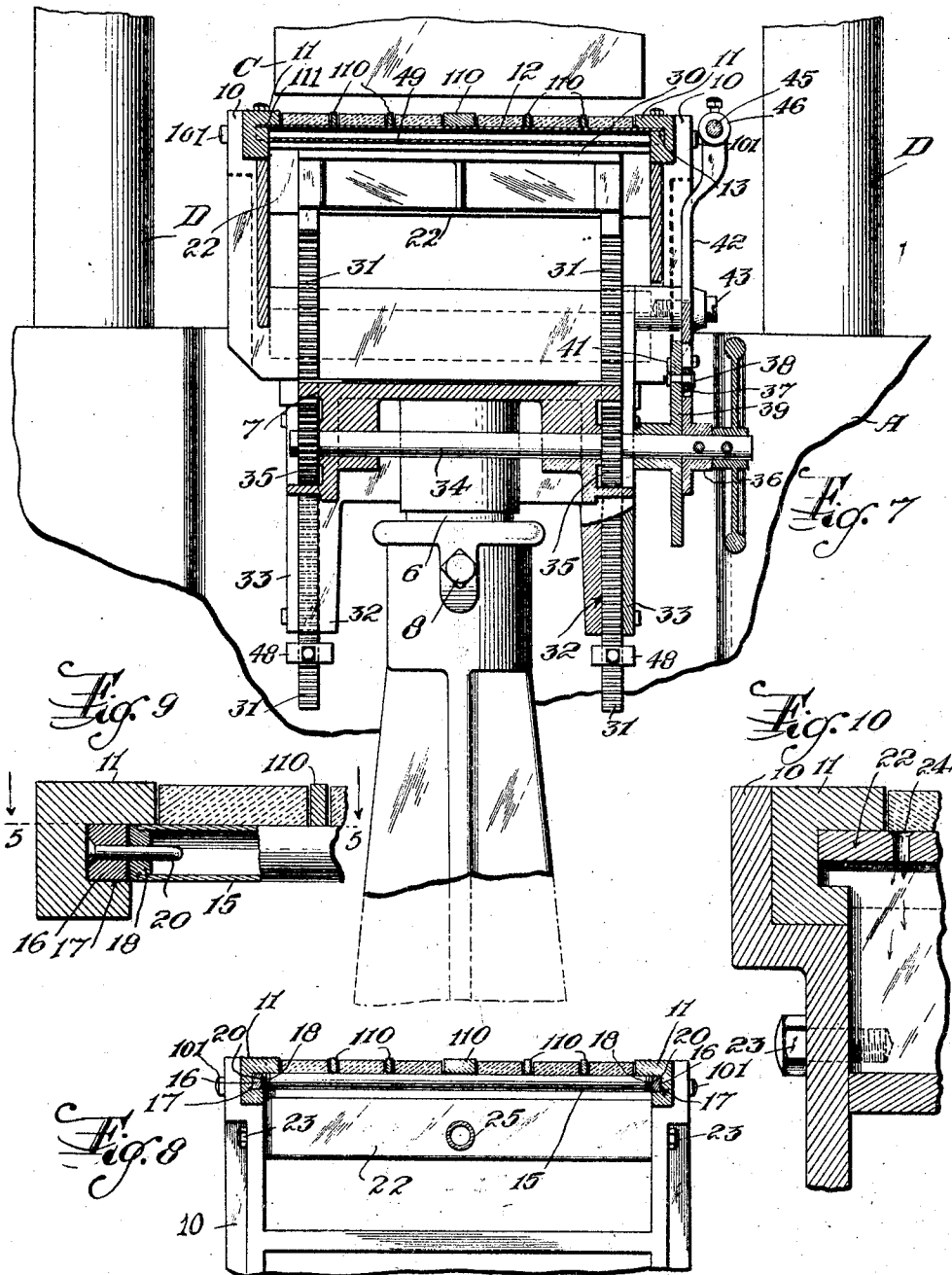
E. W. ZEH

1,581,774

TILE CLEANING AND STACKING MACHINE AND METHOD

Filed Sept. 24, 1924

4 Sheets-Sheet 4



INVENTOR

Edmund W. Zeh

BY

Everett W. Cook,

ATTORNEYS

UNITED STATES PATENT OFFICE.

EDMUND W. ZEH, OF NEWARK, NEW JERSEY.

TILE CLEANING AND STACKING MACHINE AND METHOD.

Application filed September 24, 1924. Serial No. 739,541.

To all whom it may concern:

Be it known that I, EDMUND W. ZEH, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Tile Cleaning and Stacking Machines and Methods, of which the following is a specification.

This invention relates in general to machines and methods for handling floor and wall tile and more particularly to a machine for expediting the removal of tile from the press forming the same.

The handling machine of the present invention is similar in principle and construction to that described in my copending application filed July 21, 1922, Serial No. 576,469 which has become Patent 1,545,225. Tile as they are discharged from a tile press frequently pick up on their bottom sides and edges, loose "dust" which should be removed before the tile are fired or baked. Furthermore, the tile cannot be stacked until this surplus dust is removed because the dust on the bottom of one tile would adhere to the top of the next lower tile in a stack and thereby spoil the lower tile or require another operation to remove the surplus dust. It will be understood that the tile after they are discharged from the tile press are fragile, consisting of slightly moist dust and being formed only by the pressure incident to the dies of the press, so that the tile must be gently handled to avoid breaking or otherwise injuring them.

One object of the present invention is to provide in a machine for collecting and arranging tile in stacks, means for removing the surplus loose dust on the tile before the tile are subjected to the glazing and firing operations.

Another object is to provide such a machine to receive tile immediately from a tile press and successively automatically remove the surplus loose dust and arrange the tile in stacks for further handling.

Other objects are to provide a machine of the character described which can be used interchangeably with a number of tile presses to receive tile directly therefrom; to provide novel and improved means for adjusting the tile cleaning and sticking mechanism relatively to a tile press so as to receive tile directly from the die of the press as they are discharged by a dust-box or the like; to provide such a machine including a guide-

way to receive tile from a press and having means in the bottom thereof over which the tile pass so that the loose dust is removed from the tile automatically as they pass from the press; to provide a machine of this character embodying novel and improved, simple and inexpensive features of construction, and to obtain other results and advantages as may be brought out by the following description.

Referring to the accompanying drawings, in which the same reference characters designate corresponding and like parts throughout the several views,

Figure 1 is a side elevation of a tile stacking machine embodying the invention;

Figure 2 is a horizontal sectional view taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged top plan view of the tile stacking machine;

Figure 4 is a longitudinal vertical sectional view through the head portion of the machine;

Figure 5 is a fragmentary top plan view of the tile-receiving end of the head of the tile stacking machine;

Figure 6 is a detached perspective view of the pneumatic nozzle for removing dust from the tile;

Figure 7 is a transverse vertical sectional view through the head portion of the machine;

Figure 8 is a transverse sectional view taken on the line 8—8 of Figure 3;

Figure 9 is an enlarged fragmentary sectional view taken on the line 9—9 of Figure 3;

Figure 10 is an enlarged fragmentary sectional view taken on the line 10—10 of Figure 3, and

Figure 11 is a fragmentary transverse sectional view showing the manner of stacking the tile on the tile-receiving table.

For the purpose of illustrating the principles of my invention I have shown the tile stacking machine used in connection with a well-known type of tile press for producing tile, comprising a base portion A, a lower die member B and an upper die member C reciprocable on guides D mounted in the base to cooperate with the lower die in forming the tile.

The tile stacking machine comprises a pedestal 1 having an enlarged base 2 provided with slots 3 to receive bolts 4 for securing the pedestal to a floor or other sup-

port, the slots 3 permitting adjustment of the base. The upper end of the pedestal is provided with a coaxial socket 5 to receive a pivot boss 6 on the bottom of a head 7 whereby said head is vertically and rotatably adjustable on the pedestal. The pedestal is provided with a set screw 8 for engaging the boss 6 to hold the head against rotation, and the head is provided with a set screw 9 to engage the top of the pedestal for vertically adjusting the head upon the pedestal. The head has secured thereto a pair of vertical frame pieces 10 which are arranged in spaced relation transversely of the head and support at their upper ends a guideway for receiving tile.

The said guideway comprises spaced and parallel horizontal side pieces 11 secured to the upper ends of the transverse frame pieces 10 in any suitable manner as by screws 101. The guideway is provided with a bottom formed in two sections 12 and 13, one of which is movable or displaceable. The movable section, in the present instance the section 12, is mounted in grooves 111 formed on the inner faces of the side pieces 11, and is preferably of a length to support a number of tile corresponding to that formed by the tile press in one operation. An end piece 14 is secured to the side pieces 11 at the end of the guideway carrying the movable bottom section, said end piece permitting the movable bottom section to slide beneath it and limiting movement of the tile with said movable section in one direction longitudinally of the guideway. The section 12 is provided with a handle 120 at its outer end whereby it may be slid longitudinally of the guideway. A plurality of partitions 110 extend longitudinally of the guideway above the bottom thereof so as to form passages for a plurality of rows of tile as clearly indicated in Figures 3 and 7.

The other section 13 of the bottom of the guideway comprises a plurality of spaced rollers 15 mounted between frame pieces 16 slidably mounted in grooves 17 in the side pieces 11, whereby said rollers and the frame pieces may be removed from the side pieces 11. These rollers may be of any suitable construction, but in the present instance are in the form of hollow tubes having plugs 18 fitted in their ends and revolubly mounted upon pins 20 secured in the frame pieces 16. The length of the section 13 substantially corresponds to that of the section 12 so as to receive the same number of tile, and the side pieces 11 are connected at the outer ends of the section 13 with a cross piece 21 which also closes the grooves 17.

Intermediate the bottom sections 12 and 13 of the guideway and transversely thereof is arranged a nozzle 22 secured to one of the vertical frame pieces 10 by means of screws 23 with the upper surface thereof substan-

tially flush with the upper surface of the movable section 12 of the guideway and the top sides of the rollers 15. The nozzle is formed with a plurality of openings 24 spaced transversely of the guideway and all communicating with a pipe 25 which may be connected to any suitable pneumatic device for creating a suction through the openings 24, for instance a vacuum pump or the like. A valve 26 is preferably arranged in the pipe 25 for controlling the suction through the pipe.

In operation, the tile stacking machine is positioned adjacent a tile press from which it is desired to receive tile, the base of the pedestal 1 being secured to the floor with the bolts 4 and adjusted by means of the slots 3 to bring the cross piece 21 substantially into engagement with the lower die member B of the press. The head of the machine is then adjusted by means of the set screws 8 and 9 to bring the bottom of the guideway substantially flush with the top of the die member B, as clearly shown in Figure 4. The vertical adjustment may be made by rotation of the set screw 9, and any rotative adjustment by means of the set screw 8. With the stacking machine thus arranged, the tile as they are discharged from the die member B of the press by the usual dust box or the like, will be pushed upon the rollers 15. As the tile are pushed over the rollers, it will be observed that a rocking action of the tiles will be produced which will tend to forcibly displace surplus dust adhering to the edges and bottoms of the tile, the rollers rotating to permit easy passage of the tile and to accentuate the rocking action thereof. After one batch of tile have been positioned upon the rollers 15, the next batch of tile which is discharged from the press will force the first-mentioned batch onto the movable section 12 of the guideway and the second-mentioned batch will be positioned upon the rollers 15. As the first-mentioned batch of tile passes from the rollers to the section 12 of the guideway, it must pass over the nozzle 22, and the suction therethrough tends to remove any surplus dust on the bottoms of the tile which may not have been displaced by the movement of the tile over the rollers 15. Thus, the conjoint action of the rollers 15 and the nozzle 22 will serve to remove substantially all loose dust from all of the tile.

A vertically movable table 30 is arranged beneath the movable section 12 of the guideway and is mounted at opposite sides thereof on rack bars 31 vertically movable in bearings 32 formed on the head 7 and provided with movable cover plates 33 for closing the bearings and holding the rack bars against lateral movement therein.

A shaft 34 is journaled transversely of

the head 7 and is provided adjacent its ends with pinions 35 which mesh with the respective rack bars 31 to actuate the table 30. One end of the shaft 34 has fixedly mounted thereon a ratchet wheel 36 engaged by a spring pawl 37 pivotally mounted at 38 on a ratchet disk 39 rotatably mounted on the said shaft and engaged by pawls 40 and 41 of an escapement mechanism for controlling rotation of the shaft 34. The said pawls 40 and 41 are rigidly mounted in spaced relation at one end of a lever 42 pivotally mounted intermediate its ends, as at 43, to the cover plate 33 of one of the bearings 32 for one of the rack bars 31. The end of the lever 42 opposite the pawls 40 and 41 projects vertically upward to a point adjacent the side pieces 11 of the guideway and is provided with an opening 44 to slidably receive a rod 45 carried by the movable section 12 of the bottom of the guideway. The action of gravity on the table 30 tends to rotate the shaft 34 in the direction indicated by the arrow on Figure 1, but one of the pawls 40 or 41 is normally in engagement with the ratchet disk 39 to hold the shaft against such rotation. The rod 45 is provided at opposite sides of the lever 42 with adjustable abutments 46 and 47 so that when the movable section 12 of the guideway is moved in one direction the abutment 46 engages the lever 42 and oscillates the same in one direction to release the pawl 40 from the ratchet disk 39 and when said movable section 12 is moved in the opposite direction the abutment 47 engages the lever 42 to release the pawl 41 from the ratchet disk 39. In this operation, one of the pawls 40 or 41 releases the ratchet disk 39 to permit rotation of the shaft 34 and the other of said pawls engages the said ratchet disk to stop said rotation of the shaft. The relation of the pawls 40 and 41 with the ratchet disk 39 and the pinions 35 and rack bars 31 is preferably such that the table 30 descends a distance equal to substantially one-half the thickness of the tile upon each movement of the lever 42; and the table is initially positioned below the movable section 12 of the bottom of the guideway a distance greater than one-half the thickness of one of the tile. To adjust this relative position of the table and the bottom of the guideway, the rack bars 35 may be provided at their ends with adjustable collars 48 to engage the ends of the respective bearings 32 of the rack bars. The top of the table 30 is preferably in the form of a removable plate 49 provided with a handle 50.

To stack the tile, after a batch of tile has been placed on the section 12 of the guideway, as hereinbefore described, said section is pulled outwardly from the guide-

way by the operator grasping the handle 120, as indicated in dotted lines on Figure 4, and the tile on the said section will then fall by gravity onto the plate 49 on the table 30, movement of the tile with the movable section of the bottom being prevented by the end piece 14. When the said movable section is pulled to its outward limit the adjustable abutment 47 actuates the lever 42 in one direction so that the table 30 is permitted to drop a distance equal to one-half the thickness of the tile, and when the movable section of the bottom is returned to its normal position the abutment 46 actuates the lever 42 in the opposite direction to permit the table 30 to again drop a distance equal to one-half of the thickness of the tile. This operation is performed each time a batch of tile is positioned on the movable section 12 of the guideway, and each batch of tile is thus deposited upon the next preceding batch so as to stack the tile or arrange them in superposed layers. The tops of the uppermost tile are always spaced from the bottom of the guideway as the movable section 12 is pushed back to its normal position, so that there is no danger of the said movable section injuring the tile. It will be obvious that the capacity of the table 30 may be varied as desired, but in the present instance the table is adapted to support ten layers of tile each including forty-eight tile. In other words, the table supports forty-eight stacks each including ten tile. After the table is filled to its capacity, the operator removes the plate 49 with the tile thereon and conveys the tile to the next desired place. The table 30 is then returned to its normal position, and for this purpose I may provide the shaft 34 with a hand wheel or lever 51. To elevate the table it is thus merely necessary to rotate the hand wheel in a direction opposite to that shown in Figure 1, the pawl 37 slipping over the teeth of the ratchet 36, so that the ratchet disk 39 is not moved.

With a construction embodying my invention, it will readily be seen that the stacking machine may be interchangeably used with numerous tile presses, being wholly separate from and unconnected with the press and adjustable to accommodate variations in dimensions of the presses. The separate identity of the stacking machine eliminates the jars or shocks incident to operation of the press from affecting the stacking machine in such a manner as to disarrange the stacked tile or break or chip the tile. Further, all loose dust accumulated on the tile during their passage from the press is automatically removed without in any manner impeding the stacking operation.

While I have shown and described a tile stacking machine embodying certain details

of construction, it will be understood that this is only for the purpose of illustrating the principles of the invention and that the invention may be utilized for stacking or
 5 handling other articles and objects. Also, many modifications and changes can be made in the construction of the machine without departing from the spirit or scope of the invention, and therefore I do not wish to
 10 be understood as restricting myself except as required by the following claims when construed in the light of the prior art.

Having thus described the invention, what I claim is:

15 1. The method of removing surplus dust from unfired tile, consisting in successively shaking the tile to loosen the surplus dust thereon and pneumatically removing said dust.

20 2. The method of removing surplus dust from unfired tile, consisting in successively shaking the tile to loosen the surplus dust thereon and subjecting the tile to suction.

25 3. The method of removing surplus dust from unfired tile, consisting in shaking or jarring the tile to loosen the dust and remove a portion thereof by action of gravity and then pneumatically removing the remainder of the dust.

30 4. A machine for removing surplus dust from unfired tile, comprising a guideway through which the tile are moved, means for shaking or jarring said tile as they move through said guideway to loosen the surplus dust, and pneumatic means for acting
 35 upon said tile after the dust has been so loosened to remove said dust.

40 5. A machine for removing surplus dust from unfired tile, comprising a guideway through which the tile are moved, means for shaking or jarring said tile as they move through said guideway to loosen the surplus dust, and a pneumatic means including a nozzle opening through the walls of said
 45 guideway to remove the dust from said tile as they are moved past said nozzle.

50 6. A machine for removing surplus dust from unfired tile, comprising a guideway to receive tile directly as they are discharged from a tile press, said guideway having a portion of its bottom composed of transversely disposed spaced and parallel rollers to first receive the tile from the press, said
 55 rollers causing the tile to rock or tilt as they are moved thereover to loosen the surplus dust, and a pneumatic device for acting upon said tile to subsequently remove dust therefrom as they are moved through said guideway.

60 7. A machine for removing surplus dust from unfired tile, comprising a guideway to receive tile directly as they are discharged from a tile press, said guideway having a portion of its bottom composed of trans-
 65 versely disposed spaced and parallel rollers

to first receive the tile from the press, said rollers causing the tile to rock or tilt as they are moved thereover to loosen the surplus dust, and pneumatic means including a nozzle opening through the walls of said
 70 guideway to subsequently remove the dust from said tile as they are moved past said nozzle.

8. A machine for removing surplus dust from unfired tile, including a guideway
 75 through which the tile are slid, and pneumatic means including a nozzle opening through the bottom of said guideway and over which said tile must pass.

9. A machine for removing surplus dust
 80 from unfired tile which are discharged from a tile press in batches, comprising a guideway having a portion of its bottom roughened to receive a full batch of tile from the press and shake or jar the tile as they are
 85 pushed thereover and loosen the surplus dust thereon, and pneumatic means including a nozzle at the discharge end of said portion of said guideway past which each batch of tile is moved as the next batch is discharged
 90 from the tile press, whereby the surplus dust is removed from the tile.

10. A machine for removing surplus dust from unfired tile which are discharged from a tile press in batches, comprising a guide-
 95 way having a portion of its bottom to receive a full batch of tile from a tile press and composed of transversely disposed spaced and parallel rollers over which the tile are pushed as they are discharged from the
 100 press, said rollers being arranged to cause the tile to rock or tilt so as to shake or jar the surplus dust from the tile.

11. The combination with a tile press from which tile are forcibly successively dis-
 105 charged in a continuous row and a tile stacking machine, of a guideway to receive tile from said press including means for shaking or jarring the tile as they are moved through said guideway to loosen the surplus dust
 110 thereon, said guideway also having a displaceable portion to receive tile from said shaking or jarring means and deposit said tile upon said tile stacking machine, and pneumatic means between said shaking or
 115 jarring means and said displaceable portion past which each tile is moved as the next tile is discharged from the press to remove said surplus dust from the tile, whereby each tile is moved through said guideway by the next
 120 successive tile, the surplus dust removed and the tile deposited upon the stacking machine.

12. A tile stacking machine to receive tile directly from a tile press from which tile
 125 are discharged in batches, comprising a base, a guideway mounted on said base and adapted to separably abut said tile press so that tile may be pushed from said press directly into said guideway, a portion of the bottom
 130 of said guideway at the receiving end being

of such size as to receive a full batch of tile and being perforated and roughened to shake or jar the surplus dust from the tile as they pass thereover upon discharge from the press, another portion of the bottom of said guideway being displaceable to temporarily receive each batch of tile from said first-mentioned portion as the next batch is discharged from the press so that when said displaceable portion is displaced the tile fall by action of gravity therefrom, a table beneath said displaceable portion to receive said tile as they fall, means for moving said table away from said displaceable portion to cause successive tile from said displaceable portion to fall in stacked relation on the next preceding tile on said table, and a suction device having a nozzle forming a part of the walls of said guideway between said roughened portion and said displaceable portion to remove surplus dust from the tile.

13. A machine for removing surplus dust from unfired tile, including a guideway through which the tile are slid having a portion of its bottom composed of a plurality of transversely disposed spaced and parallel rollers over which the tile are pushed so that the tile are rocked or tilted to shake or jar the surplus dust thereon, a pneumatic nozzle

forming another portion of the bottom of said guideway arranged at the discharge end of the first-mentioned portion, said tile being slid over said nozzle as they are pushed from said rollers, and means for creating suction through said nozzle to remove the loose surplus dust from said tile.

14. A tile handling machine to receive tile directly from a tile press, comprising a base having a vertical socket, a head adapted to separably abut a tile press and having a pivot boss rotatably and vertically adjustable in said socket, said head having a guideway to receive tile from said tile press, said adjustable mounting of said head enabling the bottom of said guideway to be adjusted into proper relation to the discharge surface of the press to permit the tile to be slid from the press directly into said guideway.

15. The method of handling unfired tile directly from a tile press, consisting in successively moving the tile from the press through a predetermined continuous path, successively shaking the tile to loosen the surplus dust thereon and pneumatically removing said dust from said tile as they are moved in said path, and stacking the tile at the end of the path.

EDMUND W. ZEH.