

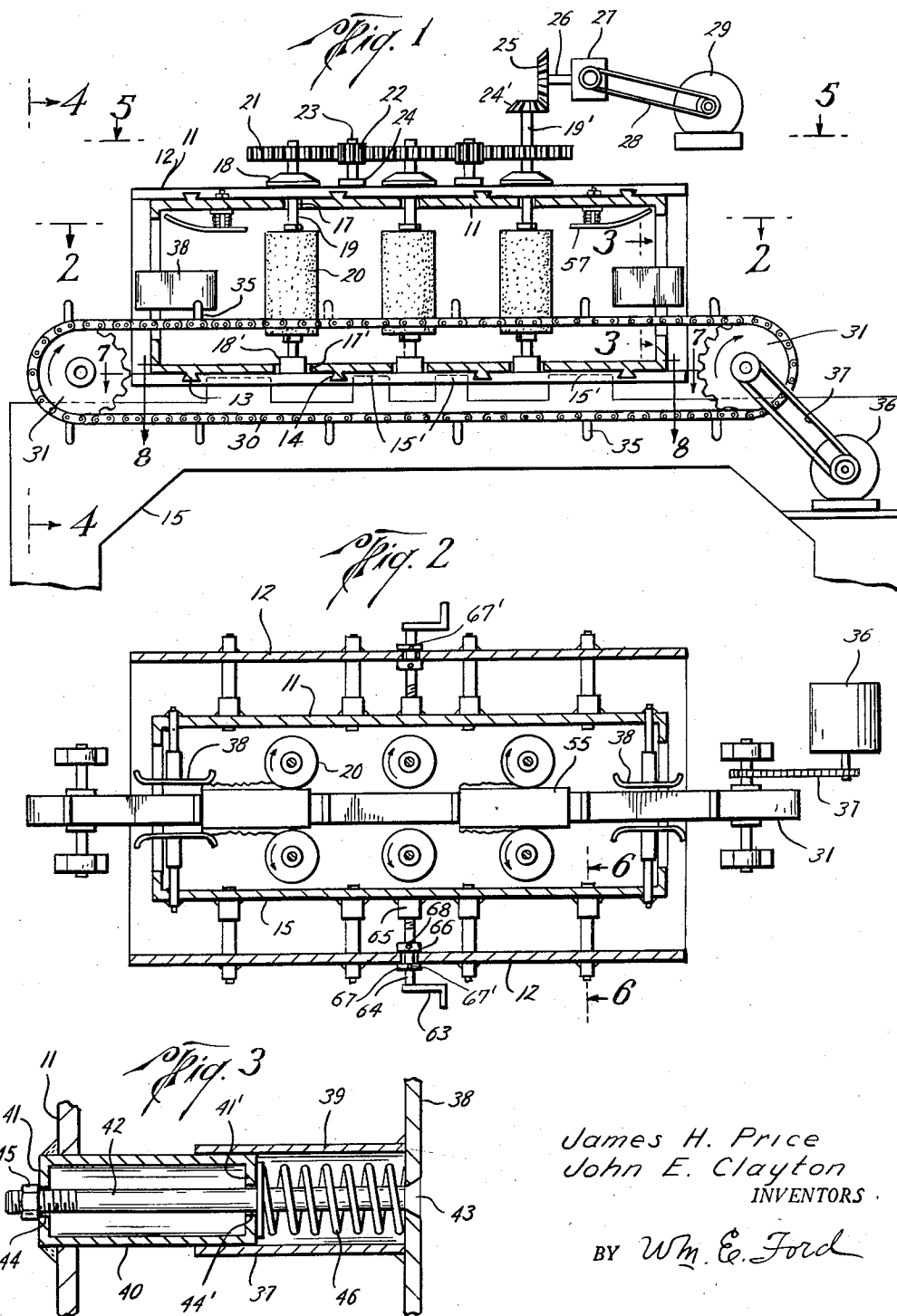
Sept. 1, 1959

J. H. PRICE ET AL
BRICK CLEANING MACHINE

2,901,868

Filed Oct. 1, 1956

4 Sheets-Sheet 1



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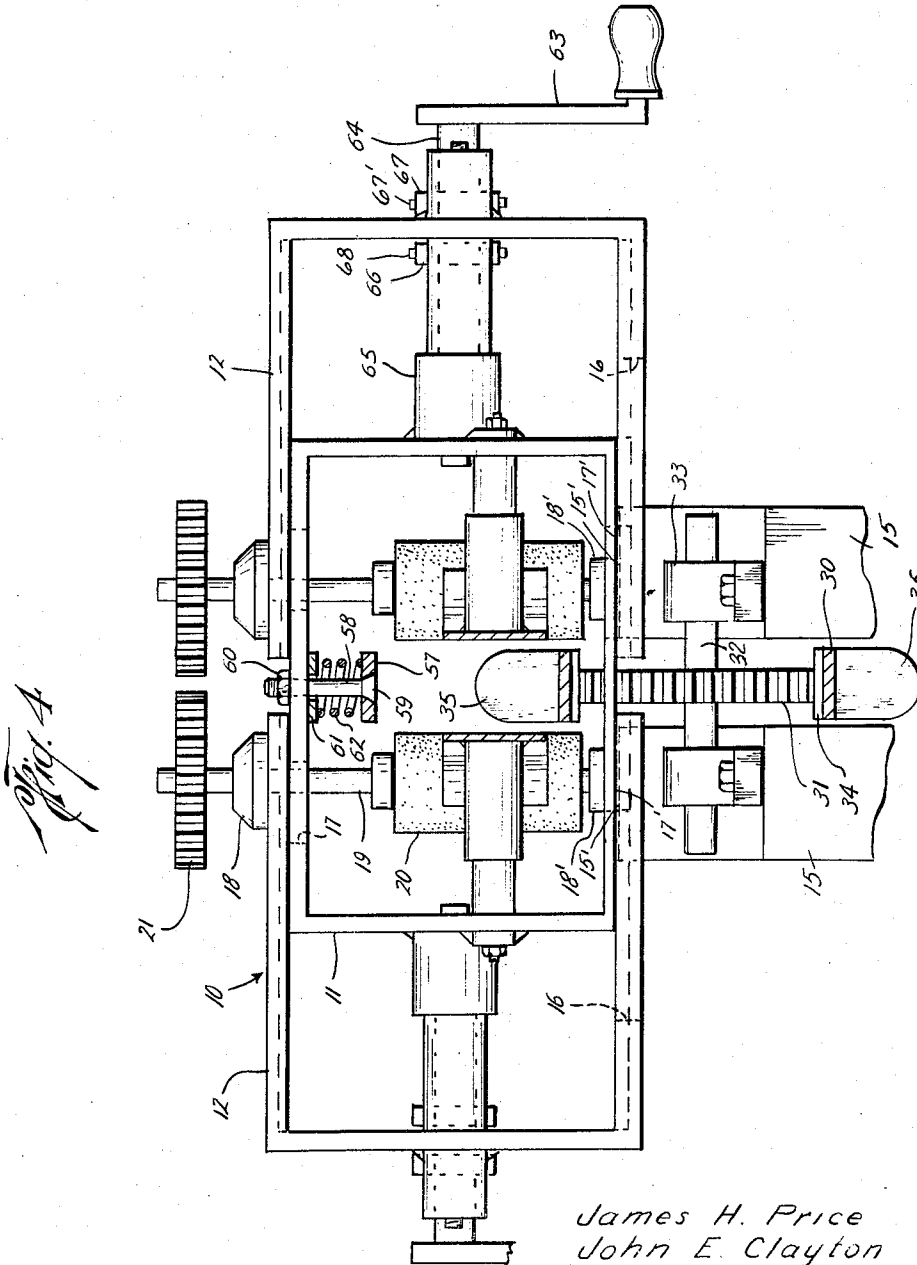
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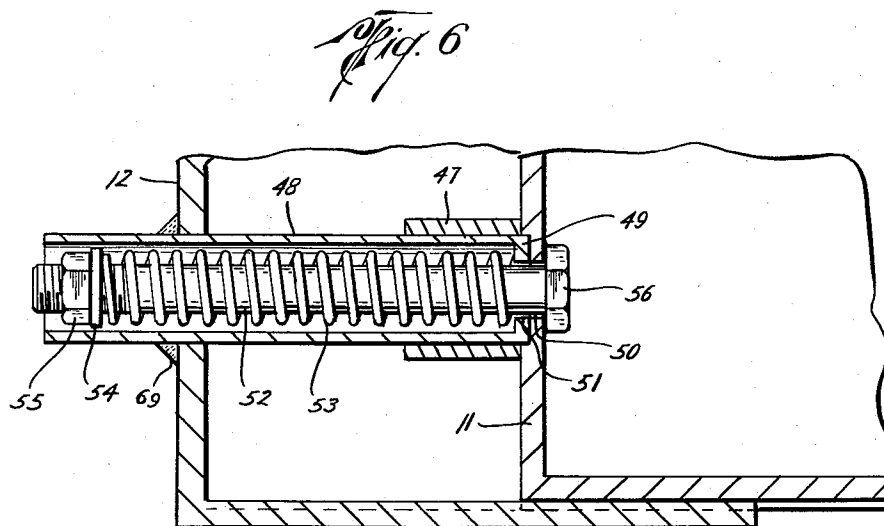
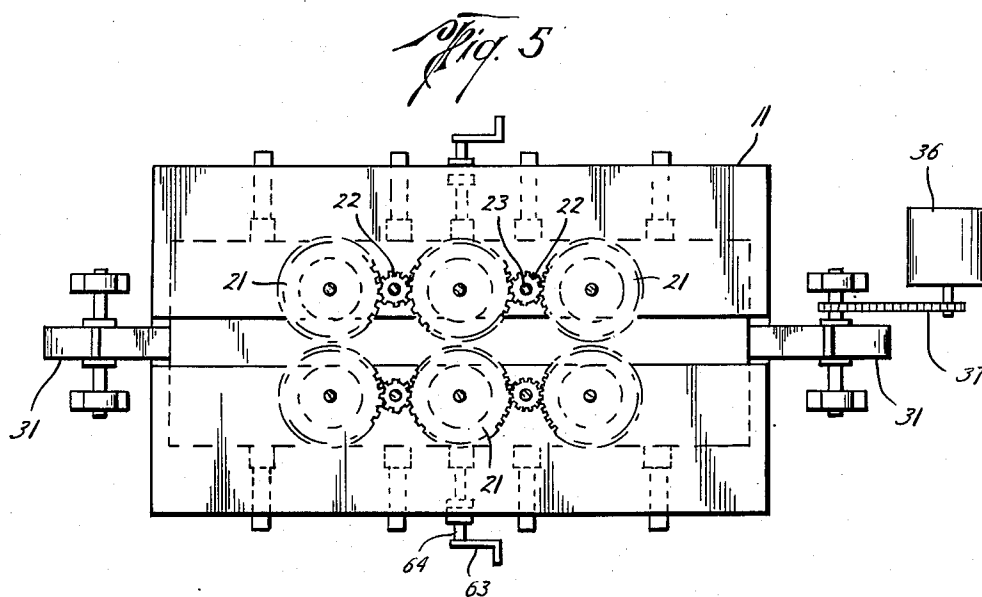
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Fig. 7

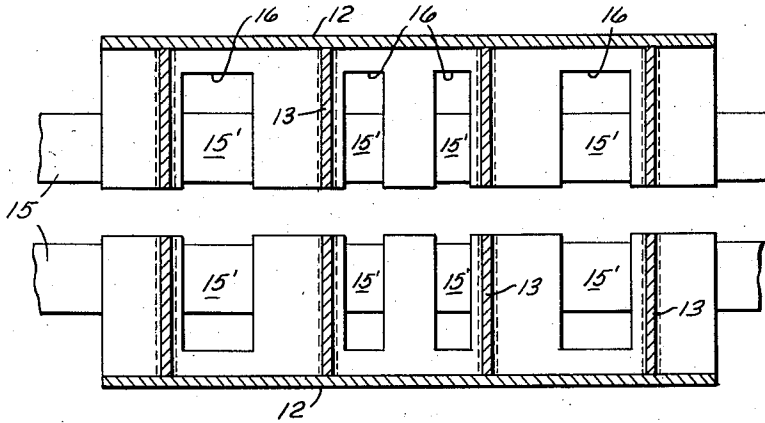


Fig. 8

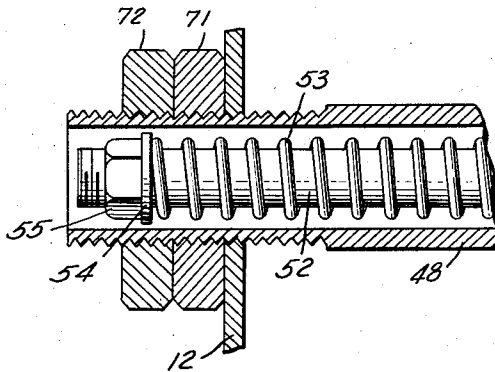
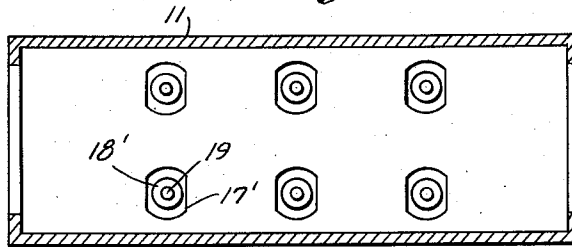


Fig. 9

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BRICK CLEANING MACHINE

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7 Claims. (Cl. 51—80)

This invention relates to a brick cleaning machine of the type which is adapted to transport bricks through a series of cutters or grinders arranged in rows whereby the abrading contact of the cutters or grinders cleans off any material as mortar which may be deposited, as on used brick.

It is a primary object of this invention to provide a brick cleaning machine which may rapidly clean bricks by transporting them on an endless belt past a series of rotating cutters.

It is another object of this invention to provide a brick cleaning machine of this class in which the frame members mounting the cutter are yieldably movable with relation to a fixed frame through which the bricks are transported.

It is another object of this invention to provide a brick cleaning machine of this class which carries entrance and exit guides yieldably mounted with relation to the brick passing therethrough.

It is another object of this invention to provide a brick cleaning machine of this class which has a minimum of operating parts, is easily portable, and which is adapted to clean variously encrusted brick surfaces and also to clean a multiplicity of sizes of brick.

Other and further objects will be apparent when the specification herein is considered in connection with the drawings in which:

Fig. 1 is an elevation of a brick cleaning machine incorporating one embodiment of the invention;

Fig. 2 is a sectional plan view taken along line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation taken along line 3—3 of Fig. 1;

Fig. 4 is a transverse elevation taken along line 4—4 of Fig. 1;

Fig. 5 is a sectional plan view taken along line 5—5 of Fig. 1;

Fig. 6 is a sectional elevation taken along line 6—6 of Fig. 2;

Fig. 7 is a sectional plan view taken along line 7—7 of Fig. 1;

Fig. 8 is a sectional plan view taken along line 8—8 of Fig. 1; and

Fig. 9 is a fragmentary sectional view of a modification of the structural arrangement shown in Fig. 6.

Referring in detail to the drawings in which like reference numerals are applied to corresponding elements in the several figures, the machine 10 is shown as having two frame structures, namely a fixed frame 11 of rectangular cross-section, and on transversely opposed sides thereof frame members 12 of U-shaped cross-section, which are slidable with relation to the frame 11 which provides ways 13 for the purpose, the members 12 having mating slots 14 to receive the ways 13 so that the members 12 may slide therealong.

Since the frame 11 must be fixed with relation to the frame members 12, a fixed support 15 is provided, as

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shown in Figs. 1 and 4, having raised surfaces 15' which extend through slots 16 provided in the lower plates of the frame members 12, such slots being spaced longitudinally from the ways 13 and grooves 14, and the frame 11 is affixed to such support 15. The frame 11 is also slotted above and below at 17, 17' respectively, and journal bearings 18, 18' carried above and below by the frame members 12 carry shafts 19 which extend vertically, the journals 18 being mounted on top of the frame members 12, and the shafts 19 extending through the upper slots 17 in the frame members, while the journal bearings 18' extend in the slots while the lower ends of the shafts 19 are journaled in the bearings 18' and extend thereabove.

The shafts carry abrading cutters or grinders 20 thereon, and a row of such units extends longitudinally in each frame member 12 in a corresponding row of slots 17, 17'. A gear 21 is mounted on the top of each shaft 19 and idler pinions 22 are provided between adjacent gears to mesh therewith, such pinions being mounted on stud shafts 23 journaled and supported in journal bearings 24 carried by the frame members 12. Through the means of such idler pinions 22 the cutters 20 of each row rotate in the same direction, and the rows are arranged so that the cutters of one frame member rotate in opposite clock direction from the cutters of the other frame member as shown in Fig. 2. Thus as viewed in Fig. 2 one row rotates in clockwise direction and the other row rotates in counterclockwise direction, and the directions of rotation are such as to oppose the translation of bricks therethrough by the conveyor 30.

An end shaft in each row has a higher extending portion 19' which has a bevel gear 24' mounted thereon. As shown in Fig. 1 such bevel gear meshes with a bevel gear 25 on a shaft 26 driven from a speed reducer or transmission box 27 which in turn is belt driven by belt 28 from a motor 29. Of necessity the transmission box 27 and motor 29, shown diagrammatically in Fig. 1, must be carried by the frame member 12 carrying the row of cutters driven thereby.

A belt conveyor 30 extends over a sprocket 31 at either longitudinal end of the machine, such sprockets being fixed to shafts 32 mounted in journal blocks 33 on the supports 15. The inner side of the belt is toothed as indicated at 34 in Fig. 4 to mesh with the teeth of the sprockets 31 for driving engagement, and on the opposite or outer side of the belt 34 uprights 35 are provided at equally spaced apart intervals to carry bricks to be cleaned.

A motor 36, shown at the rear of the machine in Fig. 1, drives the rear sprocket 31 by means of a belt drive connection 37.

The bricks to be cleaned are individually placed on the belt forward of each upright 35 in the direction of travel, the bricks being of the type as those removed from previous structures so that mortar and the like is found on all or most of the sides thereof. As a brick enters or leaves the frame 11 its side faces come into contact with guide plates 38 which are arcuate in vertical cross-section as shown in Fig. 2 and curved outwardly to guide the brick into contact with the first opposed pair of cutters 20.

Since the brick side faces have irregularities, as mortar deposits thereon, the guides must yield from an initial position of closest adjacency between opposed guides. As shown in detail in Fig. 3 each guide 38 has a sleeve 39 connected thereto to slide upon a cylinder 40 having closed ends 41, 41', such cylinder being fixed to the frame 11. A bolt 42, having a countersink head 43 to fit within a countersunk opening in the guide plate 38, extends through openings 44', 44, in the cylinder

ends 41', 41, respectively, and has a nut 45 on its threaded end. A spring 46 surrounds the bolt 42 and bears at its outer end against the cylinder end 41' and at its inner end against the outer face of the guide plate 38 and urges the guide plate 38 apart from the frame 11 to the limits determined by the distance between the bolt head 43 and the nut 45.

Thus if a brick entering between the opposed guide plates is wider than an initially selected position of closest adjacency between opposed guides, the guide plates 38 and bolts 42 will be pushed apart so that the guide plates 38 compress the springs 46 as the sleeves 39 slide upon the cylinders 40. As this occurs the bolts 42 will simply move outwardly so that the nuts 45 thereon are moved out of contact with the cylinder ends 41. Then as the irregularities, as mortar, on the side faces of the brick, move out of contact with the guides 38, the springs 46 may urge the guides 38 and therewith the bolts 42 inwardly until the nuts 45 contact the cylinder ends 41.

As the bricks continue and are brought into contact with the first pair of cutters 20, these cutters are found to be in initial closest adjacency and with the innermost points of their periphery in alignment with the innermost surfaces of the guides 38. This is accomplished for each frame member 12 by means of yieldable arrangements best seen in Fig. 6. A sleeve 47 is fixed to the outer face of the frame 11. A cylinder 48 is fixed to the frame member 12 and is slidable within the sleeve 47 and has a closed inner end 49 to fit within a receiving recess in the outer surface of the frame 11. Bores 50 and 51 are provided in the frame 11 and cylinder end 49 respectively and a bolt 52 extends therethrough and into the cylinder 48.

A spring 53 surrounds the bolt 52 and bears at its inner end against the outer face of the cylinder end 49 and at its outer end against a washer 54 on the bolt, which is defined in position by a nut 55 on the threaded end of the bolt. The distance the cylinders 48 extend within the frame members 12 thus determines the initial distance apart of opposed pairs of cutters 20 carried by such frame members 12, since the bolt heads 56 bear against the fixed frame 11 while the cylinder ends 49 are fixed with relation to the frame members 12.

When a brick having irregularities as mortar deposits thereon passes between a pair of cutters, so that the brick is wider than the initial distance of closest adjacency between the cutters, the cutters are spread so that their shafts 19 and bottom journals 18' move outwardly in their respective slots 17 and 17' in the frame 11, and as the shaft journals are fixed to the frame members 12, they move in correspondence carrying therewith the cylinders 48 so that the springs 53 are compressed, the cylinder ends 49 departing and moving outwardly from contact with the frame 11 whereas the washers 54 are held stationary by the bearing of the bolt heads 56 against the fixedly positioned frame 11.

In this manner the bricks may pass through the pairs of cutters 20 while in passage through each pair the mortar on the sides thereof is progressively removed, the springs 53 being of such tension as to urge the frame members 12 forcefully inwardly toward initial position whereby the cutters 20 are urged into forceful rotating cutting or abrading contact with the side faces of the brick. Such a brick 55 is shown in Fig. 2 in passage through the last pair of cutters 20 which takes the final cleaning pass at the mortar on the side faces of the brick.

The length of the straight face portion of the guides 38 is such in relation to the inlet and outlet guide proximity to the first and last pair of cutters, respectively, and in relation to the spacing between conveyor belt uprights 35, that the bricks in passage cannot be deflected off of the conveyor belt 30 but rather are maintained in substantial coaxial alignment with the longitudinal axis of the machine during progress.

This alignment is augmented and the bricks are pre-

vented from being deflected upwardly by a hold-down plate 57 which is urged downwardly against the tops of the bricks by a spring 62, the plate 57 being held in operative position as shown in Figs. 1 and 4 of bolts 58 spaced apart along the longitudinal axis of the machine, each bolt 58 having a countersink head 59 to fit in a corresponding countersunk opening in the plate 57, such bolt extending through a bolt hole in the top of the frame 11 and having a nut 60 on the threaded end thereof to bear on the top of the frame as the spring 62, surrounding the shank of the bolt urges upwardly against a washer 61 to force the washer against the under surface of the top of the frame, and urges downwardly to force the plate 57 against the countersink head of the bolt 58. The end of the plate 57 obviously should be curved upwardly at the entrance end of the machine, and also at the discharge end thereof.

In order more readily to accommodate bricks of various dimensions belt conveyors 30 having uprights 35 spaced at various equal distances apart may be used interchangeably. Also adjustment is provided for manually moving the frame members 11 to new ranges of cutter spacing. This can be done by means of a crank 63 on a shaft 64 which passes through an opening in each frame member 12 to thread into a boss 65 located centrally on each side of the frame 11. Such shaft has a normally floating flange 67 thereon and also a stop collar 66 floats on the shaft which is threaded into the boss 65. Then, when adjustment is desired, a through pin 68 is inserted to fixedly position the collar 66 on the shaft to bear against the inner face of the frame 12, while the flange 67 is pinned to the shaft by a pin 67' to bear upon the outer face. After adjustment of the frame 11 has been made by twining the crank 63, the pins 67' and 68 may be removed from the respective flange 67 and collar 66 so that the frame 12 may go through its normal, automatically adjustable movement with relation to the frame 11.

Then when the crank 63 is turned to rotate the shaft 64 in direction to unthread the shaft from the boss 65 the frame member 12 is drawn outwardly. As soon as a new dimension of brick starts moving through the frame 11 between the rows of cutters 20 the pin 68 may be removed and the crank 63 turned to completely unthread the shaft 64 from the boss 65.

In the case of adjusting the guides 38 to new dimensions of brick it is only necessary to turn the nut 45 in one direction to move the guides outwardly and in the other direction to move the guides inwardly, as desired.

Whereas in Fig. 6 the sleeve 48 is shown welded to the frame member 12 at 69, optionally the outer ends of the sleeves 48 may be threaded as shown in Fig. 9 to extend through a threaded opening in the frame member and two lock nuts 71, 72 may be installed on the outer part of each threaded end one to bear against the frame member 12 and the other to bear against the first lock nut. Then adjustment can be made after disengaging the pins 67 and 68 from the collar 66 and flange 67, respectively, in which case the shaft 64 may be left in threaded engagement in the boss 65. This may be done by loosening the outer lock nut 72 from contact with the inner lock nut 71 and then turning the inner lock nut 71 in direction to move the sleeve 48 back to seat in the recess in the frame 11. After this the outer lock nut 72 is threaded in direction to again lock against the inner lock nut.

The machine thus provided is of sturdy construction, admits of ready adjustment, is easily accessible for repair, the drive members are mounted for easy maintenance, and a fine speed control can be obtained, as by means of the variable speed transmission box 27 for the cutter drive motors, or as by providing a variable speed control for the conveyor drive motor 36.

The invention is not limited to the embodiment herein described, but a wide range of other variations, em-

bodiments, and modifications are also included as such may fall within the broad spirit of the invention and within the broad scope of interpretation claimed and merited for the appended claims.

What is claimed is:

1. A brick cleaning machine comprising a fixed frame of rectangular cross-section having transversely spaced apart rows of slots in the top and bottom thereof with the rows extending longitudinally of said frame, U-shaped frame members spaced apart and slidable transversely on opposite sides of said frame, a longitudinally extending row of cutters in each frame member on upright shafts including lower end journals in said slots and fixed to said frame member, a driven endless conveyor mounted to convey bricks in succession between said rows of cutters, said frame members each carrying a driven transmission for driving its cutters and the cutters of the opposed rows being driven oppositely in clockwise and counter-clockwise direction to oppose bricks conveyed therebetween and through said frame, means yieldably positioning said frame members to position said cutters with rows spaced in closest adjacency, opposed guide means at the entrance and exit into said frame and yieldably carried by said frame for spacing in initial alignment with the innermost points of the cutters of said opposed rows, said cutters cleaning opposite sides of the bricks thus conveyed as said guides receive the bricks therethrough with yieldability with relation to said frame, and said bricks passing through said cutter rows to be received therebetween as said frame members move with yieldability with relation to said frame and said cutter shafts move in said slots.

2. A brick cleaning machine comprising a fixed, rectangular cross-section frame, opposed guide means at the longitudinal ends thereof transversely spaced apart from opposite sides thereof and yieldably supported by said frame to be yieldably urged transversely outwardly by the bricks to be cleaned from an initial minimum distance between said opposed guide means, opposed transversely spaced apart U cross-section frame members guidably, slidably supported on said frame, a cooperative means guidably, yieldably connecting each frame member and said frame, said cooperative means being adapted to align said frame members initially with said guide members and to permit said frame members to be yieldably urged transversely outwardly from an initial minimum distance between frame members, each frame member carrying a longitudinal row of cutters on upright shafts extending through slots in said frame with journals fixed to said frame member and also carrying power drive means to drive said cutters, and driven belt conveyor means adapted to transfer bricks in succession through said frame between said cutters to have opposed sides thereof cleaned by said cutters, said guide means yieldably guiding brick inlet and exit from said frame.

3. A brick cleaning machine comprising a fixed frame, transversely spaced apart yieldably positionable guide

means at the longitudinal ends thereof and mounted thereon to be yieldably urged transversely outwardly by the bricks to be cleaned, opposed transversely spaced apart frame members guidably, slidably supported on said frame, a cooperative means guidably, yieldably connecting each frame member and said frame, said cooperative means being adapted to align said frame members initially with said guide members and to permit said frame members to be yieldably urged transversely outwardly from an initial minimum distance between said frame members, each frame member carrying a longitudinal row of cutters on upright shafts extending through slots in said frame with journals fixed to said frame member and each frame member also carrying power drive means to drive said cutters, and driven belt conveyor means adapted to transfer bricks in succession through said frame between said cutter rows to have the opposed sides thereof cleaned by said cutters.

4. A brick cleaning machine as claimed in claim 3 which includes crank means threadable with relation to said frame and removable means connectable to said crank whereby upon crank rotation relative translation is produced between said frame and said frame members.

5. A brick cleaning machine as claimed in claim 3 which includes means for adjusting initial guide position.

6. A brick cleaning machine as claimed in claim 3 which includes support means for said frame extending through slots in said frame members.

7. A brick cleaning machine comprising a fixed frame, opposed transversely spaced apart frame members supported for guided transverse movement relative to the longitudinal axis of said frame on said frame, cooperative means guidably, yieldably connecting each frame member and said frame to permit said frame members to be yieldably urged transversely outwardly from an initial minimum distance between said frame members, each frame member carrying a longitudinal row of cutters on upright shafts extending through slots in said frame with journals fixed to said frame member, and each frame also carrying power drive means to drive said cutters, and conveyor means adapted to transfer bricks in succession through said frame between said cutter rows to have the opposed sides thereof cleaned by said cutters as said frame members guidably, yieldably retract or advance transversely responsive to respective variations in brick thicknesses as bricks are moved through said machine to be cleaned.

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