Oct. 20, 1942. A. W. KIEHN 2,299,326

BUTTERING MACHINE

Filed June 26, 1941 6 Sheets-Sheet 1

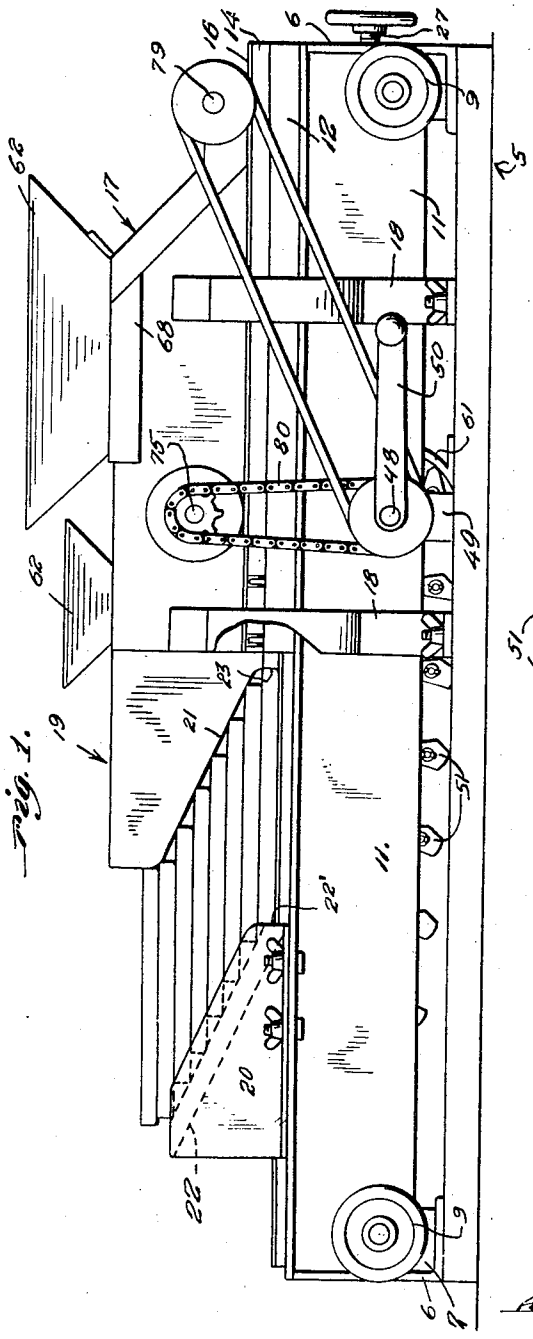


Fig. 1.

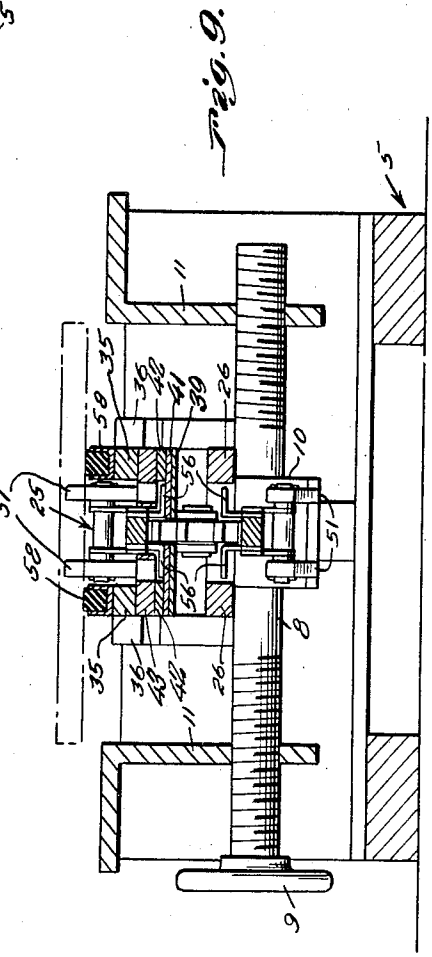


Fig. 9.

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BUTTERING MACHINE

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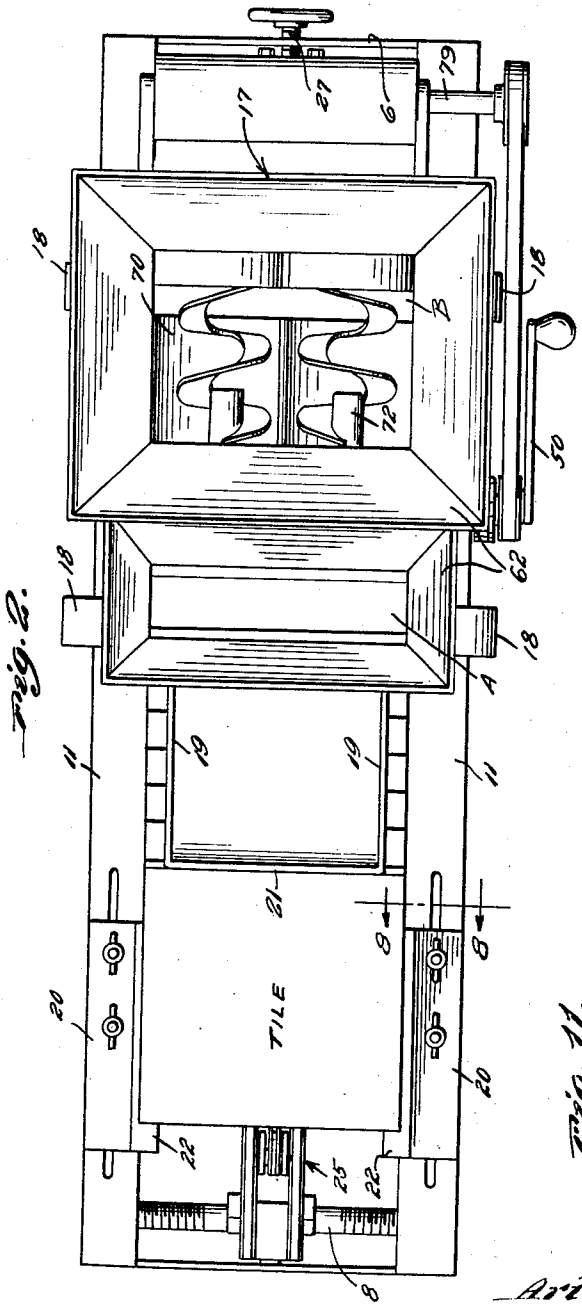


Fig. 2.

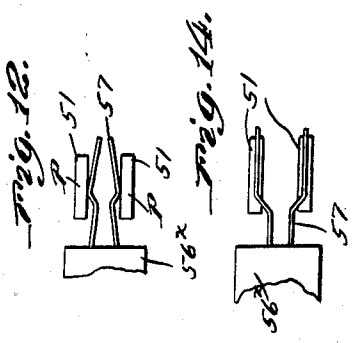


Fig. 12.

Fig. 14.

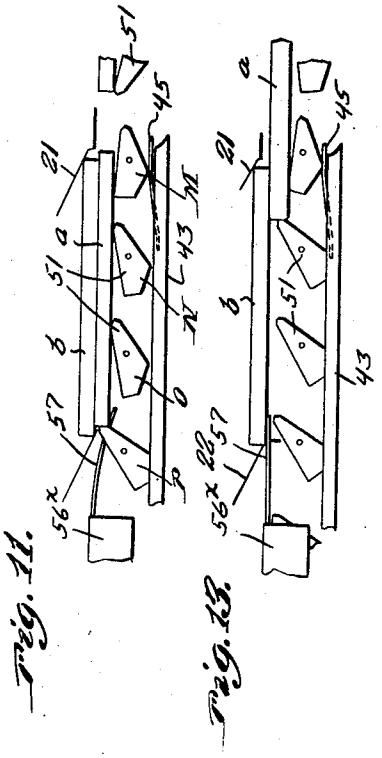


Fig. 11.

Fig. 13.

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BUTTERING MACHINE

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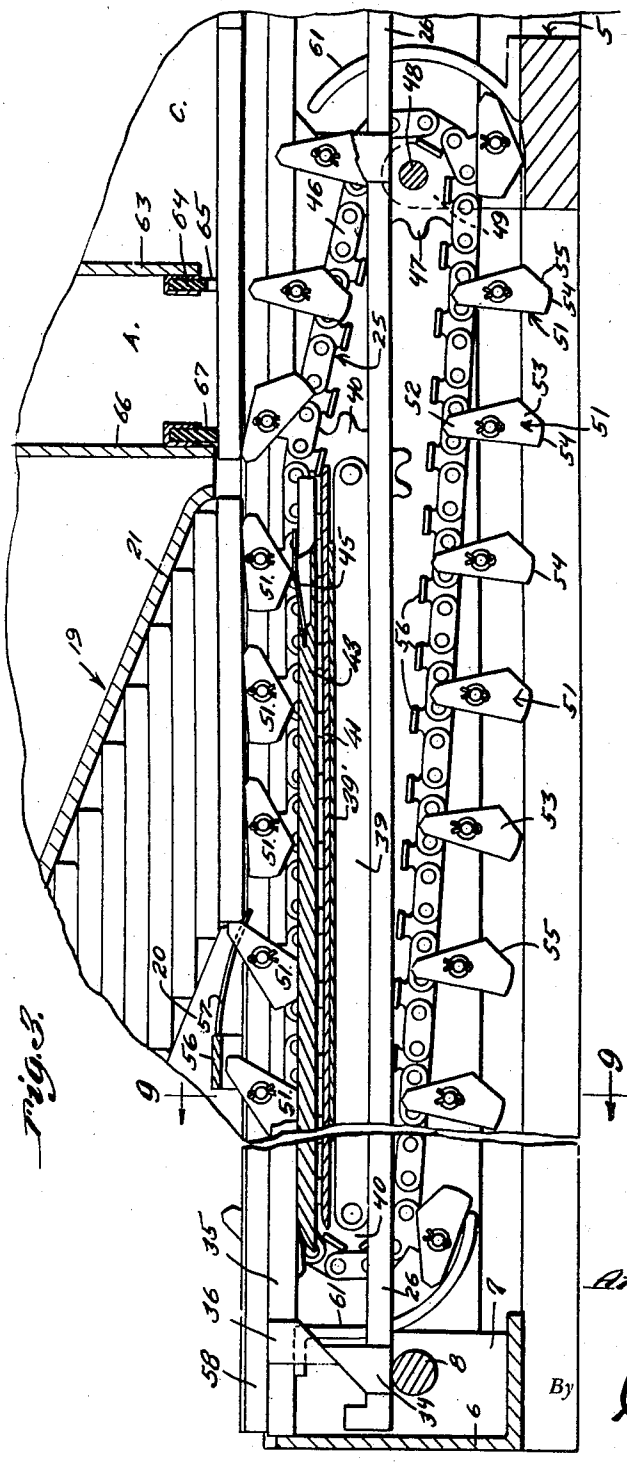


Fig. 5.

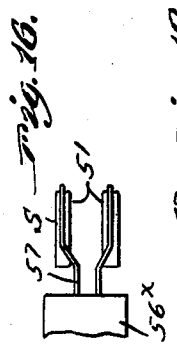


Fig. 16.

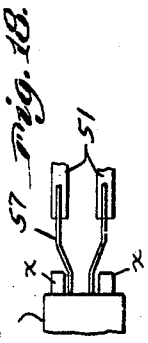


Fig. 18.

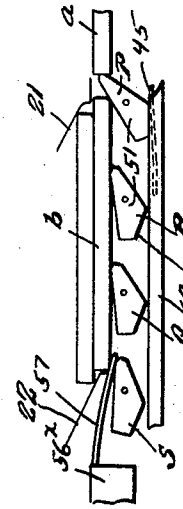


Fig. 15.

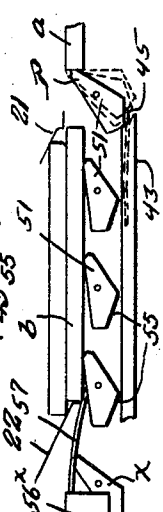


Fig. 17.

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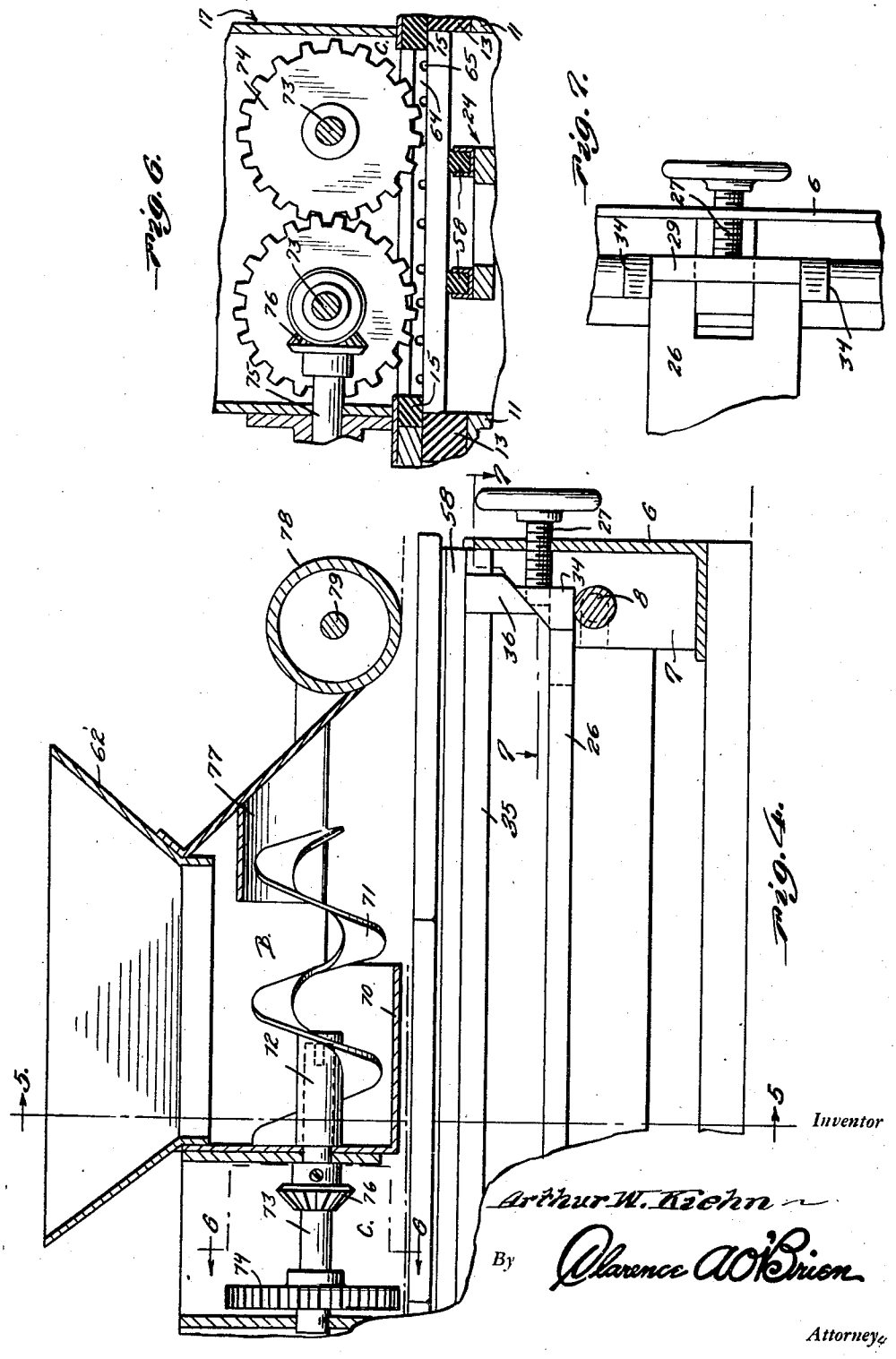
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BUTTERING MACHINE

Filed June 26, 1941 6 Sheets-Sheet 4



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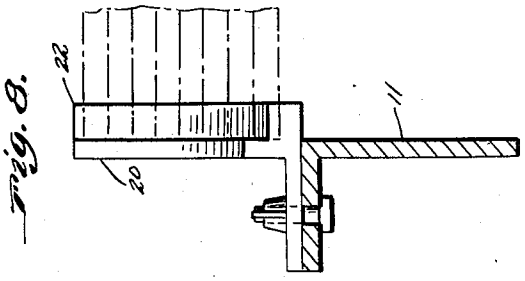
Attorney

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BUTTERING MACHINE

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Fig. 8.



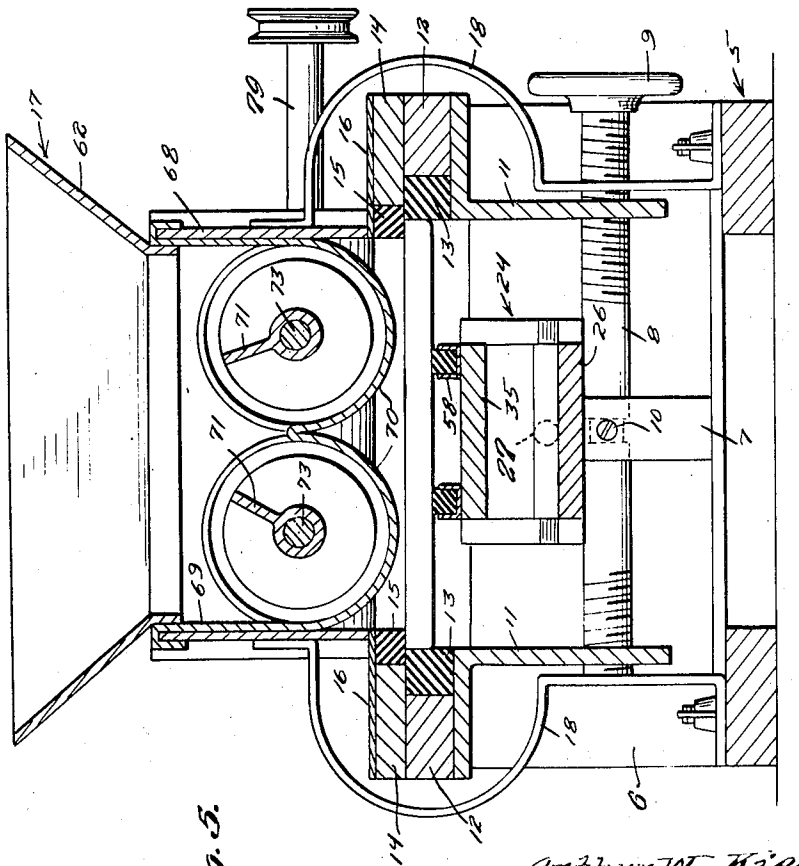


Fig. 9.

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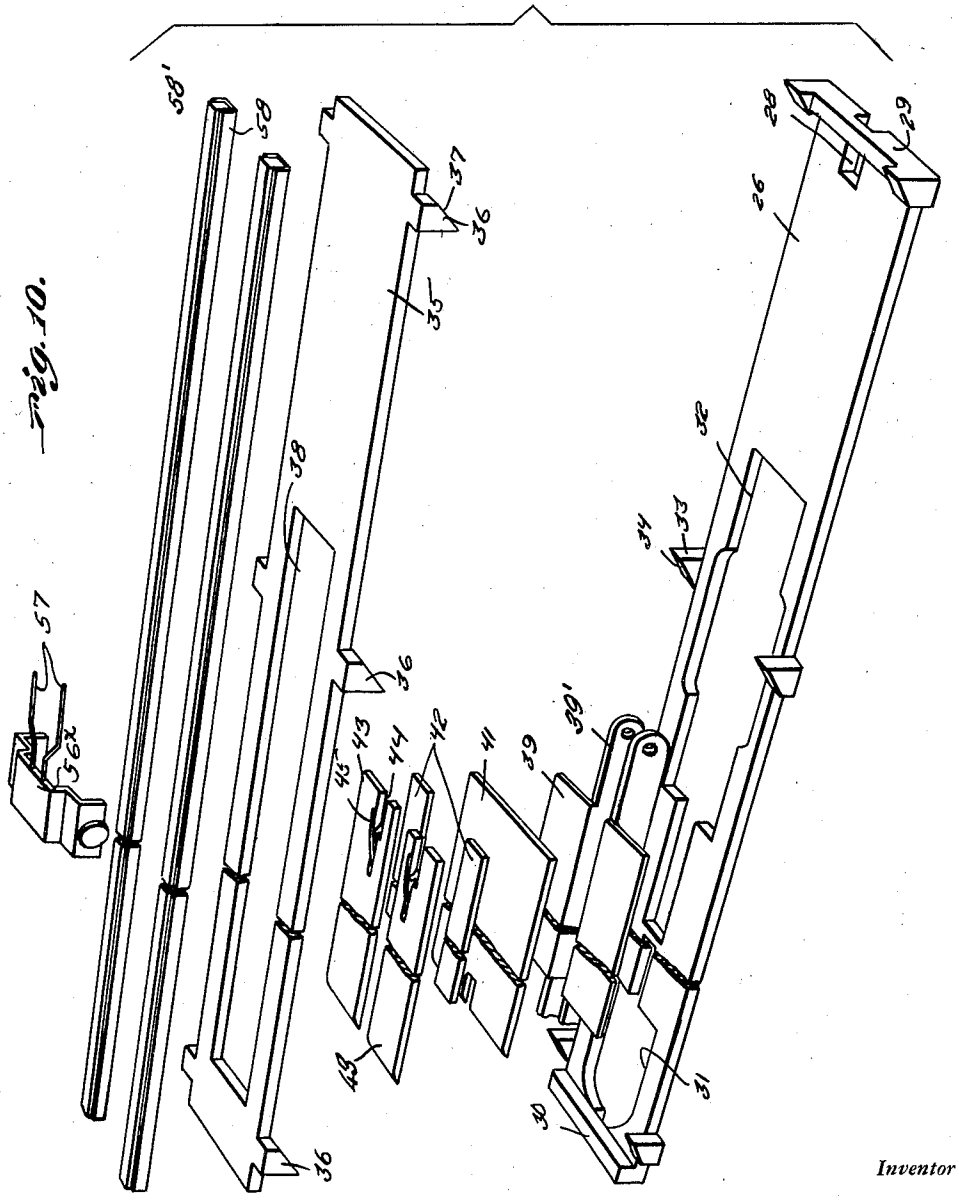
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BUTTERING MACHINE

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Fig. 10.



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UNITED STATES PATENT OFFICE

2,299,326

BUTTERING MACHINE

Arthur W. Kiehn, Elizabeth, N. J.

Application June 26, 1941, Serial No. 399,907

11 Claims. (Cl. 91—30)

This invention relates to a buttering machine especially adapted for buttering tile, mosaics, ceramics, marble, glass, etc., preparatory to application thereof to a trued scratch coat of a wall, ceiling or floor of a building. The primary object of this invention is the provision of a machine of the above stated character which will remove tile or the like one at a time from a rack and advance said tile and apply first a cement binder thereto and then evenly apply mortar under pressure to a desired thickness and deliver said tile ready for manual application on a trued scratch coat in the usual way.

With these and other objects in view as will become more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a side elevation illustrating a buttering machine constructed in accordance with my invention.

Figure 2 is a top plan view illustrating the machine.

Figure 3 is a fragmentary vertical sectional view illustrating the means of removing tile or the like one at a time from a rack and advancing the tile to have applied thereto a cement binder and mortar.

Figure 4 is a fragmentary vertical sectional view illustrating the means of applying mortar to the tile and evenly distributing the mortar on said tile.

Figure 5 is a transverse sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a detail transverse sectional view taken on the line 6—6 of Figure 4.

Figure 7 is a detail sectional view taken on the line 7—7 of Figure 4.

Figure 8 is a detail sectional view taken on the line 8—8 of Figure 2.

Figure 9 is a transverse sectional view taken on the line 9—9 of Figure 3.

Figure 10 is an exploded perspective view illustrating the various members which go to make up the adjustable tile supporting means as well as the conveyor supporting means.

Figure 11 is a diagrammatical view showing the first step taken by the dogs of the conveyor in removing a tile from the rack.

Figure 12 is a fragmentary plan view illustrating the dog tripping springs being compressed by a pair of dogs as in Figure 11, so that the latter may assume an operative position of pushing the tile from the rack.

Figure 13 is a view similar to Figure 11 showing the tile removed from the rack and about to pass from under a second tile.

Figure 14 is a plan view of the back end of Figure 13.

Figure 15 is a view similar to Figures 11 and 13 showing the following tile leaving the rack with the preceding tile still being shoved forward by a pair of dogs.

Figure 16 is a plan view of the back end of Figure 15.

Figure 17 is a view similar to Figures 11, 13, and 15, but showing the second tile ready to be engaged by approaching dogs which are contracting the springs 57 to the position shown in Figure 12, this view showing dogs in the act of becoming disengaged from the first tile.

Figure 18 is a plan view of the rear end of Figure 17.

Referring in detail to the drawings, the numerical 5 indicates a bed of a machine and has mounted thereon end plates 6 of angle iron construction. Also mounted on the bed adjacent the end plates 6 are bearing blocks 7 which rotatably support feed stems 8 each having right and left hand feed threads and an operating handle 9. The feed stems 8 besides being rotatably supported by the bearing blocks are held against endwise movements as illustrated at 10.

Side supporting plates 11 are arranged between the end plates 6 above the bed and are provided with feed thread openings meshing with the feed threads of the feed stems whereby said side plates may be adjusted towards and from each other for the purpose of supporting tile or the like of different widths. The side plates 11 are of angle iron construction providing vertical and horizontal portions, as clearly shown in Figure 5. The horizontal parts slide on the tops of the end members 6 but the vertical parts are shorter and move between the end members 6 during adjustment of the members 11.

A double hopper construction 17 is supported on the bed 5 by brackets or legs 18 detachably secured to the bed. The double hopper construction is arranged over the forward portion of the machine and a tile rack is located rearwardly of the hopper construction. Guide members 12 are connected with the horizontal portions of the side plates 11 and extend from the rear end of the double hopper construction to the front end of the machine and each member

12 is provided with a cushion facing strip 13. Mounted on these guide members 12 are the guide strips 14 of a width slightly greater than the width of the guide members 12 and these strips 14 are provided with cushioned facing strips 15 which are adapted to contact the top faces of the tiles as they are moved from the rack to the front end of the machine while the strips 13 engage opposite edges of the tile. Facing strips 16 cover the guide strips 14 and the strips 15 thereof and are suitably secured to the guide strips 14.

The tile rack is composed of the spaced side plates 19 and the plates 20. The spaced plates 19 are fixed on the hopper construction and are connected by a forwardly and downwardly inclined wall 21. The plates 20 are adjustably mounted on the members 11 for adjustment longitudinally thereof or toward and from the plates 19 and have formed on their opposed faces downwardly and forwardly inclined flanges 22 on which the tiles rest while in the rack, that is, one end of each tile is in engagement with the flanges while the opposite ends of the tiles are in engagement with the wall 21 of the plates 19 thereby arranging the tiles in stepped formation within the rack. The tiles thus arranged in the rack will have most of the weight thereof borne by the plates 20 while the plates 19 act to prevent the tiles from moving forwardly and tipping upwardly by the weight of other tiles thereon. The plates 20 are provided with comparatively short vertically arranged edges 22' into which the lower ends of the flanges merge. The wall 21 is provided with a comparatively short vertical portion 23.

When a tile engages with the edges 22' and the portion 23 it may then drop vertically. The plates 20 being adjustable on the machine longitudinally is for the purpose of accommodating tiles of different sizes in conjunction with the plate 21.

A tile supporting unit 24 is arranged between the side plates 11 and is capable of vertical adjustment. The supporting unit 24 also supports a tile feed mechanism 25. The unit 24 includes a lower adjusting plate 26 arranged between the side plates 11 and the end plates 6 of the machine and is capable of having a limited endwise movement through the operation of a feed shaft 27 journaled in one of the end plates and engaging one end of said plate 26. The plate 26 is provided at its ends with transversely arranged ribs 29 and 30. The rib 29 is engaged by the shaft 27 while rib 30 stiffens the rear end of the plate. The plate 26 is further provided with slots 31 and 32. The purpose of the slot 31 is to permit the endless conveyor to extend therethrough which also applies to the slot 32. Notches 28 in ends of the plate 26 receive the bearing blocks 7 to prevent lateral movement of the plate.

Formed on the edges of the plate 26 are upstanding lugs 33 having sloping or cam faces 34. An upper adjusting plate 35 is provided with depending lugs 36 having cam faces 37. The cam faces 37 of the lugs 36 engage with the cam faces of the lugs 33 and when the plate 26 is adjusted endwise in direction it will cause an upward movement of the plate 35 and an adjustment of the plate 26 endwise in an opposite direction will permit lowering of the plate 35. The plate 35 is also provided with a conveyor slot 38.

The ends of the plate 35 have sliding contact with the inner faces of the end members 6 so that the plate 35 can be moved upwardly and downwardly by movement of the plate 26 but cannot move longitudinally.

As shown more clearly in Figures 9 and 10 a pair of spaced plates 43 is connected to the underface of the plate 35 and a pair of narrow spaced plates 42 are connected with the under side of the plates 43. Wider spaced plates 41 are connected with the under faces of the plates 42 while flanges 39 of bars 39' are connected with the under side of the plates 41, the various plates being connected together by welding or in any other suitable manner. Thus the plates 43, 42 and 41 and the members 39 and 39' will move vertically with the plates 35 and the bars 39' will extend into the narrow parts of the slots 31 and 32 as the member 35 with the parts attached thereto is lowered.

As will be seen from Figure 3 the various plates carried by the plate 35 are of less length than the plates 26 and 35 and the bars 39' have perforations in their ends and are spaced apart and the perforations receiving the trunnions of the front and rear idler sprockets 40. The forward ends of the plates 43 have slots 44 therein with springs 45 extending over the slots. The sprocket chain of the feed mechanism 25 is indicated by the character 46 and is trained over the idler sprockets 40 and a drive sprocket 47 secured on a shaft 48 journaled in center bearings 49 located forwardly on the tile rack and under the double hopper construction. The shaft 48 has its main bearings sliding in the side plates 11 and one end of the shaft is extended and has secured thereto a crank handle 50 for the manual rotation thereof. However, a power means may be connected to the shaft 48 in lieu of the hand crank.

Pairs of dogs 51 are pivotally connected to the sprocket chain and move therewith and each dog includes a tapered end portion 52 and an enlarged end portion 53 having a rounded edge 54 and an angular edge 55.

The sprocket chain has formed on the links thereof in front of and in rear of the links carrying the dogs pairs of oppositely extending ears 56 which are adapted to travel between the chain supporting plates 41 and the dog supporting plates 43 to prevent the upper run of the sprocket chain from buckling under load.

A pair of rails 58 are carried by the upper face of the plate 35 extending from one end of the plate to the other and each rail has a cushioning strip 58' therein, these rails receiving the tiles as they move downwardly out of the rack and the tiles are moved along these rails by the dogs 51 and after they pass under the double hopper 17 the tiles will be engaged by the resilient members 13 and 15 as shown in Figure 6.

As the endless chain moves up over the rear sprocket 40 the peculiar shape of the dogs will cause them to engage the supporting plates 43 with the dogs in pushing position as shown by the last dog to the left in Figure 11. Also the ears 56 extending between the plates 41 and 43 will prevent any buckling movement of the chain when the dogs engage a tile which tends to cause the front or upper ends of the dogs to move upwardly and rearwardly, thus causing the chain to buckle. However, the ears 56 will prevent this buckling of the chain as before described. Also any tendency of the dogs to rotate anti-clockwise on their pivots by the resistance offered by

the tile is prevented by the lower part of the dogs engaging the plates 43. Thus the movement of the dogs by the chain will cause the dogs to move a tile from the bottom of the rack forwardly as shown in the diagrammatic views.

The bottom tile rests upon the rails 58 and is moved forwardly over the rails by that pair of dogs which is engaging the rear end thereof. The dogs under the tile are moved to inoperative position by the weight of the tile so that they do not engage the plates 43.

The intersection of the vertical walls 22' of the plates 20 with the inclined faces 22 will be at a point slightly below the bottom face of the second tile in the rack so that the inclined faces will continue to support the second tile, with the assistance of the resistance of the forward movement of the tile by the wall 23 and resisting the downward movement of the second tile by the bottom tile. The vertical support by the bottom tile continues until the back edge of the bottom or first tile passes beyond the front edge of the second tile. When this happens the front edge of the second tile drops upon the rails or guides 58 and then resistance to forward movement of the second tile by the wall 23 is removed and the back edge of the tile then moves along the inclined faces 22 and drops to the guides 58 at the intersection of the vertical faces 22' with the inclined faces. This drop imparts a slight shock to the tiles in the rack which helps to cause them to settle to normal position. This shock is necessary because if the inclined faces 22 continued until they met the horizontal plane of top of parts 58 there would be a tendency of the back edges of the tiles to remain partly up the inclines 22. However, this would occur mostly when the rack is nearly empty and pressure along the inclined faces was reduced.

That pair of dogs engaging the rear end of a tile will continue to push the tile along the guides 58 until the dogs reach the slots 44 in the plates 43. When the dogs reach these slots the resistance offered by the plates 43 to pivotal movement in an anti-clockwise direction of the dogs is removed and thus the dogs move downwardly and disengage the tile so that the tile comes to rest. However, the rear slotted ends of the plates 43 are so formed that these ends will continue, at least one unit of chain pitch beyond the slots in order that the forward pair of ears 56 will continue to resist buckling action until the dogs have become inactive after pivoting at the slots. The springs 45 are heavy enough to tip inactive dogs which are held in inactive position by the weight of a tile and the springs are light enough to be depressed readily by the dogs pushing upon them. These springs 45 prevent the pair of inactive dogs nearest the front edge of the second tile from passing under such edge and resuming normal pushing position which will cause such dogs to run afoul of the tiles. Thus these springs 45 hold such pair of dogs in inactive position so that the springs act as non-fouling springs. However, as before stated these springs will be depressed by the pair of dogs under load as shown in Figures 15 and 17.

A clip 56x is adjustably mounted on the unit 24 slightly in rear of the tile rack and this clip carries a pair of springs 57 which has straight outer portions but converging inner portions. The straight portions are normally spaced apart a distance equal to the spacing of each pair of dogs so that these straight portions will engage the upper ends of a pair of dogs but when a pair of dogs approach the constricted inner parts of the springs, with the dogs in raised position the said dogs will engage the constricted parts and thus move the straight parts inwardly so that these straight parts will not be engaged by the last-mentioned dogs. This position of the springs is shown in Figure 12.

As will be seen the tiles are pushed through the machine by the dogs until a pair of dogs passes through the slots 44, after which the tile comes to rest until pushed forward again by the next tile being moved by another pair of dogs. In turning out of pushing position the upper parts of the dogs rotate in a direction opposite to the travel of the tile and this makes it necessary to maintain sufficient clearance between tiles to prevent fouling of dogs between the tiles. As clearance between dogs remain constant and tile lengths vary there will be cases where, as a new tile drops into position, the next pusher dogs may start pushing the tile too soon to maintain the clearance needed. This condition is taken care of by the springs 57. In normal position these springs clear the tops of the dogs before a tile drops upon the guides 58. As tile drops it renders the dogs within its length as well as that pair of dogs which are under the straight parts of the springs 57, inoperative by tipping downwardly the front ends of the dogs. However, the next pair of dogs will press the springs 57 together so that the springs will not interfere with the next pair of dogs and thus this pair will engage the rear end of the tile and push it forwardly.

Figure 11 shows the dogs P starting to push tile a with the dogs O and N depressed by the tile and dogs M tipped forwardly by the non-fouling springs 45. Figure 12 shows how the dogs P can move the springs 57 into inoperated position so that said dogs can engage the rear end of the tile a. Figure 13 shows the tile a in motion with the springs 57 in normal position and Figure 14 is a plan view of the rear end of Figure 13.

Figure 15 shows the dogs P still pushing tile a while tile b has dropped into place, depressing dogs Q and R and the springs 57 have depressed dogs S as these dogs are under the straight portions of the springs as shown in Figure 18.

Figure 17 shows the different positions of the dogs P as they pass through the slots 44 so that the tile a will come to rest. The three pairs of the following dogs are in inactive position while the pair of dogs X are about to engage the springs 57 to move them into inoperated position so that these dogs X will engage the tile b.

Arcuately curved guide members 61 are located on the forward and rearward portions of the machine adjacent the end of the unit 25 or the rear sprocket 40 and the drive sprocket 47. The purpose of the arcuately curved guide members 61 is to prevent the dogs from fouling on ears 56 as they pass about the drive sprocket 47 and the rear idler sprocket 40.

The double hopper construction 17 includes chambers A and B provided with flared mouths 62 to permit cement to be readily poured into the chamber A and mortar into the chamber B. A partition 63 separates the chambers A and B and is spaced a limited distance above the top face of a tile when the latter moves under the double hopper construction and carries a wiper strip 64 provided with a series of notches 65

through which cement may pass with the tile on its forward movement forming the cement into ribs and with a very thin coating of the cement over the entire top face of the tile. The opposite wall of the chamber A from the partition 63 is designated by the character 66 and carries a sealing strip 67 to prevent the cement from passing from the chamber A under the partition 66 towards the tile rack.

It is to be understood that the strip 64 has a wiping contact with the top face of the tile so that as the tile advances a very thin layer of cement will be left on the top face with ribs of cement spaced a selected distance from each other on said top face of the tile.

Mounted on the side walls 68 of the chamber B is a liner 69 including spaced semi-cylindrical portions 70 in which spiral type conveyors 71 operate. The liner closes a portion of the bottom of the chamber and towards the forward end of the chamber the latter is open to provide a discharge for mortar fed forwardly in the chamber by the spiral conveyors onto the tile or the cement thereof as said tile advances on the machine. The spiral conveyors are of the open type and are only supported at one end by being provided with sleeves 72 connected to shafts 73 by a pin and slot connection, the back pressure of the mortar acting on the spiral conveyors 71 to hold them on the shafts.

The shafts are rotatably mounted in the double hopper construction and extend into a chamber C arranged between the chambers A and B and are connected to each other by gearing 74 and one of the shafts is connected to a shaft 75 by gears 76. The shaft 75 is chain connected to the shaft 48 so that the spiral conveyors will be driven from the crank handle in opposite directions to each other.

A guard 77 is arranged in the chamber B and includes semi-circular portions overlying the discharge slot of the chamber B and the free ends of the spiral conveyors. The purpose of the guard 77 is to coact with the forward wall of the chamber B in causing the mortar fed forward by the conveyors to be directed downwardly through the discharge opening onto the tile. The forward wall of the chamber B has a slot in which operates a roller 78 journaled on the hopper construction to contact the mortar and evenly distribute the mortar over the top face of the tile as the latter is advanced and to a desired thickness. The roller 78 includes a shaft 79 belted to the shaft 48 and the roller 78 is rotated in a reverse direction to the forward travel of the tile. The shaft 75 is connected to the shaft 48 by sprocket gears and a sprocket chain 80 so as to provide a positive drive for the conveyors from the crank handle.

It will be seen that as the tile leaves from under the roller 78 it has first had ribs of cement applied thereto and then mortar which is spread evenly to a desired thickness on the tile throughout one face thereof so that the tile is ready to be manually tapped into place on a trued scratch coat which has been prepared or applied to a wall, ceiling or floor of a building.

While the specific construction of this machine as well as its operation has been set forth, the specific advantages for the use of this machine will now be given and are as follows:

The advantages of this machine can be most readily pointed out by a description of the present method of setting tile. Most wall and ceiling tile work is installed with cement mortar on a roughened cement mortar background called a scratch coat by either the buttering or floating method.

In the buttering method the setting bed is applied to individual tiles and then tamped into place. In the floating method the setting bed is applied to the scratch coat and while this is still soft a thin coating of neat cement is applied to the tiles which are then tamped into place.

With the buttering method the tendency is to use a bed of excessive thickness to compensate for irregularities in scratch coat. In addition to this excessive thickness the setting bed rarely is continuous behind all edges and corners of the tile. As cement mortar shrinks toward the center of the mass, these unconnected patties of mortar develop a convexity which causes loose tile and often the setting bed has a poor knit on scratch coat. Even when this method is used by capable and conscientious mechanics providing a full buttered setting bed with no voids behind the tile, knit failures are possible. These failures are possible because many tiles are vitreous or of low porosity while most all tiles, even those of high porosity, have a die sheen to which cement mortar does not knit readily without a neat cement coating which is almost never used in this method. When the tiles do get a good knit to setting bed with this method, the tendency toward convexity of incomplete backing or the uneven shrinkage of full backing of irregular thickness sets up internal stresses in tiles which often result in damaging or cracking of the glazed face of the tile.

The floating method is, theoretically, the better method. It requires, however, control of a number of factors which are seldom obtained consistently on any job. Control of plasticity and therefore workability of mortar is always a problem. Under conditions of high temperature and low humidity the thin areas of setting bed, due to irregularities in scratch coat, become stiff through dehydration. Under opposite conditions of cold and high humidity there is the problem of sagging setting bed at the thicker areas. These conditions are aggravated in ceiling work. Timing is an important factor. Floating an area small enough to set tile in time to take advantage of maximum workability of setting bed may make floating adjoining areas impractical or at least inconvenient. This makes for a tendency to float greater areas than can be followed with tile in time to do good work.

Obviously an ideal method would be one where part of the setting bed was used as a straightening or leveling coat with no time element involved other than letting it go beyond the initial set stage. This to be followed by a means for applying to tile a neat cement coating and the balance of setting bed full buttered and trued mechanically so that each tile is practically a section of finished work as it is applied to the trued scratch coat. This combination of method can be successfully carried out through the use of the present machine.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention as claimed.

Having thus described the invention, what I claim is:

1. In a slab buttering machine, a bed, slab sup-

porting guides on said bed, a unit on said bed coacting with said guides in the support of slabs, a slab rack on said bed for supporting stacked slabs at one end of the bed over said guides and the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, and a slab feed means carried by said unit for taking slabs one at a time from the rack and advancing them under the hoppers to have cement and mortar applied to said slabs and advance the slabs from one end of the bed for manual setting on a scratch coat.

2. In a tile buttering machine, a bed, horizontal tile supporting guides on said bed, a horizontal unit on said bed coacting with said guides in the support of the tile for sliding movement from one end of the bed toward the opposite end, a tile rack on said bed for supporting stacked tiles in staggered relation at one end of the bed over said guides and the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, and a tile feed means carried by said unit for removing tiles one at a time from the rack and advancing the tiles under the hoppers to have cement and mortar applied to said tiles and advance the tiles from the bed for manual setting on a scratch coat.

3. In a tile buttering machine, a bed, horizontal tile supporting guides on said bed, a horizontal unit on said bed coacting with said guides in the support of the tile for sliding movement from one end of the bed toward the opposite end, a tile rack on said bed for supporting stacked tiles in staggered relation at one end of the bed over said guides and the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, and a tile feed means carried by said unit for removing tiles one at a time from the rack and advancing the tiles under the hoppers to have cement and mortar applied to said tiles and advance the tiles from the bed for manual setting on a scratch coat, and means on the hoppers for spreading the mortar and cement evenly to a desired thickness on the tile.

4. In a tile buttering machine, a bed, horizontal tile supporting guides on said bed and adjustable toward and from each other, means for adjusting said guides, a unit on said bed between said guides and coacting therewith in the support of tiles and adjustable vertically, means for adjusting said unit vertically, and an adjustable tile rack on said bed for supporting stacked tiles at one end of the bed over said guides and the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, a tile feeding means carried by said unit for removing tiles from the rack one at a time advancing the tiles and the guides under the hoppers to have cement and mortar applied thereto and to advance the tiles from one end of the bed for manual setting on a scratch coat, and means for the even distribution of the mortar and cement on the tiles.

5. In a tile buttering machine, a bed, horizontally arranged tile supporting guides including cushioned spacing strips to engage opposite edges and top faces of tiles, a unit on said bed between the supporting guides and coacting with said guides in the support of tiles by engaging the under faces of the tiles and including cushioned tracks, and an adjustable tile rack on said bed for supporting stacked tiles in stepped relation at one end of the bed over said guides in the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, an endless conveyor mechanism carried by said unit for removing tiles one at a time from the rack and advancing the tiles over said unit and the guides and under the hoppers to have cement and mortar applied to said tiles and advance the latter from one end of the bed for manual setting on a scratch coat.

6. In a tile buttering machine, a bed, horizontally arranged tile supporting guides on said bed and adjustable toward and from each other, means for adjusting said guides, a unit on said bed between the guides and coacting therewith in the support of tiles by engaging the under faces of the tiles and including cushioned tracks, cushioned strips for said guides and engaging opposite edges and top faces of the tiles, a tile rack on said bed for supporting stacked tiles in stepped formation at one end of the bed over said guides and the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, an endless sprocket chain carried by said unit, means for driving said sprocket chain, pairs of dogs pivoted on said sprocket chain to move the tiles through the machine, means for causing certain of the dogs to assume inoperative positions, and means for causing certain dogs to assume operative positions of pushing the tiles from the rack and under the hopper.

7. In a tile buttering machine, a bed, horizontal guides on said bed for engaging opposite edges and top faces of tiles, means for adjusting said guides towards and from each other, a unit on said bed and engageable with the under faces of the tiles and coacting with the guides in the support of tiles for sliding movement, an adjustable tile rack on said bed for supporting stacked tiles in stepped relation and at one end of the bed over said guides and the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, an endless feed chain carried by said unit, means for driving said chain, pairs of dogs pivoted on said chain, means for causing certain pairs of dogs to assume inoperative positions and certain pairs of dogs to assume tile pushing positions to engage rear edges of the lowermost tile of the rack and advance said tile under the hoppers to receive cement and mortar thereon.

8. In a tile buttering machine, a bed, horizontal guides on said bed for engaging opposite edges and top faces of tiles, means for adjusting said guides towards and from each other, a unit on said bed and engageable with the under faces of the tiles and coacting with the guides in the support of tiles for sliding movement, an adjustable tile rack on said bed for supporting stacked tiles in stepped relation and at one end of the bed over said guides and the unit, cement and mortar hoppers mounted on the bed forwardly of the rack and over the guides, an endless feed chain carried by said unit, means for driving said chain, pairs of dogs pivoted on said chain for imparting movement to the tiles, means in the cement hopper for applying cement on the tile in rib formation, means in the mortar hopper for applying mortar on the tile, and means for spreading the cement and mortar to a determined thickness over the entire area of one face of the tile.

9. In a tile buttering machine, a bed, tile supporting means on the bed, a unit coacting with said means for the support of tiles, a rack on said bed and at one end thereof and disposed over said first means for supporting tiles in

stacked and stepped formation, hoppers on said bed over said first means in advance of the rack for containing cement and mortar, means carried by the unit for removing tiles one at a time from the rack onto the guides and advancing the tiles under the hoppers, means on one of the hoppers to apply the cement in ribbed formation on the tile, spiral conveyors operating in the other hopper to apply mortar under pressure to the tile, and means for spreading the mortar and cement to a desired thickness on the tile.

10. In a tile buttering machine, a bed, tile supporting means on the bed, a unit cooperative with said means in supporting the tile for sliding movement, a rack on said bed at one end thereof and located over the first-named means for supporting tiles in stacked and stepped relation, a feed means carried by said unit for removing the tiles one at a time from the rack and advancing the tiles under the hoppers, a notched strip located in one of the hoppers for distributing cement on the tile in ribbed formation, spiral conveyors operating in the other hopper to apply mortar under pressure to the cement and tile, and a spreading roller for smoothing the mortar and cement to a desired thickness over one face of the tile.

11. In a tile buttering machine, a bed, tile supporting means on the bed, a unit cooperative with said means in the support of tiles for sliding movement in a horizontal plane, an adjustable rack on said bed over said first means for the support of tiles in stacked and stepped relation, said unit including dog guides and a drop-off slot, idler sprockets carried by said unit, a drive sprocket carried by said bed, an endless chain trained over said sprockets, a pair of dogs pivoted on said chain, ears on said chain and engaging with the guides of said unit, means for causing certain of said dogs to assume inoperative positions and certain dogs to assume tile shoving position, and means carried by said unit to cause the latter-named dogs to pivot away from the tile after a predetermined movement of the tile over the guide means, cement and mortar hoppers mounted on the bed over the guide means and under which the tiles one at a time are moved by said dogs, means for distributing cement in ribbed formation on the tile, and means for distributing under pressure mortar on the cement and over the complete area of one face of the tile.

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