

May 8, 1928.

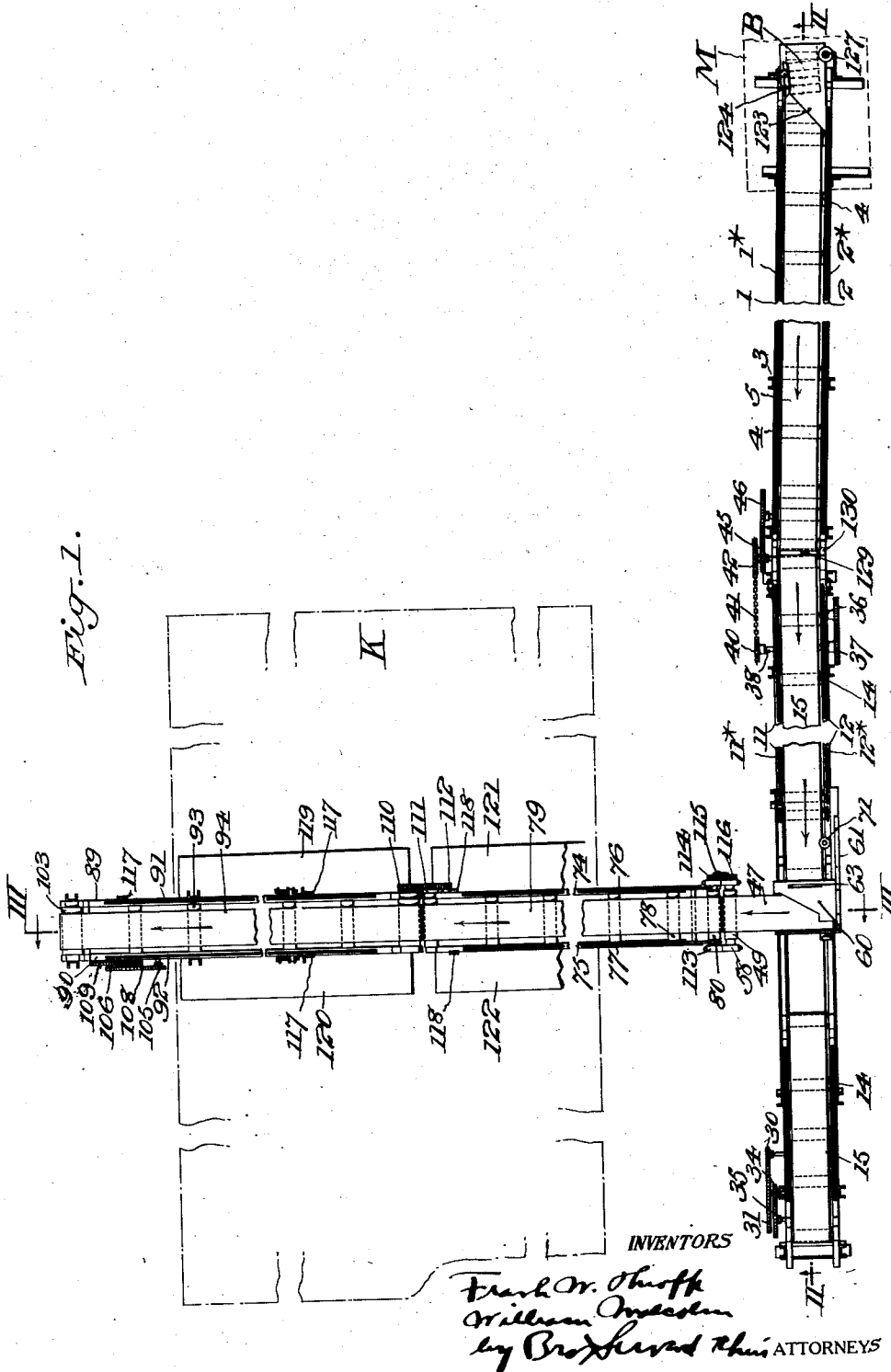
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F. W. THROPP ET AL

CONVEYER FOR GREEN BRICKS AND THE LIKE

Filed July 23, 1925

4 Sheets-Sheet 1



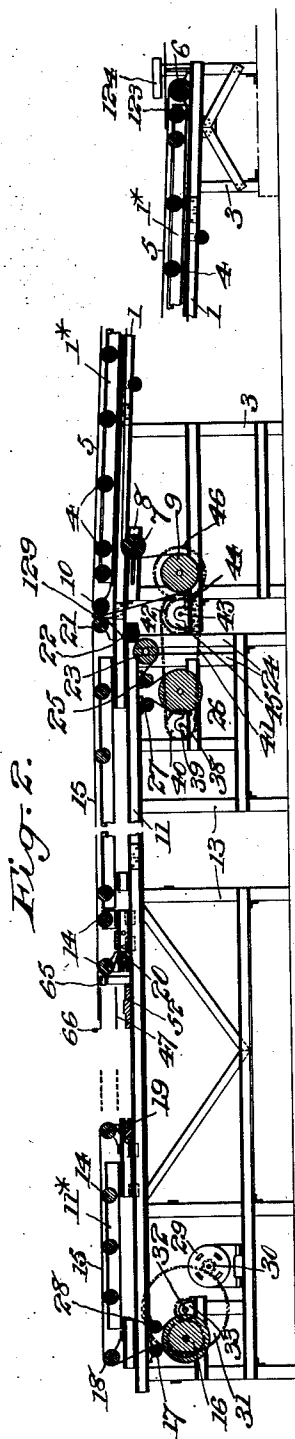
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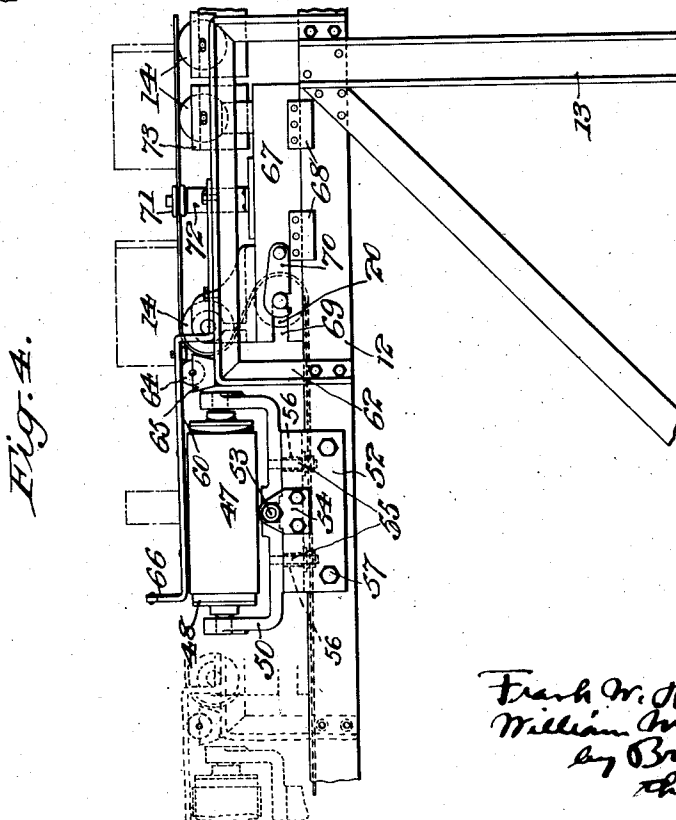
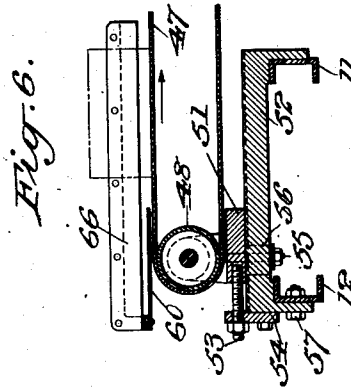
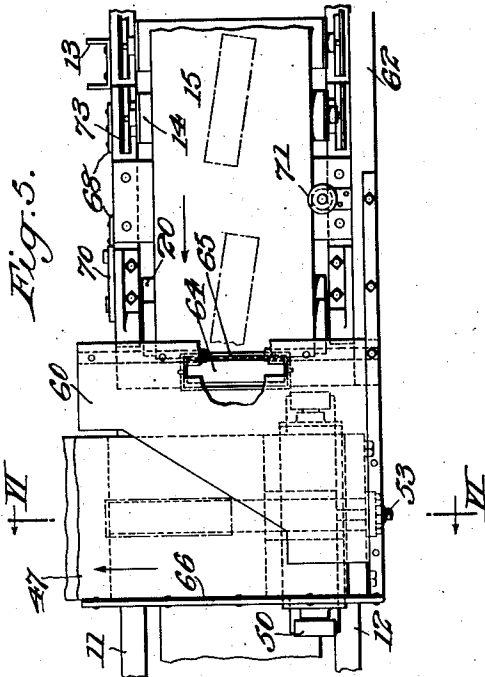
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

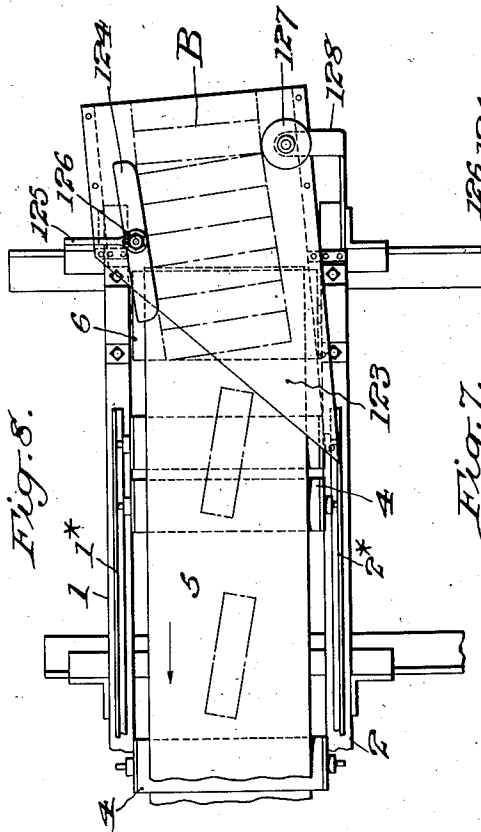


Fig. 9.

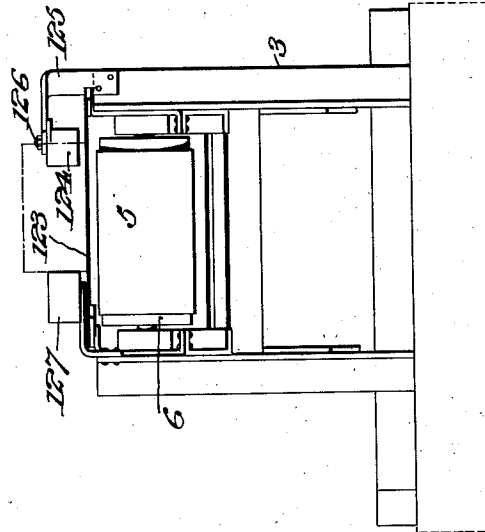
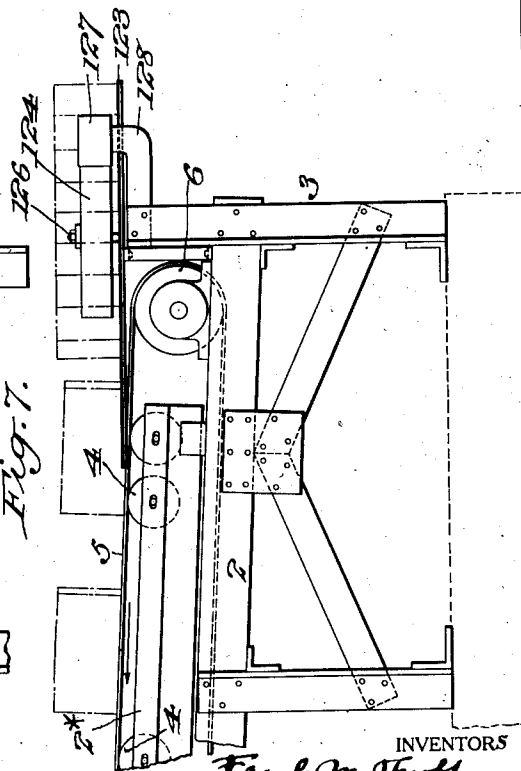


Fig. 7.



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CONVEYER FOR GREEN BRICKS AND THE LIKE.

Application filed July 23, 1925. Serial No. 45,610.

This invention relates to an improvement in conveyers for green bricks, and the like, and has for an object to provide means for very rapidly conveying the green and unfired bricks from the molding and cutting machine in which the bricks are formed, to the kiln in which the bricks are fired.

Another object consists in providing means for automatically conveying the bricks from the brick making machine to the kiln, so that they need not be touched by any operative until they are unloaded from the conveyer for stacking in the kiln.

Another object consists in providing means for automatically changing the direction of travel of the bricks, so that they can move in one direction from the brick making machine and then move at right angles, or any other desired angle, for the purpose of traveling into the kiln.

Another object consists in providing means for varying the position in which the bricks are taken from the brick making machine and carried along upon the conveyer.

Another object consists in providing means for feeding the bricks either to the right or to the left from the main conveyer which takes them from the brick making machine.

Another object consists in providing means for adjusting the elevation of the branch of the conveyer that enters the kiln.

Another object consists in providing means on the branch of the conveyer which enters the kiln, for supporting the operators who are to unload the bricks and stack them in the kiln.

Another object consists in providing certain improvements in the form, construction and arrangement of the several parts of the apparatus, whereby the above named and other objects may be effectively attained.

A practical embodiment of the invention is represented in the accompanying drawings, in which

Fig. 1 represents a top plan view, partly broken away, showing the general arrangement of the apparatus.

Fig. 2 represents a section taken in the plane of the line II—II of Fig. 1, looking in the direction of the arrows.

Fig. 3 represents a section taken in the plane of the line III—III of Fig. 1, looking in the direction of the arrows.

Fig. 4 represents an enlarged detail side view showing the parts of the apparatus adjacent the point where the branch of the conveyer which enters the kiln, joins the main conveyer.

Fig. 5 represents a top plan view, partly broken away, of the parts shown in Fig. 4.

Fig. 6 represents a section taken in the plane of the line VI—VI of Fig. 5, looking in the direction of the arrows.

Fig. 7 represents an enlarged detail side view of the parts of the apparatus adjacent the brick making machine.

Fig. 8 represents a top plan view of the parts shown in Fig. 7.

Fig. 9 represents an end view of the parts shown in Fig. 7.

As is well understood in this industry, bricks are commonly formed from the proper mixture of clay and water, by extruding them from a machine, similar to a tubing machine, in the form of a long strip of plastic material, which has the cross sectional size and shape of the largest section of the brick. This long strip of material immediately passes through an apparatus where it is severed, intermittently, into a series of separate green bricks, and these independent but contiguous bricks are passed out from the last named apparatus onto a conveyer for the purpose of carrying them to the kilns where they are dried and fired into their hard, commercial condition.

Ordinarily, the arrangement is such that the conveyer travels between rows of kilns or in front of a row of kilns and it is, therefore, necessary to change the direction of travel of the bricks to cause them to enter the kilns. This has commonly been accomplished by providing two conveyers running at right angles to each other, one leading from the brick making machine and the other leading into a kiln. The ends of these two conveyers have been located adjacent each other, and operatives have been accustomed to lift the bricks off the conveyer that comes from the brick making machine and place them on the conveyer that leads into the kiln. Owing to the rapidity with which the bricks are fed, it has been found necessary to employ several operatives at this point for performing this duty.

Our apparatus does away with the necessity of this manual work just described, and therefore, saves labor, increases speed, and

avoids injury to the green bricks resulting from manual handling thereof.

The section of the main conveyer which leads from the brick making machine (not shown, but one end of which is diagrammatically represented in dotted lines at M) consists of longitudinal stringers 1, 2 that are supported on suitable framing, represented generally by 3. Above the stringers 1, 2 are mounted a series of rollers 4 designed to support the upper section of an endless belt 5. These rollers are journaled in rails 1*, 2* carried on top of stringers 1, 2. The said belt passes around a large roller 6 (Fig. 2) located at the end immediately adjacent the brick making machine, around a take-up roller 7 that is adjustably mounted in guides 8 carried on the under side of the stringers 1, 2; then around a driven roller 9 mounted in the framework 3, and finally around an end roller 10, and thence back along the rollers 4 to the roller 6.

As will be observed by examination of Fig. 2, the said section of the conveyer is constructed at an angle so as to slant upwardly from the position adjacent the brick making machine.

The main conveyer also includes another section which comprises a pair of stringers 11, 12 that are supported on framework represented generally by 13. Above these stringers 11, 12 are mounted a series of rollers 14 that serve to support the upper length of an endless belt 15. The rollers 14 find bearings in rails 11*, 12* carried on stringers 11, 12. The said belt travels from a driven roller 16, located at the extreme left in Fig. 2, around a guide roller 17, an end roller 18, thence over some of the rollers 14, down around a movable roller 19, along and around a similar movable roller 20, up around and along on top of other rollers 14, thence around end roller 21, a guide roller 22, a take-up roller 23 that is adjustably mounted in guides 24, a guide roller 25, a large roller 26, guide roller 27, and back to guide roller 28 which is immediately adjacent driven roller 16.

A motor 29 mounted on the framework 13 has a small gear 30 on its shaft which meshes with a large gear 31 fixed on a shaft 32 mounted in a bearing 33 also carried in the framework 13. On shaft 32 there is also fixed a smaller gear 34 that meshes with a gear 35 which is fixed on the shaft of the roller 16.

It will be clear that this train of gears causes the power from the motor 29 to be imparted to the roller 16 and thereby drive it and the belt 15.

This operation of the belt 15 of course rotates the roller 26 and it carries a gear 36 that meshes with another gear 37 fixed on a shaft 38 mounted in a bearing 39 which is supported in the framework 13. The shaft

38 has a sprocket 40 fast to its end and a sprocket chain 41 leads therefrom to another sprocket 42 that is fast on a shaft 43 carried in a bearing 44, supported in the framework 3. This shaft 43 also has a gear 45 fixed thereon which meshes with a gear 46 that is secured to the end of the shaft of roller 9.

The result of this last described arrangement is that the train of chain and gears causes motion to be imparted from the roller 26 to the roller 9, so that the belt 5 is driven at any time that belt 15 is driven. The proportions of the driving elements are such that the belt 5 travels at a somewhat slower speed than belt 15, which is desirable because the belt 5 takes the bricks immediately from the brick making machine M and it is not desirable to have it travel at too high a speed for fear of upsetting or tumbling the green bricks and thereby injuring them. The reason for having the belt 15 travel at a higher rate of speed is to increase the speed of operation of the apparatus.

At the point where the belt 15 passes down around movable rollers 19 and 20, it will be observed that a gap is left in the upper length of the belt, and it is at this point that the branch belt which leads into the kiln is brought into operative connection with the main belt 15.

In order to establish this last named connection, a short endless belt section is employed which is supported at one end on a carriage mounted on the framing 13 and at the other end on uprights projecting from the floor.

This short section is shown in Figs. 1, 3, 4, 5 and 6. It includes an endless belt 47 that traverses a roller 48 and a roller 49. The roller 48 is mounted in a bifurcated bracket 50 that is carried on a sliding plate 51 fitted to move in a slide formed in the top of a carriage 52. An adjusting screw 53 is threaded into a plate 54 that is bolted to and projects upwardly from the carriage 52. This screw 53 is also threaded into the slide 51 so that its adjustments serve to adjust the slide with respect to the carriage and, hence, to vary the tension of the belt 47. Locking screws 55 travel in elongated openings 56 formed through the carriage 52 and enter the slide 51, whereby the latter may be locked in any adjusted position.

The carriage 52 is fixed to the stringers 11, 12 by a pair of bolts 57, and it will be observed that it is mounted so that the belt 47 projects at right angles to the belt 15.

The outer roller 49, around which the belt 47 passes, is mounted in a bifurcated bearing 58 (see Fig. 3) supported on an upright framing 59.

In order to provide means for causing the bricks to turn in their travel from the belt 15 to the belt 47, we have mounted a plate

60 at the junction of these two belts, which plate lies immediately above the traveling surfaces of the said belts, and has its edge which overlies the belt 47 cut at an angle of approximately forty-five degrees to the line of travel of each of said belts, as clearly shown in Fig. 1.

This plate 60 is fixed to a bracket 61 that is screwed, or otherwise suitably secured to a support 62 that is bolted to the stringer 12. The plate 60 is preferably composed of some thin smooth sheet metal, such as copper, and we have found it desirable to provide it with an aperture 63 fitted to receive the upper edge of a lubricating roller 64 that is mounted in a trough 65 that is normally filled with oil. This provision of lubricant assists the sliding travel of the bricks on the plate 60 when passing from belt 15 to belt 47.

In order to prevent any of the bricks from accidentally moving across and falling off of belt 47, a guard 66 is fixed in proper position by fastening it to bracket 61.

When feeding bricks to different sides of the same kiln, it is desirable to slightly move the carriage 52 and parts supported thereupon, including belt 47, a short distance along the stringers 11, 12, as indicated in dotted lines in Figs. 2 and 4. This is accomplished by loosening the bolts 57 and moving the carriage 52 bodily along into the dotted position shown in Fig. 4, where it is again secured in place by the said bolts, suitable holes being provided in the stringer 12 for this purpose.

This movement of the carriage 52 and connected parts, also requires moving the support 62 that carries the plate 60, guard 66 and lubrication supply 64, 65. This is accomplished by loosening the bolts which secure the support 62 to the stringer 12 and moving it bodily along into position, as also partially indicated in dotted lines in Fig. 4. This movement of the said parts also requires corresponding movement of the rollers 14 and 20, and this is accomplished by mounting the said rollers on a slide 67 which is slidably secured by clips 68 on the stringers 11, 12. In order to facilitate this movement, the roller 20 is mounted in an open bearing 69 formed in the slide 67. Latches 70 pivoted on the slide 67 serve to removably hold the roller 20 in its bearing 69. By swinging these latches upwardly, the roller 20 may be released and moved out of its bearing 69. This at once slackens the belt 15 and permits the ready movement of slide 67 and connected parts. The slide 67 also carries a guide roll 71 for the edge of belt 15, which roll is mounted on a bracket 72 uprising from said slide; and the slide further supports one of the rollers 14 in a bracket 73 mounted upon the slide, so that the roll 71 and said roller 14 are moved

whenever the slide 67 is moved in order to give proper support and guidance to the belt 15 at points adjacent its operative connection with belt 47.

The portion of the conveyer which leads into the kiln from the portion having belt 47 is shown in Figs. 1 and 3. It comprises two sections, abutting each other, and one of them abutting the section carrying belt 47. The section adjacent belt 47 has a pair of stringers 74, 75 upon which the mounted rails 76, 77 that serve as bearings for a series of rollers 78 which support the upper run of a belt 79. The said belt also travels around a driven end roller 80, guide roller 81, take-up roller 82, guide roller 83, guide roller 84, gear roller 85, guide roller 86 and end roller 87, the latter being mounted on the stringers 74, 75.

The section of the branch conveyer which projects further into the kiln is mounted on framework, represented generally by 88, and includes stringers 89, 90, which support rails 91, 92 that serve as bearings for rollers 93 which support the upper length of a belt 94. The said belt also passes around a gear roll 95, guide roll 96, take-up roll 97 mounted in a slot 98, guide roll 99, guide roll 100, driven roll 101, guide roll 102, and end roll 103. The rolls 95 and 103 are carried on the stringers 89, 90.

A motor 104 is carried on the framework 88 and its shaft has a gear 105 that meshes with a large gear 106 carried in a bearing 107 supported in the framing 88. The shaft carrying gear 106 has another gear 108 fast thereon which meshes with a gear 109 carried on roll 101. This motor and chain of gearing serve to impart movement to the belt 94.

The roller 95 has a gear 110 that meshes with an intermediate gear 111 carried on guide roll 86, which latter gear meshes with a gear 112 fast on roll 85. This connection causes the movement of belt 94 to impart movement to belt 79 and make it travel in the same direction as belt 94.

Roller 80 is mounted in a bifurcated bracket 113 that is carried by upright frame 59, and it has a gear 114 which meshes with an idle gear 115, also carried by frame 59, which last named gear meshes with a gear 116 that is fast upon roller 49. These connections serve to cause the movement of the belt 79 to impart corresponding movement to belt 47.

At times during the operation of loading the kiln, which is here represented diagrammatically, as shown at K in Fig. 1, it is desirable to elevate the branch conveyer and, to this end, we provide the stringers 89, 90 and 74, 75 with eyes 117, 118, to which suitable falls or other block and tackle may be connected for the purpose of providing the desired elevation for these parts. In such

movement, this branch of the conveyer will pivot about the axis of roll 80, and it will be understood that the angular movement about said pivot is relatively slight. This is a feature of some advantage because it greatly facilitates the stacking of the green bricks in the kiln as the piles therein become higher and higher.

We also provide the branch of the conveyer with platforms 119, 120, 121, 122 that are secured by depending brackets to stringers 89, 90 and 74, 75 respectively. These platforms serve as scaffolds, so to speak, for the operatives who are unloading the green bricks from the conveyer and stacking them in the kiln, and thus obviate the necessity of the operatives standing upon the previously piled green bricks, thereby eliminating any cause of injury to the bricks from this practice.

At the point where the bricks are passed out of the brick making machine M, we secure a plate 123 (see Figs. 1, 7, 8 and 9), which plate is preferably similar to plate 60 and has its forward edge cut at substantially the same angle.

An adjustable guiding shoe 124 is mounted in a bracket 125 and provision is made for changing its angle with respect to the travel of belt 5 by loosening nut 126, moving the shoe to the desired adjustment and then tightening said nut. As the bricks come immediately into contact with shoe 124 as they leave the brick making machine, their direction of travel with respect to that of belt 5 may readily be controlled by shoe 124, as clearly represented in Fig. 8, and this, in turn, determines the extent to which the bricks are turned when they are drawn by belt 5 off of plate 123, as will be hereinafter described. Suitable lubricating means for assisting the travel of the bricks over the plate 123 consists of a drum 127 that is mounted in a bracket 128, and is composed of material that is saturated with a lubricant such as oil, from a suitable source of supply, not shown.

In operation, the bricks which are marked B, pass out from the brick making machine M by moving in a sidewise direction, as clearly shown in Fig. 8. The bricks travel in this way along the top of plate 123 because they are pushed by the bricks behind which are continuously coming from the machine. The direction of travel of the bricks along the plate 123 is determined by adjustment of shoe 124 and, as an end of each brick comes in contact with belt 5 which is moving immediately under plate 123, the said brick is drawn along and simultaneously turned so as to lie substantially lengthwise on the belt 5, as also indicated in Fig. 8. If the shoe 124 is adjusted so as to permit the bricks to travel directly onto the belt 5 from the brick making machine with-

out any change in their path of travel, the turning movement imparted to the bricks by the belt 5 as it takes them up will be considerably less than ninety degrees. If, however, the shoe 124 is adjusted to change the path of movement of the bricks on the plate 123 so as to make it at somewhat more of an angle with respect to the belt 5, as shown in Fig. 8, the belt, on taking the bricks off plate 123, will turn them so that they lie almost lengthwise of the belt. By still further increasing the angular adjustment of the shoe 124, the belt can be caused to take the bricks away from plate 123 so that they ride on the belt precisely lengthwise thereof. This provision for adjustment is of some importance because it enables the bricks to be caused to rest on the belt 5 in the position which is best for steady travel, which position is substantially that shown in Fig. 8, to wit: slightly at an angle to the direction of movement of the belt. This position tends to prevent the bricks from falling over from one side to the other, which falling might injure them owing to their green condition. Furthermore, this angular adjustment is of importance because it assists in insuring that the bricks will be taken along by the branch belts 47, 79 and 94, while resting in a similar proper position thereupon.

As the bricks travel along with the belt 5, they move slightly upwardly and come to that section of the conveyer which carries the belt 15, and they are taken onto the said belt 15, an increase of speed being imparted to their travel as soon as they reach the belt 15. For the purpose of convenience in location of the various parts of this apparatus in establishments of this character, it is frequently desirable to have the first section of the conveyer which includes the belt 5 at a lateral angle with respect to the section of the conveyer that includes the belt 15, as clearly shown in Fig. 1; and, when this occurs, we prefer to insert a conical roller 129 between the adjacent ends of belts 5 and 15. The said roller is mounted in brackets 130 carried by stringers 1, 2. This roller serves to fill the gap between belts 5 and 15 and to cause the bricks to ride easily from the former onto the latter.

As the bricks travel along belt 15, they reach plate 60 and travel along its surface owing to the smooth nature thereof and the impetus imparted to the bricks by the belt 15. As the leading end of each brick encounters belt 47, it is drawn onto said belt and, at the same time, turned substantially at a right angle to its previous position on belt 15 so that each brick rides upon belt 47 in substantially the same relationship with respect to the direction of travel of that belt, that it previously held with respect to the direction of travel of belt 15. From

belt 47, the bricks travel onto belt 79, and thence onto belt 94, from which they are removed manually by the operatives and stacked in the kiln in a well understood manner. At desired periods, the branch of the conveyer which runs into the kiln may be elevated by tackle, as previously described.

We have found it desirable to arrange the plate 60 so that it inclines slightly downwardly toward the belt 47 and also slightly downwardly toward the direction of travel of the branch conveyer, as this position facilitates the travel of the bricks from the belt 15 across plate 60 and onto belt 47. To this end, the belt 47 is arranged so as to be slightly lower than belt 15. With a similar thought in mind, we prefer to have the plate 123 project downwardly at a slight angle from the brick making machine end of the belt 5, as shown in Fig. 7.

As the kilns are frequently located in series side by side, the main conveyer is intended to be arranged so that the branch thereof which projects into the kiln may be connected with it at various points throughout its length. Thus, provision would be made at intervals throughout the length of the main conveyer for causing the belt 15 to be depressed and passed around rollers such as 19 and 20 in order to provide a gap for the insertion of carriage 52 and parts supported thereby. Such a provision would naturally be made at a point in the main conveyer opposite the entrance to each kiln. Thus, it will be seen that the branch conveyer may be removed after a kiln has been completely filled, and connected with the main conveyer at another place so as to enter another kiln in the series. At each point where provision is made for the insertion of the carriage 52 and connected parts, provision is also made for support 62 and parts carried thereby, as well as slide 67 and parts carried thereby.

It will be understood that the branch conveyer may be arranged at an angle other than one of ninety degrees to the main conveyer, if it should be desired; in which case, the angle of the edge of the plate 60 would be changed so as to turn the bricks properly onto the branch conveyer according to the angle of the branch conveyer with the main conveyer. Also any necessary changes in the construction of the connected parts would be made. It is also plain that the branch conveyer may lead either from the right or the left of the main conveyer and that the lateral inclination of the plate 60 will be toward the right or the left according to the location of the branch conveyer; the intention being to have the plate inclined downwardly at a slight degree toward the branch conveyer and also toward the direc-

tion in which the branch conveyer leads from the main conveyer.

We believe that the operation of this apparatus and its utility will now be clear to anyone skilled in this art, but we may add, by way of emphasis, that we have provided means which takes bricks automatically from the brick making machine and conveys them to the kiln for unloading, all without the necessity of any manual handling whatever until the unloading point is reached, and that the apparatus is so designed and constructed as to insure not only very rapid handling of the bricks, but handling in such a manner that the danger of injury to the bricks owing to falling over or contact with any obstruction is reduced to a minimum. The arrangement of plates which we have provided for changing the angle of the bricks as they pass from the brick making machine onto the first belt, and for passing the bricks from the main conveyer belt to the branch conveyer that takes them off to the right or left, are particularly efficacious because they accomplish their purpose with great rapidity and exactitude, without requiring any contact whatever with the brick other than on that side upon which it is normally resting and traveling on the conveyer. By using smooth metal plates, slightly downwardly inclined and provided with lubricant, the operation is surprisingly smooth, rapid and consistent. In actual operation, while filling one kiln, we have done away with the services of four men customarily required in passing the bricks from the main conveyer to a branch conveyer, and have also greatly expedited the work and decreased the danger of injury to the green bricks. The speed of operation possible with this apparatus is such as to keep busy all the operatives that can conveniently be at work unloading in the kiln.

We desire it to be understood that various changes may be resorted to in the form, construction and arrangement of the several parts without departing from the spirit and scope of our invention; and hence, we do not intend to be limited to the details herein shown and described, except as they may be included in the claims.

What we claim is:

1. An apparatus of the character described comprising, traveling means for taking the green bricks from their source and conveying them to a distance, a second traveling means moving at an angle to the first traveling means, and automatic means for passing the bricks from the first traveling means to the second traveling means, said automatic means consisting of a substantially horizontal stationary plate overlying said second traveling means and having its

edge adjacent said second traveling means at an acute angle to its direction of travel.

2. An apparatus of the character described comprising, traveling means for taking the green bricks from their source and conveying them to a distance, a second traveling means moving at an angle to the first traveling means, and automatic means for passing the bricks from the first traveling means to the second traveling means, said automatic means consisting of a stationary plate abutting said first traveling means and overlying said second traveling means, and having a lubricating means in its portion adjacent said first traveling means for facilitating the passage across the plate of bricks being conveyed.

3. An apparatus of the character described comprising, traveling means for taking the green bricks from their source and conveying them to a distance, a second traveling means moving at an angle to the first traveling means, and automatic means for passing the bricks from the first traveling means to the second traveling means, said automatic means consisting of an inclined stationary plate abutting said first traveling means and overlying said second traveling means, and having a lubricating means in its portion adjacent said first traveling means for facilitating the passage across the plate of bricks being conveyed.

4. An apparatus of the character described comprising, traveling means for taking the green bricks from their source and conveying them to a distance, a second traveling means moving at an angle to the first traveling means, and automatic means for passing the bricks from the first traveling means to the second traveling means, said automatic means consisting of a plate abutting said first traveling means and overlying said second traveling means, having its edge

adjacent said first traveling means disposed substantially at right angles to the direction of travel of said means and having its edge adjacent said second traveling means at an acute angle to the direction of travel of said second means.

5. An apparatus of the character described comprising, traveling means for taking the green bricks from their source and conveying them to a distance, a second traveling means moving at an angle to the first traveling means, and automatic means for passing the bricks from the first traveling means to the second traveling means, said automatic means consisting of a plate abutting said first traveling means and overlying said second traveling means, having its edge adjacent said first traveling means disposed substantially at right angles to the direction of travel of said means, having its edge adjacent said second traveling means at an acute angle to the direction of travel of said second means and having a lubricating means adjacent the first named edge for facilitating the passage across the plate of the bricks being conveyed.

6. An apparatus of the character described comprising, traveling means for taking the green bricks from their source and conveying them to a distance, a second traveling means moving at an angle to the first traveling means, said second traveling means including a fixed horizontal end portion adjacent the first traveling means, a vertically movable end portion, and an intermediate portion pivoted to the first named portion to permit moving vertically the second named portion.

In testimony that we claim the foregoing as our invention, we have signed our names this 21st day of July, 1925.

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WILLIAM MALCOLM.