

March 12, 1963

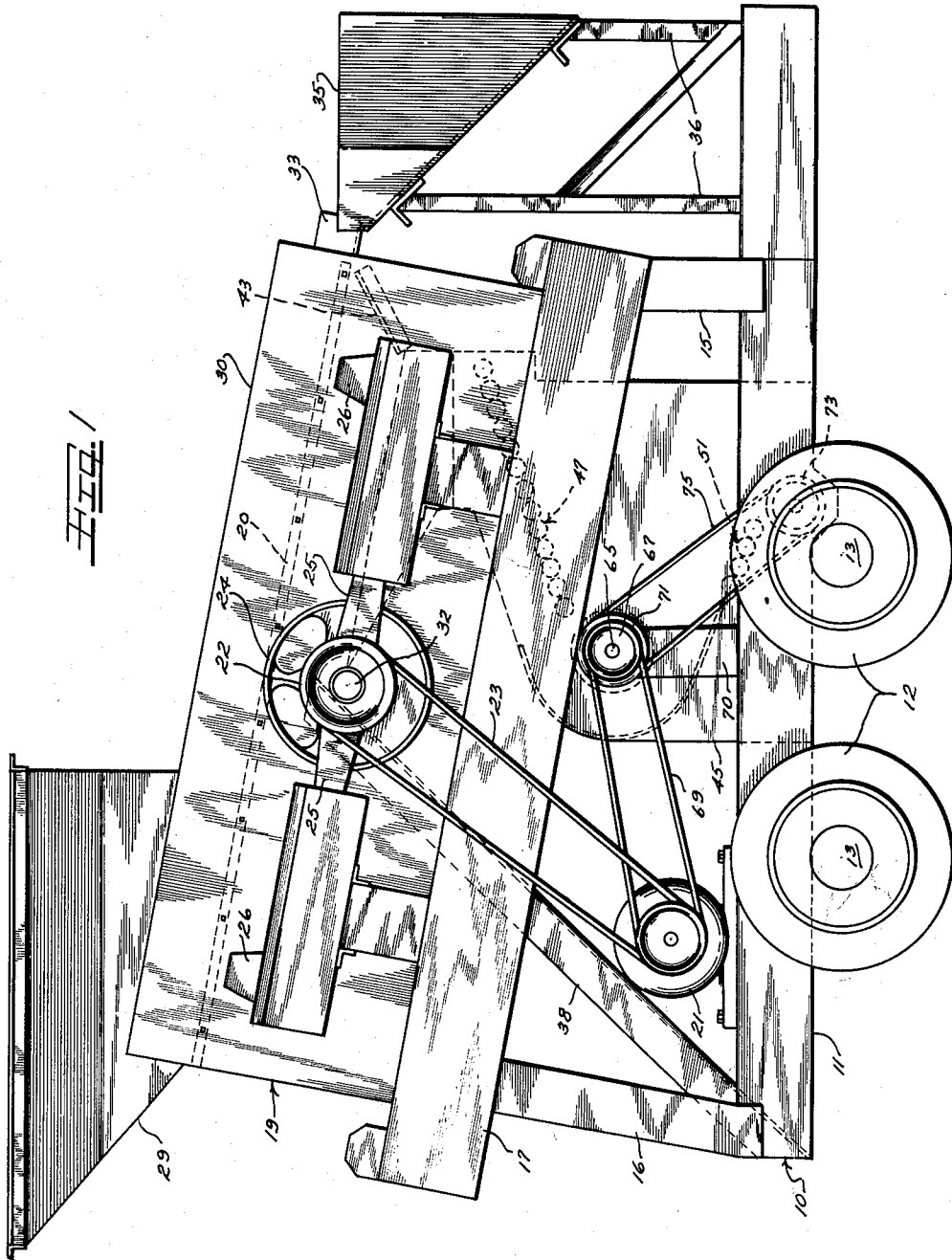
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3,080,860

BRICK CLEANING MACHINE

Filed Aug. 26, 1960

4 Sheets-Sheet 1



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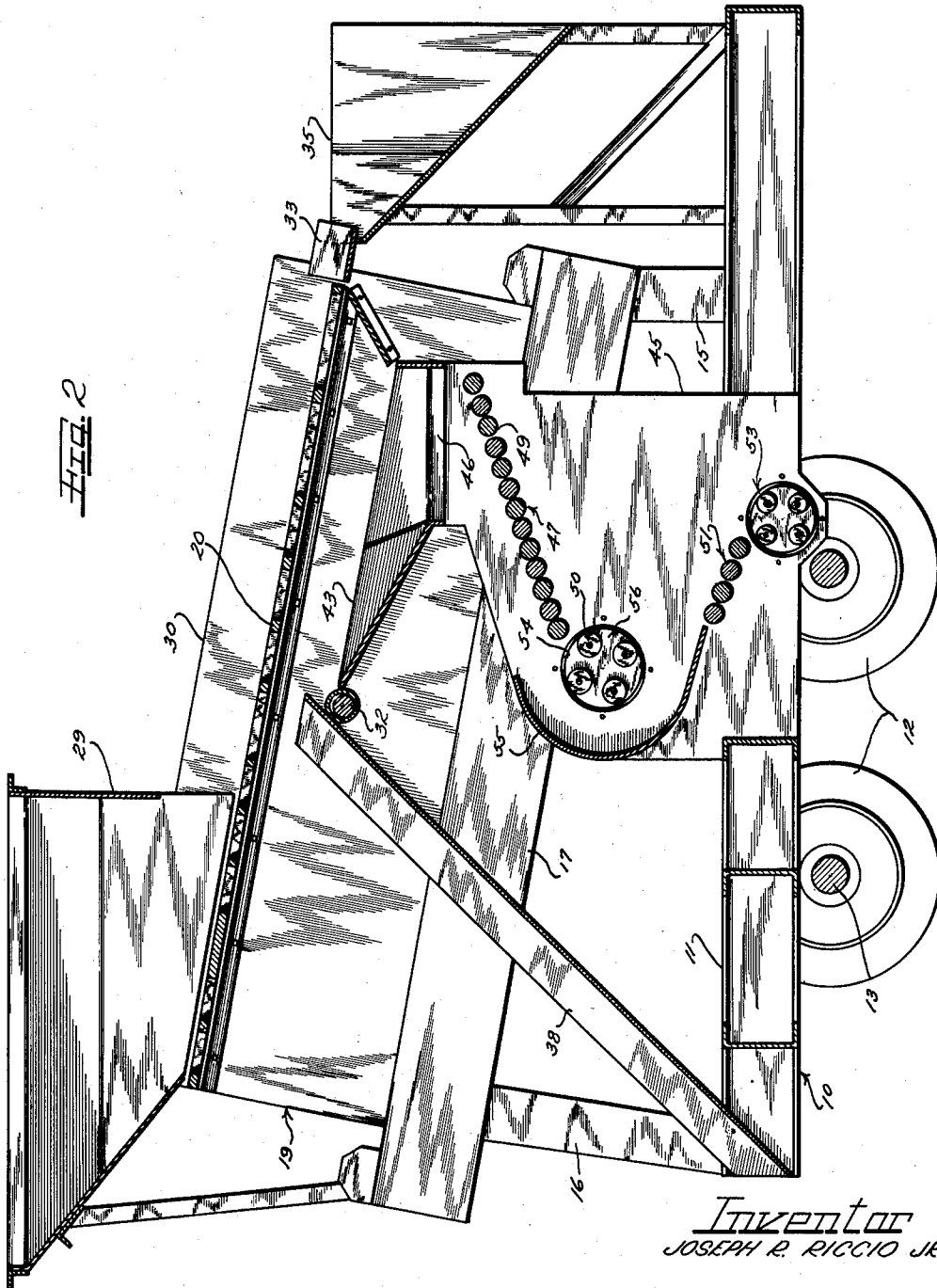
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FIG. 3

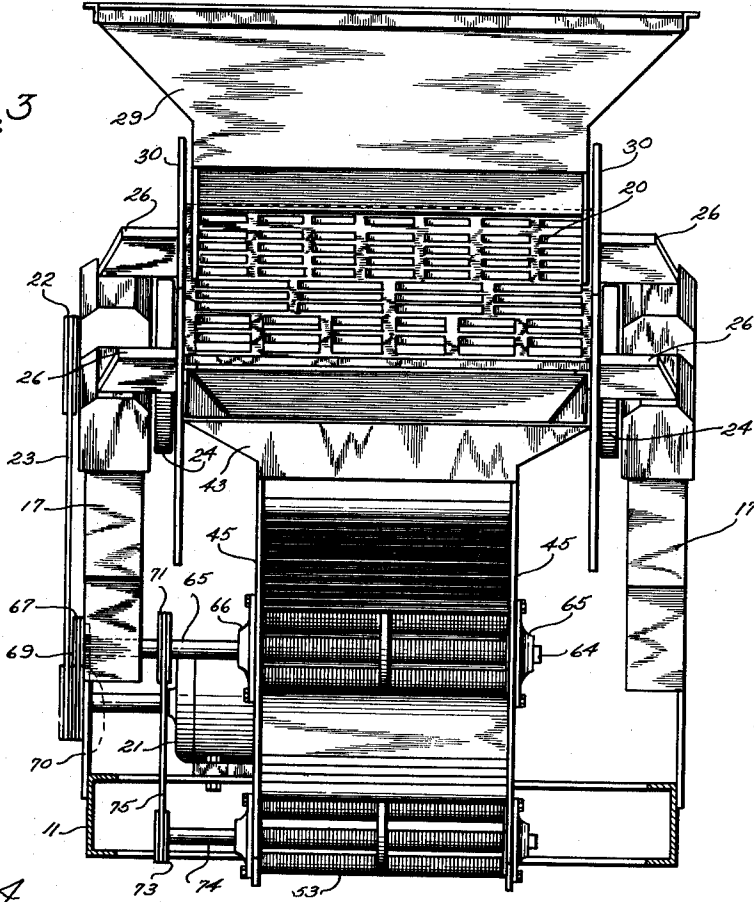
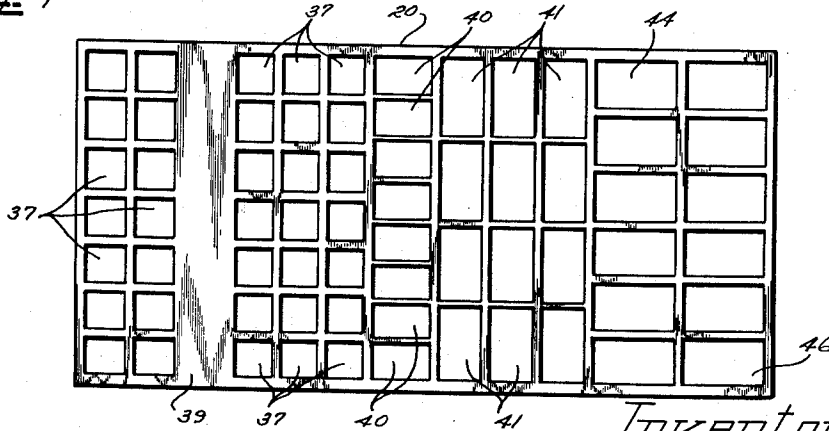


FIG. 4



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Fig. 5

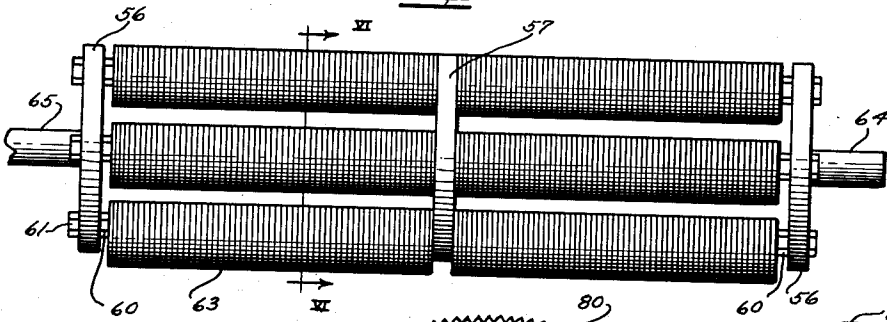


Fig. 7

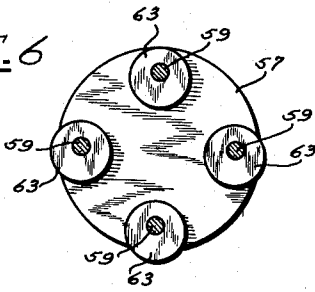


Fig. 8

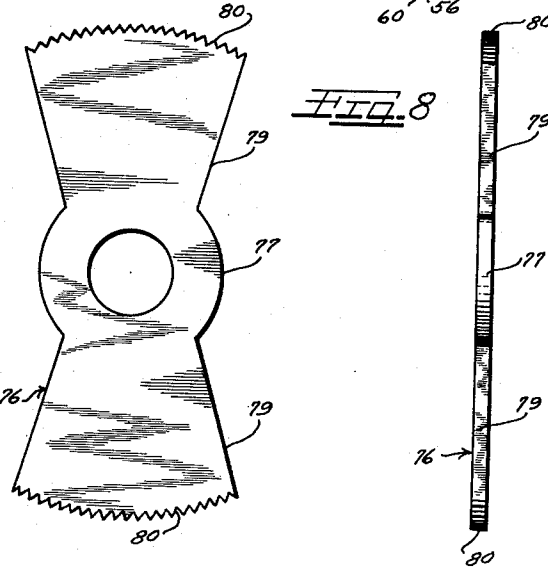
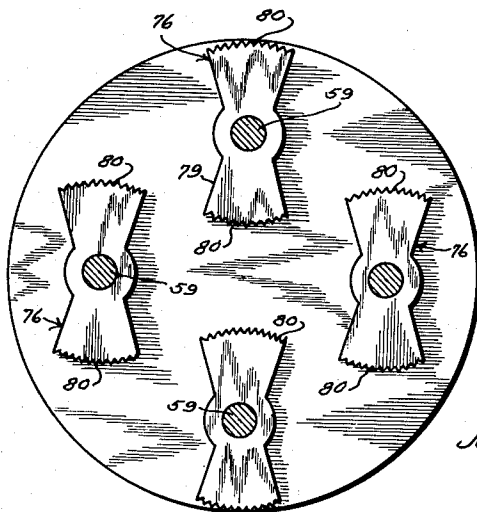


Fig. 9



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**BRICK CLEANING MACHINE**

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8 Claims. (Cl. 125-26)

This invention relates to improvements in machines for cleaning bricks and the like.

A principal object of the invention is to provide a novel and improved machine particularly adapted for cleaning used bricks and arranged with a view toward utmost efficiency in operation and simplicity and compactness in construction.

A further object of the invention is to provide a simplified machine for cleaning mortar from bricks at the site of a building in the process of being torn down, discarding broken and oversize bricks and cleaning bricks of a selected size, all while the bricks move by gravity for discharge into a collector or the like.

Still another object of the invention is to provide an improved form of brick cleaning machine utilizing oppositely inclined chute structures, one of which is in material receiving relation with respect to the other, guiding the bricks to a discharge point by gravity and providing rotary impact cleaners in association with the chute structures for cleaning mortar from the bricks as they pass along the chute structures by gravity.

A still further object of the invention is to provide an improved form of brick cleaning apparatus utilizing an inclined vibrating screen for separating the over and undersize bricks from the bricks to be cleaned, and forming a feeder for feeding the bricks to a series of oppositely inclined chute structures having impact cleaners in association therewith, for cleaning the bricks as they drop by gravity along the inclined chute structures.

Still another object of the invention is to provide an improved form of sizing screen having a mesh through which the broken and undersize bricks may fall at the receiving end thereof, and having a rectangular mesh toward the discharge end thereof having a series of elongated openings of substantially brick size extending transversely of the screen for a portion of the length thereof, and another series of elongated openings of substantially brick size extending longitudinally of the screen for another portion of the length thereof.

A still further object of the invention is to provide an improved form of rotary impact cleaner for cleaning mortar from bricks and the like.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a view in side elevation of a brick cleaning machine constructed in accordance with the invention;

FIGURE 2 is a vertical sectional view taken longitudinally through the machine shown in FIG. 1;

FIGURE 3 is an end view of the machine shown in FIGURE 1 looking at the machine from the discharge end thereof with the wheels and refuse discharge chute removed and showing the base frame in transverse section;

FIGURE 4 is a top plan view of the screen plate;

FIGURE 5 is an enlarged detailed view of one of the rotary impact cleaners, with the drive shaft therefor broken away;

FIGURE 6 is a sectional view taken substantially along line VI-VI of FIGURE 5;

FIGURE 7 is a view of a modified form of impact member that may be used on the rotary cleaner shown in FIGURE 5;

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FIGURE 8 is an end view of the impact member shown in FIGURE 7; and

FIGURE 9 is a transverse sectional view taken through a rotary impact cleaner utilizing the impact members shown in FIGURES 7 and 8.

In the embodiment of the invention illustrated in the drawings, the brick cleaning machine is generally shown in FIGURES 1, 2 and 3, as comprising a truck 10, which may be a trailer truck and which includes a generally rectangular base frame 11 mounted on wheels 12 and axles 13. The base frame 11 has parallel spaced upright legs 15 extending upwardly from the forward end portion thereof and upright legs 16 extending upwardly from the rear end thereof and inclined inwardly to extend at right angles to longitudinally extending support beams 17 for a vibrating screen structure 19. The support beams 17 are mounted at their forward and rear ends on the legs 15 and 16 and are inclined at the angle of inclination of a screen plate 20 for the vibrating screen 19.

The vibrating screen 19 may be of any well known form and is herein shown as being a commercial form of screen known as a "Ty-Rock Screen" and illustrated in Catalog 68 of the W. S. Tyler Company of Cleveland, Ohio, so need not be shown or described in detail herein. The screen is generally shown as being driven in a vibratory manner by a motor 21 on the base frame 11. An endless belt 23 drives a pulley 22 from the motor 21. Said pulley is mounted on a shaft 32 suitably mounted in side plates 30 of the vibrating screen structure. The shaft 32 in turn drives counterweighted flywheels 24 on opposite sides of the screen and vibrates the screen through oppositely extending links 25 mounted in yieldable mountings (not shown) connected with the side plates 30 for the screen as by connectors 26. The flywheels 24 are so counterweighted and the drive to said flywheels is such as to vibrate said screen to tend to progress material from the lower discharge to the upper receiving end of said screen. The angle of inclination of the screen is such, however, that the bricks will move downwardly along the screen retarded by the conveying action of the screen.

At the upper or receiving end of the screen 19 is a hopper 29 suitably supported on the side frame plates 30 for the screen and guiding and storing brick on the screen plate 20 extending between the side plates 30.

The side plates 30 have a discharge lip 33 mounted therebetween at the discharge end thereof, for directing oversize material passing along the screen plate 20 to discharge onto a discharge chute 35, shown as being mounted on the base frame 11 in vertically spaced relation with respect thereto on legs 36.

A discharge chute 38 for undersize refuse, such as mortar, brick chips and quarter or half bricks, is mounted between the side plates 30 and extends angularly downwardly from the screen at a relatively sharp angle, to the rear end portion of the base frame 11. Said refuse chute may discharge directly onto the ground or into a conveyor or any other collecting means.

The screen plate 20 is shown in FIGURE 4 as being a rectangular mesh screen plate having a series of square openings 37 therein beneath the hopper 29 and separated by a flat surface 39. If desired, the openings 37 on one side of the flat surface 39 may be larger than the openings 37 on the opposite side of said plate surface. The openings 37 are of sufficient size to accommodate quarter and half bricks to pass therethrough, as well as any debris and broken portions of bricks that may be discharged into the hopper 29. Beyond the openings 37 are a series of oblong openings 40. The longest dimensions of said openings extend lengthwise of the screen plate. The openings 40 are of sufficient size to accommodate chipped or undersize brick passing over the open-

ings 37, to pass therethrough for discharge onto the discharge chute 38.

Spaced forwardly of the oblong openings 40 toward the discharge end of the screen is a series of oblong openings 41 having their longest dimensions extending transversely of the screen plate. The openings 41 are of sufficient size to accommodate a full size brick to drop therethrough onto a discharge hopper 43 spaced beneath the openings 41 between the side plates 30 and receiving and storing the standard size bricks passing through the screen and feeding the bricks for cleaning.

In advance of the openings 41 towards the discharge end of the screen plate 20 is a series of rectangular openings 44, oblong in shape, like the openings 41, with their longest dimensions extending longitudinally of the screen plate, to accommodate any full size brick which may move over the openings 41 to pass therethrough onto the hopper 43.

The hopper 43, as shown in FIGURE 2, is mounted on the upper end portions of parallel spaced side plates 45 spaced inwardly of the side plates 30 and extending upwardly from the base frame 11, on which said side plates 45 are suitably mounted. As shown in FIGURE 2, the hopper 43 has a reduced area discharge end portion 46 for discharging the bricks onto a chute structure 47 herein shown as being a roller chute structure having a plurality of rollers 49 rotatably mounted at their ends in the side plates 45, for free rotation with respect thereto in an inclined plane, inclined downwardly from the discharge end portion 46. The roller chute structure 47 extends beneath and across the discharge end portion 46 of the hopper 43 and terminates at a rotary impact cleaner 50 at the discharge end of said roller chute structure. Beneath the roller chute structure 47 and inclined downwardly toward the opposite side of the machine from the roller chute structure 47, is a roller chute structure 51 terminating at a rotary impact cleaner 53. The roller chute structures 47 and 51 are herein shown as being inclined at the same angle, although facing in opposite directions. They may, however, be inclined at different angles with respect to each other, if desired. The bricks are inverted and the direction of travel of the bricks is changed from the roller chute structure 47 and rotary impact cleaner 50 to pass to the roller chute structure 51, by an arcuate deflector plate 55, extending between the side plates 45.

The rotary impact cleaner 50 is shown in FIGURES 2, 3, 5 and 6 as comprising two outer disks 56 rotatably mounted in openings 54 in the side plates 45, and an intermediate disk 57 spaced between said outer disks and connected thereto by a series of tie rods 59. As shown in FIGURE 5, the tie rods 59 have nuts 60 abutting the inner sides of the outer disks 56 and have nuts 61 threaded on the outer ends thereof for securing the disks 56 to said tie rods.

Freely mounted on the tie rods 59 are a series of impact members 63. As shown in FIGURE 6, the impact members 63 are in the form of eccentrically mounted washers, although they may be concentrically mounted, if desired, as shown in FIGURE 2. The washers 63 are loosely mounted on the tie rods 59 to accommodate free rotation of said impact members with respect to said tie rods, to enable the impact members 63 to exert a hammering action on the bricks passing along the discharge end of the roller chute structure 47.

The end plate 56 opposite the motor 21 has a stub shaft 64 extending outwardly therefrom, suitably journaled in a bearing support 65 secured to the outer side of the side plate 45 and closing the opening 54 thereof. The opposite end plate 56 has a shaft 65 extending outwardly therefrom and journaled in a bearing support 66 suitably secured to the outer side of the opposite side plate 45 and closing the opening 54 thereof. The shaft 65 extends outwardly of the end plate 45 to the outer end portion of the base frame 11 and has a pulley 67 on its outer

end, driven from the motor 21 through an endless belt 69. The shaft 65 is suitably journaled inwardly of the pulley 67 on a bearing support 70, projecting upwardly from the base frame 11. Keyed or otherwise secured to the shaft 65, inwardly of the bearing support 70 is a pulley 71, driving a pulley 73 on the outer end of a shaft 74, for driving the lower rotary impact cleaner 53. An endless belt 75 is trained about the pulleys 71 and 73. The lower rotary impact cleaner 53 is like the upper rotary impact cleaner 50, and is rotatably journaled in the side plates 45 in the same manner as the upper impact cleaner 50, so need not herein be described further.

In FIGURES 7, 8 and 9, I have shown a modified form of impact member 76, which may be substituted for the impact members 63. The impact members 76 are shown as having a central hub portion 77, from which extend sectors 79 having serrated circumferential peripheries 80. The impact members 76 like impact members 63 may be mounted on the tie rods 59 between the plates 56 and 57 for free rotation about said tie rods to exert a hammering action on the mortar on the bricks passing over the impact cleaner.

It should here be understood that the impact members 63 or 76 may be separated by separators such as washers (not shown) if desired, and that they may be of various other forms than the forms specifically shown herein, the form and arrangement of impact members selected being dependent upon the cleaning operation required.

In operation of the machine, used bricks may be discharged into the hopper 29 by a chute, conveyor, or power shovel or the like and fed onto the screen plate 20 of the vibrating screen 19, vibrating in a direction tending to convey the bricks from the discharge to the receiving end thereof, and thereby retarding the travel of the bricks along the screen plate sufficiently to accommodate the bricks to orient themselves to fall through the openings 41 and 44 in the screen plate. The debris and half and undersize or fragmentary and chipped bricks not suitable for reuse will pass through the openings 37 and 40 onto the refuse chute 38, where they may be discharged onto the ground or onto a conveyor or other suitable collector. The oversize bricks will pass downwardly along the screen over the openings 41 and 44 onto the discharge chute 35, which may discharge the bricks onto the ground or onto a suitable conveyor or collector.

The bricks suitable for reuse, however, will pass through the openings 41 and 44 and drop into the hopper 43 for discharge through the discharge portion 46 thereof onto the roller chute or conveyor 47, along which the bricks will pass by gravity over the rotary impact cleaner 50. During passage of the bricks over the rotary impact cleaner 53, they are guided by the deflector plate 57 to pass around said cleaner and accommodate the impact members 63 to pass upwardly into the planes of travel of the bricks, into engagement with the mortar on the bricks with an impact action, to clean the mortar therefrom. The deflector 55 will change the direction of travel of the bricks as they pass about the rotary impact cleaner 50 and will invert the bricks to move downwardly along the inclined rotary chute 51 to the rotary impact cleaner 53, for cleaning of the opposite faces thereof from the faces cleaned by the rotary impact cleaner 50.

It should be understood that while I have shown one angle of inclination of the roller chutes 47 and 51, that the angle of inclination of said roller chutes may be varied for different cleaning conditions and said roller chutes may be adjusted by changing the angular relation of the side plates 45 with respect to the base frame 11 in any manner well known to those skilled in the art, and no part of the present invention so not herein shown or described.

While I have herein shown and described one form in which my invention may be embodied, it should be understood that various modifications and variations in the invention may be attained without departing from

the spirit and scope of the novel concepts of the invention as defined by the claims appended hereto.

I claim as my invention:

1. In an apparatus for cleaning bricks and the like, a vibrating screen having a receiving end at one end thereof and a discharge end at the opposite end thereof and having a mesh increasing in size from the receiving to the discharge end thereof, to accommodate debris and undersize bricks to fall through said screen at the receiving end portion of said screen and to accommodate full size bricks to fall through said screen toward the discharge end of said screen, inclined chute means spaced beneath the discharge end portion of said screen, second inclined chute means in material receiving relation with respect to said first inclined chute means extending at an opposite angle of inclination than the angle of inclination of said first mentioned inclined chute means, and rotary impact cleaners in association with said chute means for cleaning opposite sides of the bricks passing therealong.

2. In an apparatus for cleaning bricks and the like, an inclined vibrating screen having an upper receiving end and a lower discharge end, inclined chute means beneath the discharge end portion of said screen and extending from the discharge end portion of said screen in one direction, other inclined chute means beneath said first mentioned inclined chute means and extending in an opposite direction from said first mentioned inclined chute means, means guiding the bricks from one inclined chute means to the other and turning the bricks over as they pass from one chute means to the other, and rotary impact cleaners in association with said chute means for cleaning opposite faces of the bricks passing therealong.

3. In an apparatus for cleaning bricks and the like, an inclined vibrating screen, means for driving said screen to vibrate in a manner to tend to progress material from the lower to the upper end thereof, first inclined chute means beneath said screen extending therealong in one direction, second inclined chute means spaced beneath said first inclined chute means and extending along said first mentioned inclined chute means at an opposite angle of inclination than the angle of inclination of said first inclined chute means, rotary impact cleaners in association with said impact chute means, and a direction changing deflector changing the direction of travel of the bricks as they pass from said first inclined chute means to said second inclined chute means and turning the bricks over as they pass from one chute means to the other.

4. In an apparatus for cleaning bricks and the like, an inclined vibrating screen having a receiving end at the upper end thereof, inclined chute means beneath the lower end of said screen and extending therealong in a direction toward the receiving end of said screen, second inclined chute means spaced beneath said first mentioned inclined chute means and extending therealong at an opposite angle of inclination than the angle of inclination of said first mentioned inclined chute means, a rotary impact cleaner at the discharge end of said first mentioned inclined chute means for cleaning the mortar from the bricks as they pass thereover, a second rotary impact cleaner at the discharge end of said second inclined chute means for cleaning the mortar from the opposite faces of the bricks than the faces cleaned by said first mentioned rotary impact cleaner, and a direction changing deflector spaced from said first mentioned rotary impact cleaner and retaining the bricks thereto as they pass thereby and turning the bricks over and guiding the bricks to said second chute means for cleaning the opposite faces of the bricks by said second impact cleaner.

5. In an apparatus for cleaning bricks and the like, an inclined vibrating screen having an upper receiving end and a lower discharge end, a first inclined chute means extending along said screen from the discharge end thereof and spaced therebeneath and inclined downwardly with

respect to said screen, said inclined chute means having a series of freely rotatable rollers forming the bottom thereof, second inclined chute means having a series of transversely extending freely rotatable rollers forming the bottom thereof, said second inclined chute means being spaced beneath said first inclined chute means and having a receiving end adjacent the discharge end of said first inclined chute means and extending in an opposite direction from said first mentioned inclined chute means, a rotary impact cleaner at the termination of said first inclined chute means having impact members rotatably moving into and out of the general plane of said inclined chute means, a rotary impact cleaner at the termination of said second mentioned inclined chute means and having impact members rotatably moving into and out of the general plane of said inclined chute means, and a direction changing deflector spaced from said first mentioned impact cleaner and retaining the bricks thereto as they pass thereabout and turning the bricks over and discharging the bricks onto said second mentioned chute means, for cleaning the opposite faces of the bricks from the faces cleaned by said first mentioned inclined chute means.

6. In an apparatus for cleaning bricks and the like, a frame, an inclined vibrating screen mounted on said frame in vertically spaced relation with respect thereto and extending therealong and having an upper receiving end and a lower discharge end, said screen having a rectangular mesh increasing in size from the upper to the lower end thereof, inclined roller chute means spaced beneath the discharge end portion of said screen and inclined downwardly with respect to said screen, a second inclined roller chute means spaced beneath said first mentioned inclined roller chute means and having a receiving end beneath but adjacent the discharge end of said first mentioned roller chute means and extending at an opposite angle of inclination than the angle of inclination of said first mentioned roller chute means, rotary impact cleaners at the ends of said roller chute means having a series of rotatable impact members movable into and out of the general planes of said roller chute means, and power means for rotatably driving said rotatable impact cleaners.

7. In an apparatus for cleaning bricks and the like, a mobile base frame, an inclined vibrating screen mounted on said base frame in vertically spaced relation with respect thereto and extending therealong, said screen having a mesh increasing in size from the upper to the lower end thereof, a chute disposed beneath said screen beneath the portion thereof of smaller mesh, for guiding the debris for discharge beyond said frame, a second chute in advance of the discharge end of said screen for guiding oversize debris for discharge beyond said screen, an inclined roller chute mounted on said frame beneath the portion of said screen of larger mesh and inclined downwardly with respect thereto and extending therealong, a second roller chute spaced beneath said first mentioned roller chute and having a receiving end beneath the discharge end of said first mentioned roller chute and inclined toward the ground and extending in an opposite direction from said first mentioned roller chute, impact cleaners at the discharge ends of said roller chutes and comprising spaced rotatable power driven disks having a series of impact members mounted thereon in radially spaced relation with respect to the axes of rotation of said disks and moving into and out of the planes of said roller chutes, and a direction changing deflector spaced from the discharge end of said first mentioned impact cleaner and extending beneath said impact cleaner and turning the bricks over and depositing the inverted bricks onto said second mentioned roller chute for cleaning the opposite faces of the bricks from the faces cleaned by said first mentioned roller chute.

8. In an apparatus for cleaning bricks and the like, a mobile base frame, an inclined vibrating screen mounted on and extending along said base frame in vertically spaced relation with respect thereto and vibrating in a

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direction to tend to move material from the lower to the upper end thereof, said screen including a screen plate having a square mesh adjacent the upper end thereof, a refuse chute beneath said square mesh, said screen having an oblong mesh following said square mesh having a series of openings larger than the size of a brick, a hopper beneath said screen plate beneath the oblong openings thereof, two inclined roller chutes in association with said hopper, one extending along said frame toward the rear end thereof and being inclined downwardly with respect to said hopper, the other being spaced beneath said first mentioned chute in material receiving relation with respect thereto and being inclined downwardly toward the forward end of said frame, a deflector changing the direction of travel of the bricks from one roller chute to the other and inverting the bricks as they pass to said second mentioned roller chute, and rotary impact cleaners in association with said roller chutes and having a plurality of impact members mounted thereon and extending across

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said roller chutes and moving into and out of the planes of said roller chutes to clean mortar from the bricks thereon.

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