Sept. 6, 1932. L. N. DYHRBERG 1,876,211

BRICK HANDLING MEANS

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FIG. 1

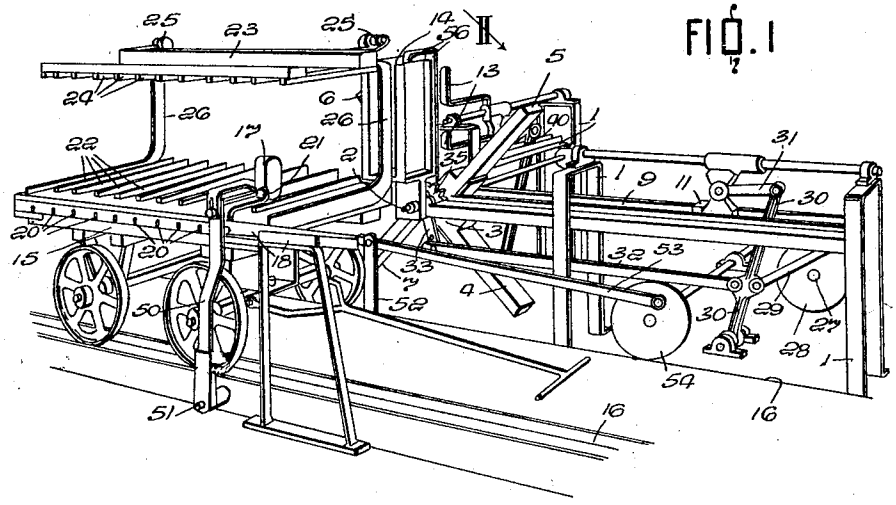


FIG. 2

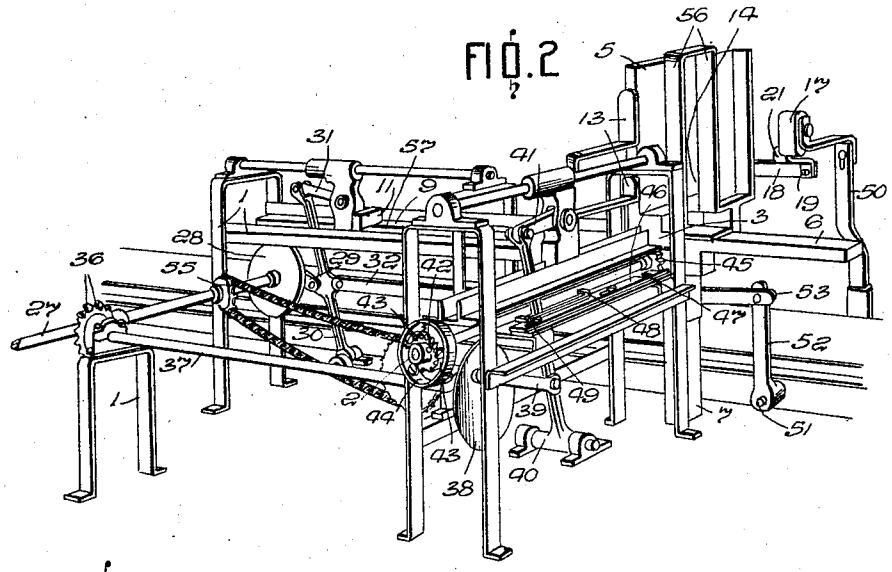
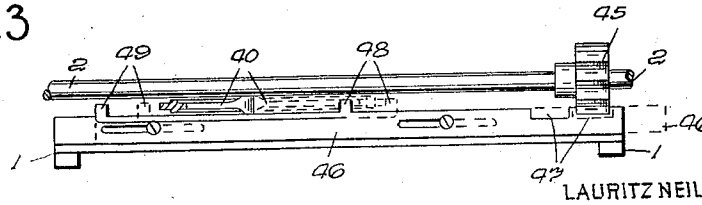


FIG. 3



INVENTOR
LAURITZ NEILSEN DYHRBERG
BY Fatherstonhaugh & Co
ATTORNEYS

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FIG. 4

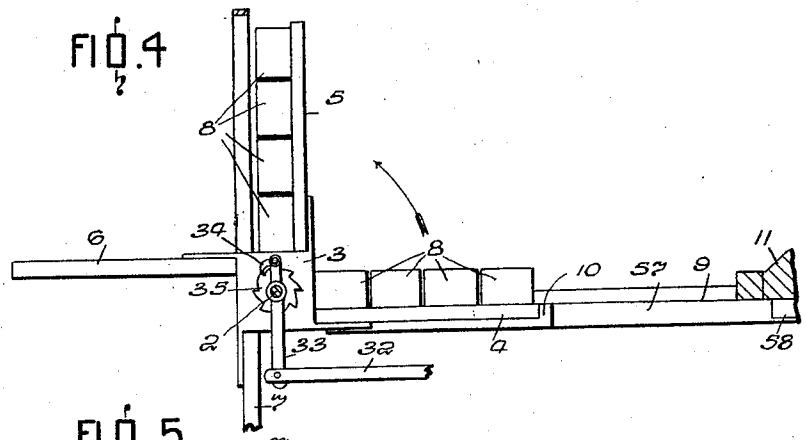


FIG. 5

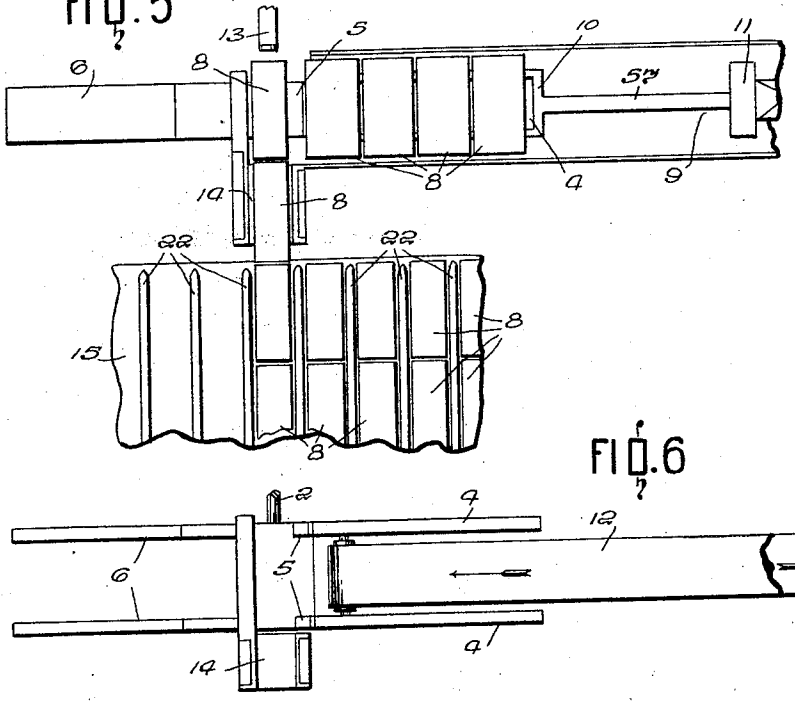


FIG. 6

INVENTOR
LAURITZ NEILSEN DYHRBERG
BY Fetherstonhaugh & Co
ATTORNEYS

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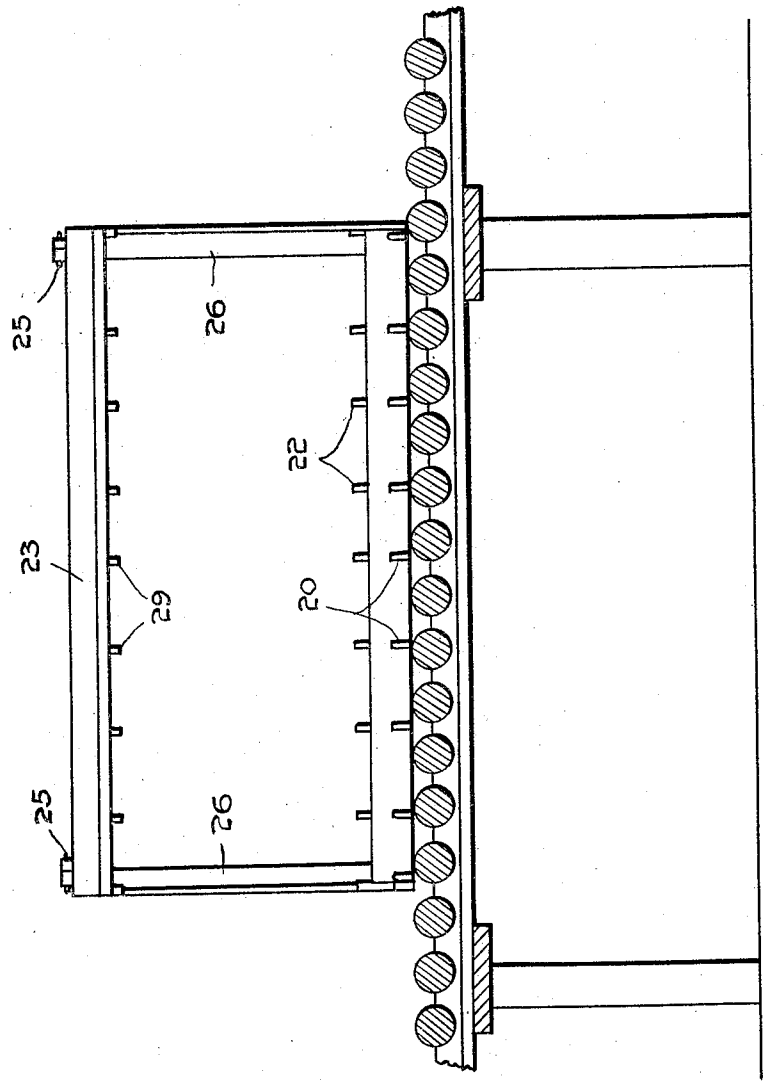


FIG. 7

INVENTOR
LAURITZ NEILSEN DYHRBERG
BY Fetherstonhaugh & Co
ATTORNEYS

Patented Sept. 6, 1932 1,876,211

UNITED STATES PATENT OFFICE

LAURITZ NEILSEN DYHRBERG, OF ALLENTON, NEW ZEALAND

BRICK-HANDLING MEANS

Application filed June 4, 1929, Serial No. 368,421, and in New Zealand June 19, 1928.

This invention relates to the handling of bricks, more especially in their green or unburnt condition as delivered from a brick-making machine.

It is the object of the present invention to provide mechanism whereby such bricks may be automatically arranged in hacked formation for transportation as to a kiln or open air drying hack, a further object of the invention being to provide means whereby a conveyor upon which the hack is formed may be automatically fed forward during the progress of such hacking to place it in the required position to receive each row of bricks as it is delivered. Such rows are spaced apart in open formation as required for drying or burning.

In attaining these objects the present invention includes as its central feature a rotary member providing one or more radial arms each arranged when rising through a substantially horizontal position to receive bricks which as such arm, in continuing its progress, approximates to the vertical position will thereby be placed in stacked formation one above the other and in which condition such bricks are removed from the arm.

The invention includes also means for the reception of bricks and means for so forwarding the bricks to the said position within range of the arms, means for ejecting such bricks in stacked formation from the arms, a specially arranged conveyor upon which such stacked bricks are delivered, and means for automatically forwarding the said conveyor as the loading of the bricks thereon proceeds, together with various subsidiary features as hereinafter explained.

In order that the nature of the invention and its construction may be clearly understood, it will now be fully described and explained with reference to the accompanying drawings, in which:—

Fig. 1 is a perspective view showing a machine constituting a practical embodiment of the invention with the conveyor in position to receive bricks therefrom.

Fig. 2 is a perspective illustration of the machine as viewed from a direction indicated by the arrow 11 Fig. 1, the conveyor being in this case omitted.

Fig. 3 is a plan view of means employed for locking the rotary member against rotation at those stages in the operation at which the bricks are ejected therefrom.

Fig. 4 is an end elevation of the rotary member with bricks in position thereon.

Fig. 5 is a plan view of the same showing also a portion of the conveyor in position to receive the bricks.

Fig. 6 is a plan view illustrating a slightly modified form of the rotary member and the surface by means of which the bricks are forwarded thereto and,

Figure 7 is a view of the conveyor showing a modified construction of supporting means therefor.

As here shown 1 is a suitable supporting frame-work in a portion of which is rotatably mounted in bearings a horizontal shaft 2.

According to the present invention there is provided a rotary member comprising a boss 3 fixed upon the shaft 2 and from which boss radiate at suitable peripheral intervals one or more arms, as 4, 5, 6 and 7 each providing surfaces upon which bricks as 8 may rest.

Co-operating with the said rotary member is a loading surface horizontally disposed, or inclined at a slight angle, and extending towards the said rotary member in a direction at right angles with the said axis 2, to a position past which each of the said arms, 4, 5, 6 and 7 in turn rises during the rotary movement of the said rotary member.

As here shown in Figs. 1, 2, 4 and 5 the said loading surface consists of a stationary table 9 having a slot or opening 10 (Figs. 4 and 5) through which the arms of the rotary member rise, a push-block 11 being in this case provided and operated with a reciprocal movement over the table 9 to forward the bricks to the said arms.

In the preferred form of the construction, as here shown, the portion of the table 9 over which the push-block 11 moves is formed with a longitudinal slot 57 in which a dependent tongue-piece 58 upon the push-block

is slidably received, thereby to guide, or assist in guiding such push-block in its said reciprocal movements.

In a modified form shown in Fig. 6 however, in lieu of the stationary table 9 and push-block 11, the loading surface consists of a travelling conveyor-belt 12 and in this form also the arms 4, 5, 6 and 7, instead of being solid as in the previously described form, are bifurcated to permit of the belt 12 running in the space or interval between their two branches or fingers.

It will be understood however that these two forms of the loading surface and the arms are given merely by way of example and that there is no reason why each of the said arms should not be bifurcated or divided into two or more branches or fingers to co-operate with a correspondingly shaped stationary loading table, or alternatively the loading surface might consist of a parallel pair of conveyor-belts co-operating with solid arms rising therebetween.

Again if so desired the said loading surface may be arranged to deliver the bricks to the arm in a direction parallel with the axis 2.

The present invention is therefore to be construed as including within its scope each and all of such modifications.

In all cases the arrangement is such that a plurality of bricks having been forwarded along the loading surface to the required position within range of the arms, will be received and lifted from such surface by the arms as they rise therepast, as here illustrated in the case of the arm 4 Figs. 4, 5 and 6.

As the rotation continues the loaded arm in approaching its vertical position, will place its bricks in stacked formation one above the other, as here shown in the case of the arm 5, Figs. 4 and 5.

At this stage the bricks will be removed from the arm by the operation of an ejecting device, which conveniently takes the form of a push-block 13 operating with a reciprocal movement parallel with the axis 2.

In order to steady the bricks on reaching their said ejecting position, there will preferably be provided a stationary vertical surface or member 56 with which such bricks will come in contact, the said surface or member being so formed as to offer no obstruction to the subsequent passing of the arm. Thus for example the said member may take the form here shown comprising a pair of uprights which serve to engage the bricks while the space or opening between such uprights allows of the arm passing therethrough when the movement of the rotary member is resumed after the ejection of the bricks has taken place.

The bricks, when ejected from the rotary member, are directed, as by means of a chute 14 onto a conveyor 15 ranged alongside the rotary member to receive such bricks in rows extending transversely of such conveyor.

The said conveyor may consist of a trolley or barrow as here shown arranged to run upon a rail track 16 Fig. 1, extending at right angles with the direction of the said discharge and such conveyor or the bricks supported thereon, will be subjected to forward impulses by means actuated by the mechanism and whereby, as each row of bricks is completed, the conveyor will be moved along the track for a sufficient distance to place it in the required position to receive the next succeeding row and so on until the load is completed.

In one preferred form of the construction, as here shown, this movement of the conveyor is attained by the employment of a push-block 17 adapted to perform a reciprocal or vibratory motion above the conveyor in a direction parallel with the track 16 the arrangement being such that as each row is completed the said push-block in performing its said movement will come in contact with the last portion of the row and thus serve to move the conveyor the necessary distance to receive the next row.

In order to prevent the conveyor, when so actuated, from over-running the required distance, provision is preferably made for causing such conveyor to become locked in each of its said loading positions.

This locking may conveniently be attained as here shown by the provision of a spring 18 stationarily mounted at the side of the track, such spring being provided in its free end with a pin 19 engageable with any one of a series of holes 20 provided at the required intervals lengthwise along the side of the conveyor, the arrangement being such that, as the vehicle moves forward, the natural tendency of the spring will cause the pin to enter the first of the holes 20 with which it comes into register.

As here shown, in order to disengage the pin from the hole before each forward movement of the vehicle takes place, the said free end of the spring lever 18 is provided also with a contact-piece 21 adapted to be engaged by end of each row of bricks as the latter comes into position upon such conveyor thereby forcing such spring outward slightly and so disengaging the pin.

In the preferred form of the construction also the deck of the conveyor, or a removable pallet supported thereon, is provided at the required intervals with transversely disposed ridges or separators 22 upstanding slightly above the surface of such deck or pallet to guide the rows of bricks into place thereon in the desired open formation.

The conveyor is preferably provided also with a second pallet or frame 23 mounted at a height equal to that of the top of the stack, or slightly thereabove, such upper pal-

let or frame being provided at its under surface with a series of pendent transverse ridges 24 corresponding with the ridges 22 of the lower pallet or deck.

By this arrangement the bricks will be delivered row-by-row into the space between the deck or lower pallet and the upper pallet 23 and in which condition such stack will be securely held.

The mounting of the said upper pallet 23 is preferably by hinges 25 connecting it at one lateral side with the supporting uprights 26, thereby permitting of such upper pallet being turned upon its hinges to one side of the conveyor and so leaving the space above such conveyor clear for unloading the bricks.

While the conveyor herein illustrated in Figure 1 is mounted on wheels movable over tracks 16, it is desired to be understood that various types of conveyors may be employed without departing from the scope of the invention. In Figure 7 I have illustrated a slightly modified construction, wherein the conveyor is mounted to move over rollers supported on a stationary frame or runway of any desired construction.

Means are provided for actuating the various parts in the required order and synchrony from power obtained from any suitable source but preferably from the brick forming and delivering means whereby the bricks are supplied to such mechanism in order to ensure synchrony of movement between the latter and such brick forming and delivering means.

Thus for example as here shown the power is delivered to a main shaft as 27 whereon is a crank 28 operating through a connecting rod 29 a rock-lever 30 which latter through a link 31 actuates the reciprocal movements of the push-blocks 11.

Connected with the rock-lever 30 through a connecting-rod 32 is a lever 33 fulcrumed, as upon the shaft 2, and carrying a pawl 34 adapted to engage with the teeth of a ratchet-wheel 35 connected to the aforementioned rotary member thereby to perform a step-by-step relation of the latter, as hereinafter explained.

Connected with the said main shaft 27 as by bevel gearing 36, is a cross-shaft 37 having a crank 38 operating through a connecting-rod 39 a rock-lever 40 which through a link 41 actuates the push-block 13 in its reciprocal movements whereby the bricks are ejected from the arms.

Means are preferably provided also for preventing backward turning movement of the said rotary member. As here shown this is accomplished by fixing upon the shaft 2 a ratchet-wheel 42, Fig. 2, and with the teeth of which ratchet-wheel one or more pawls as 43 pivoted upon a fixed mounting as 44 are adapted to engage.

Means are provided also for locking the rotary member against rotary movement while the ejection of bricks therefrom is taking place, such means operating in synchronism with the movements of the push-block 13 by which such ejection is performed.

As here shown the said locking means consist of a toothed wheel 45 connected with the rotary member, as by fixing upon the shaft 2, Figs. 2 and 3, and a sliding plate 46 actuated in conjunction with the push-block 13 and adapted when slid into one position, as here shown in Fig. 2, and in full lines Fig. 3 to engage the teeth of the wheel 45 thereby locking the rotary member and when slid into another position to present a notch 47 to such ratchet wheel as indicated in dotted lines, Fig. 3 and thus permit of the said rotary member revolving.

For the purpose of attaining the said sliding movements of the plate 46 the latter is provided with a pair of lugs 48 and 49 projecting in the path of the movement of the rock-lever 40, the arrangement being such that as the latter completes its forward stroke by means of which its connected push-block 13 ejects the bricks, such rock-lever will engage the lug 48 thereby bringing the notch 47 into register with the ratchet-wheel as indicated in dotted lines Fig. 3, and so unlocking the rotary member in readiness for the next stage of its turning movement, while at the completion of its return or outward stroke the said rock-lever will engage the lug 49 and so place the notch 47 out of register with the ratchet wheel, thereby locking the rotary member, as here shown in Fig. 2 and in full lines Fig. 3.

As here shown for the purpose of operating the push block 17 the latter is mounted upon an arm 50 fixed upon one end of a shaft 51 extending transversely beneath the rail track 16 and upon the other or reverse end of which shaft is fixed an arm 52 which is actuated with a vibratory or rocking movement as by means of a connecting rod 53 connecting such arm with a crank 54 driven as by a chain gear 55 from the main shaft 27.

The operation of the machine is briefly as follows:—

Bricks as 8 delivered onto the loading surface, as 9 or 12 as the case may be, will be caused to travel therealong as by the action of the push block 11 in one case or the movement of the conveyor belt in the other case to the position past which the arms 4, 5, 6 and 7 of the rotary member rise.

When the bricks lie side-by-side in this position the sliding plate 46 will be moved by the action of the rock lever 40 to present its notch 47 to the toothed wheel 45, thereby unlocking the rotary member after which the pawl 34 will engage one of the teeth of the wheel 35 thereby turning the rotary member through a portion of a revolution during which one of its said arms 4, 5, 6 or 7 as the

case may be, will rise from an approximately horizontal position lifting the said bricks from the loading surface and obtain an approximately vertical position thereby stacking such bricks one upon the other.

In this position the rotary member will pause and become locked by the action of the rock lever 40 in moving the sliding plate 46 so as to carry the notch 47 out of register with the toothed wheel 45 after which the push block 13 will advance to engage the end of the stack of bricks and push the same clear of the arm into the chute 14.

The above explained cycle of operations will then be repeated so as to similarly load bricks onto the next succeeding arm and discharge them in stacked form into the chute where they will cause those previously delivered to be pushed onto the conveyor.

Upon the completion of the loading of each row of bricks upon the conveyor the end bricks of such row will engage the contact-piece 21 thereby disengaging the pin 19 from the hole 20 which it previously occupied thereby unlocking the conveyor, while the end stack of bricks upon attaining their position upon the conveyor will also be engaged by the push block 17, as the latter performs its said reciprocal movement, thereby causing the conveyor to be advanced for the correct distance to receive the next row whereupon the pin 19 will engage with the next succeeding hole and so lock such conveyor in position and prevent it from overrunning.

I claim:

1. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and presenting one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as such arm reaches its upper vertical position, a loading surface whereon said bricks are received and along which such bricks are forwarded to a position from whence they are lifted as aforesaid by said rising arm, said loading surface comprising a stationary table formed with a longitudinal slot and a push-block adapted to reciprocate over said table, said push-block having a depending tongue-piece operating in the table slot to serve as a guide for the push-block.

2. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as said arm approaches its upper vertical position, and means operable by the machine to eject the bricks in their said stacked form from said arm when the latter occupies its said upper position.

3. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as such arm approaches its upper vertical position, means operable by the machine to eject the bricks in their said stacked form from said arm, and a stationary vertical member to contact with and steady said bricks when in their said position for ejection, said member being formed to offer no obstruction to the passage of said arm therepast when said ejection has taken place.

4. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as such arm approaches its upper vertical position, means for ejecting said bricks in their said stacked form from said arm, a vehicle to receive said stacked bricks, and a chute to receive said bricks as they are ejected from said arm and direct the same onto said vehicle.

5. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as such arm approaches its upper vertical position, and a push-block reciprocating parallel with said axis and whereby said bricks are ejected in their stacked formation from said arm when the latter occupies its said upper position.

6. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as such arm approaches its upper vertical position, means for ejecting said bricks in their stacked form from said arm while the latter occupies its said upper position, and means for intermittently actuating said member in its rotary movement thereby to cause the same to pause while said ejecting operation takes place.

7. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation

as said arm approaches its upper vertical position, means for ejecting said bricks in their stacked form from said arm, means for intermittently actuating said member in its rotary movement and whereby the same will be caused to pause while said ejecting operation takes place, and means for locking said member against rotation while said ejecting operation takes place.

8. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as such arm approaches its upper vertical position, means for intermittently actuating said member in its rotary movement to cause the same to pause when each arm occupies its said upper position, means for ejecting said bricks in their stacked form from said arm, and means operable in conjunction with said ejecting means whereby said rotary member will be locked against rotation while said ejection takes place.

9. Improvements in brick-handling means comprising a member adapted to intermittent rotation upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and to place the same in stacked formation as such arm approaches its upper vertical position, a push-block reciprocating parallel with said axis and whereby said bricks are ejected in their stacked form from said arm, a toothed wheel connected with said rotary member to rotate therewith, and a sliding plate operable in conjunction with said push-block thereby to be brought into engagement with the teeth of said wheel to lock the rotary member against rotation while said ejection of the bricks takes place.

10. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place the same in stacked formation as such arm approaches its upper vertical position, means for actuating said member in its rotary movement, and means for retaining said member against backward turning movement.

11. Improvements in brick-handling means comprising a member rotatable upon a horizontal axis and providing one or more substantially radial arms each adapted when rising through its substantially horizontal position to receive bricks in side-by-side relation and place such bricks in stacked formation as such arm approaches its upper vertical position, means for ejecting said bricks in their stacked form from the said arm in a direction parallel with said axis, a vehicle to receive in transverse rows said stacked bricks as the same are ejected, and means operable by the machine whereby at the completion of each row said vehicle is advanced into position to receive the next row.

12. Improvements in brick-handling means as defined in claim 11 characterized in that said means for advancing the vehicle comprises a push-block operating with an oscillating movement over said vehicle longitudinally with the direction of movement of such vehicle and adapted to engage the bricks of each row as the same is completed.

13. Improvements in brick-handling means as defined in claim 11 characterized in that means are provided for locking the vehicle in each of its row-receiving positions and in that said locking means are releasable by engagement with the bricks of each row as the same is completed.

14. Improvements in brick-handling means as defined in claim 11 characterized in that the brick-receiving surface of the said vehicle is provided with a series of upstanding transverse ridges to serve as spacers between the rows and guide the same into place therebetween.

15. Improvements in brick-handling means as defined in claim 11, characterized in that the said vehicle is provided with a pallet mounted to overlie the bricks upon said vehicle and in that said pallet is provided at its underside with a series of transversely disposed pendent ridges serving as spacers between the rows.

In witness whereof, I have hereunto set my hand.

LAURITZ NEILSEN DYHRBERG.