April 16, 1929. G. E. LUCE 1,709,138

BRICK LIFTER

Filed Aug. 1, 1925 2 Sheets-Sheet 1

FIG. 1

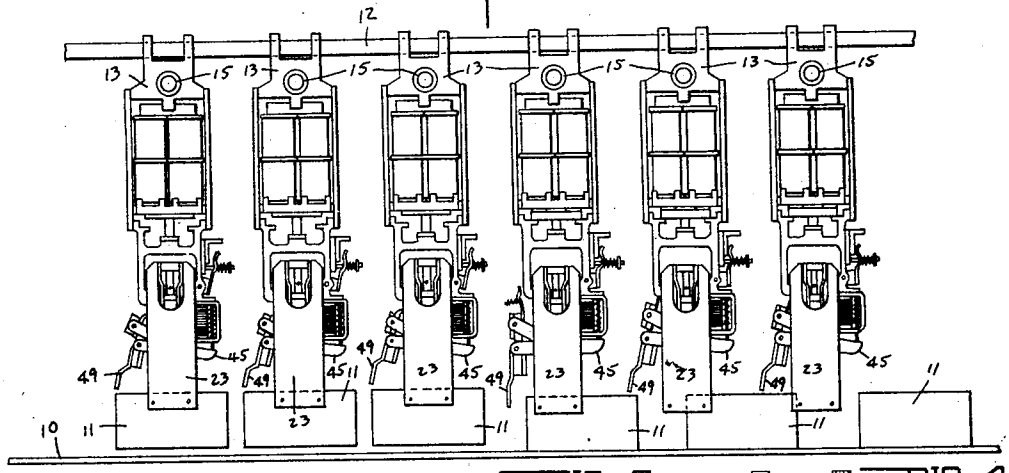


FIG. 2

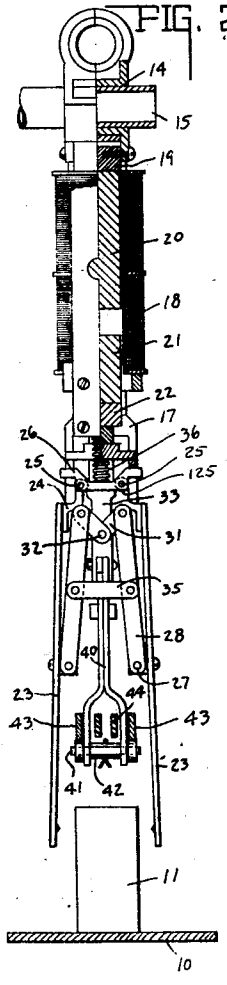


FIG. 3

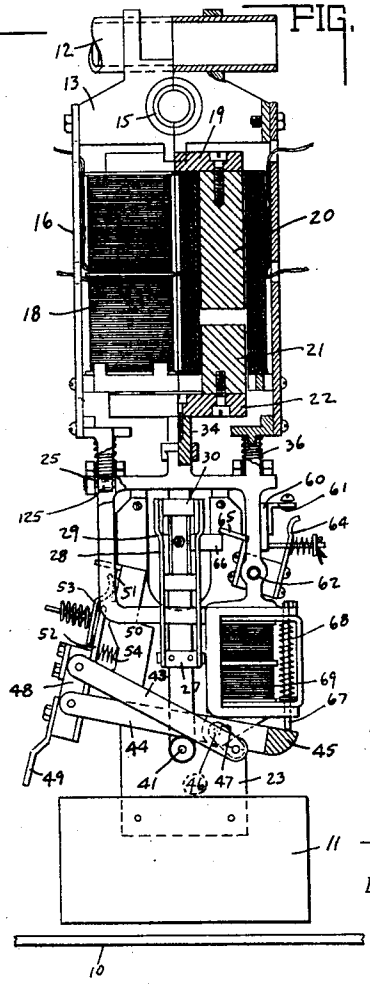
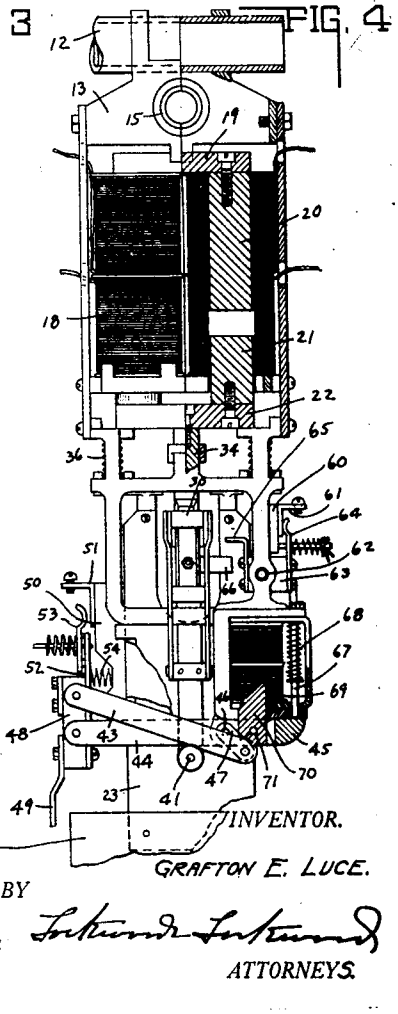


FIG. 4



INVENTOR.
GRAFTON E. LUCE.
BY
ATTORNEYS.

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FIG. 6

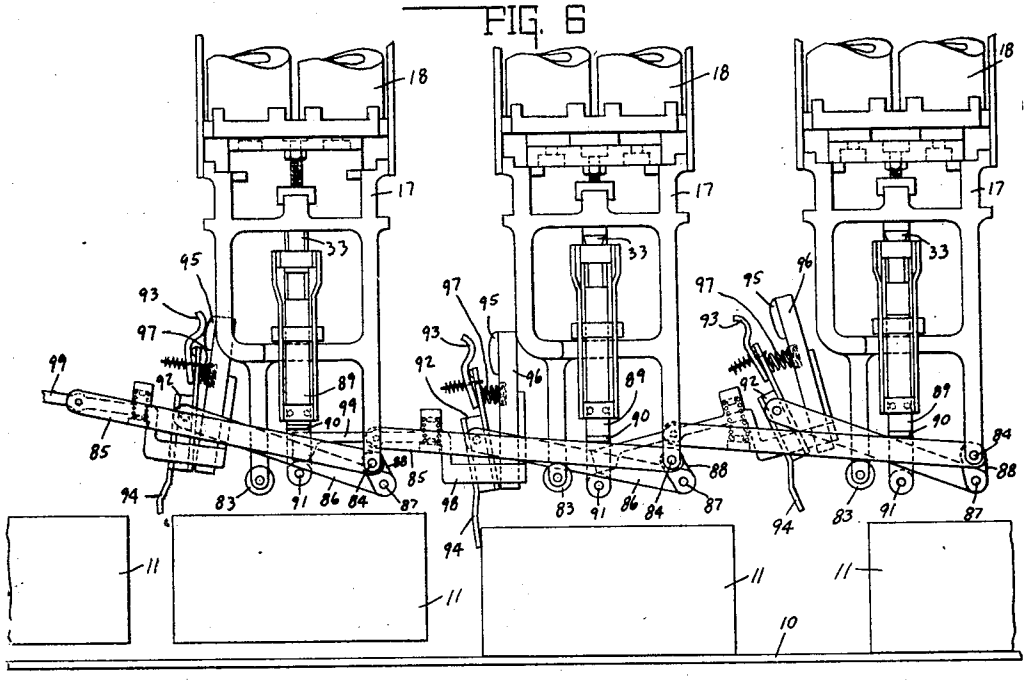


FIG. 5

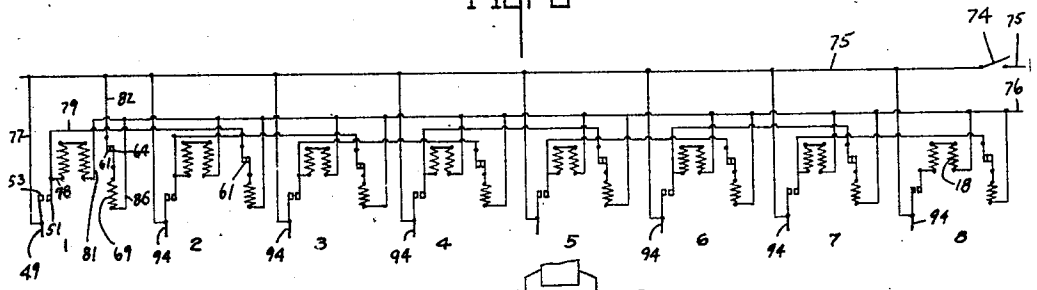


FIG. 7

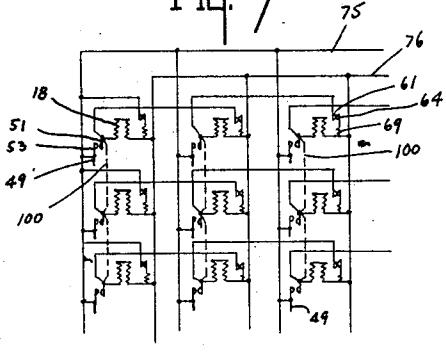
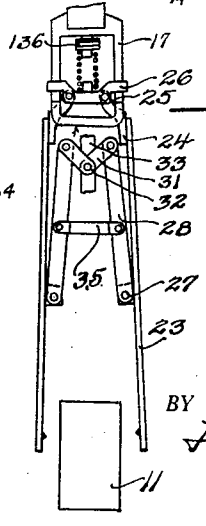


FIG. 8



INVENTOR.
GRAFTON E. LUCE.

BY Fairbanks Fairbanks

ATTORNEYS.

Patented Apr. 16, 1929. 1,709,138

UNITED STATES PATENT OFFICE.

GRAFTON E. LUCE, OF CHICAGO, ILLINOIS, ASSIGNOR TO LANCASTER IRON WORKS, INC., OF LANCASTER, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

BRICK LIFTER.

Application filed August 1, 1925. Serial No. 47,515.

This invention relates to a machine for handling articles presenting opposed surfaces upon which oppositely directed forces may be applied for grasping the article and thereafter manipulating the grasped article as desired. Articles of this character may be of any desired or preferred type or form. The device is herein illustrated as applied to brick handling, although its application is to be understood as not limited thereto. Handling green brick presents the greatest problem for a machine of the foregoing character because such an article is readily deformed by excessive pressure and such an article has a relatively low compression strength. Furthermore, such an article is readily deformed by slight contact with extraneous objects or obstructions. The mechanism, therefore, is herein illustrated as adapted to handle substantially the worst class of substantially "solid" articles, to wit, a relatively plastic or green brick without materially deforming the same. The present application is a continuation of the copending application Serial No. 723,323 heretofore allowed.

The chief object of the invention is to provide a construction which will grasp an article of the character described without deforming the same and thereafter manipulate the article as desired, particularly in the release of the article from the grasping means without the preliminary supporting of the article upon another support other than the grasping means. This last mentioned action is comparable to electromagnetic operation, but in contradistinction from the aforesaid action it is to be understood that the device has no inductive connection or magnetic connection with the article to be handled.

Another object of the invention is to associate in a machine of the character described, a control for the several units thereof whereby each unit will automatically control the succeeding unit.

The chief feature of the invention is the arrangement of the parts of each unit in the machine of the character described whereby the grasping members will grasp an article such as a brick, particularly green bricks, with just sufficient force to hold the same and permit the brick to be moved from its support without movement of the support for the grasping mechanism.

Another and most important feature of the invention is the substantially "human" estimation of the force required to elevate the article and the automatic application of said estimated force to the article by the mechanism, the remainder of the force initially applied to the entire unit being expended in handling the article after the same has been grasped. Thus the device applies to the article just sufficient force to grasp it and hold it for subsequent movement, the remainder of the total force applied being expended in moving the article following the grasping action.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings Fig. 1 is a side elevational view of a portion of the machine showing six units arranged in tandem relation and with aricles to be handled thereby in several positions and the units in corresponding positions. Fig. 2 is an end elevation of one of the units, parts being shown in half section to illustrate the same and show other parts in detail and the parts being further shown in the non-grasping position. Fig. 3 is a side elevational view with parts shown in half section to show the same and other parts in detail and with the article grasped and in an elevated position. Fig. 4 is a very similar view to Fig. 3 but illustrates the same parts in a non-grasping position preparatory to grasping. Fig. 5 is a wiring diagram of the connections. Fig. 6 is a side elevational view of several of the devices showing a modified form thereof, to wit, the mechanical inter-control, one of the units being shown in the article grasping position, one in position preparatory to grasping and the other in a position prior thereto or the non-grasping position.

Fig. 7 is a diagram of connections between a plurality of lifting devices arranged in transverse row formation and inter-connections and controls therebetween.

Fig. 8 is a view similar to Fig. 2 but with certain parts omitted or broken away to show in detail the gripping fingers and adjustment of the springs.

In the drawings 10 indicates a support for the plurality of articles 11. Herein 10 illustrates an offbearing belt carrying the brick, such as green brick or the like, beneath the brick lifting units which are associated together and carried by a common support. Herein such a support is indicated by the shaft 12. The saddle 13 is also provided with an opening 14

adapted to receive a transverse support 15. These supports 15 serve to position the several units in spaced relation while mounting of the saddles 13 on the shaft or support 12 secures the units in tandem relation. Although not a part of the present invention, it may be noted that the units are relatively movable with respect to each other and thus all of the units can be moved into close relationship on support 12 when desired, but for the purpose of the present invention the foregoing moving mechanism and control is omitted, but reference will be had to a copending application entitled "Segregator," filed July 14, 1924, having Serial No. 726,032.

Herein the saddle 13 supports two depending straps or side members 16, and supported thereby and depending therefrom is a cradle 17.

Mounted within the aforesaid framework is a fluid operable power unit. Herein said power unit is illustrated as a pair of solenoids each including an upper and lower coil, said coils being in aligned relation. The numeral 18 indicates the same. A common armature 19 is suitably secured to the framework previously described, and to the same is secured the top portion of a core 20. Thus a part of the core is stationary. The bottom part of the core 21 is movable and the two cores 21 are connected by an armature bar 22. Energization of the coils 18 therefore, will cause the cores 21 with the bar 22 to be elevated so that the core 21 may be in substantially abutting relation to core 20. This elevated position is shown in Fig. 3. Figs. 2 and 4 illustrate non-energized or lowered position of the cores.

A pair of grasping plates 23 are hingedly supported at their upper ends through a hinge member 24 at 25 upon a combination support and spring retainer 26 slidably supported in aligned relation upon the cradle 17. As shown in Figs. 3 and 4, a pair of said spring seats and guides are provided and the plates 23 include a pair of hinges 24 at their upper ends. The plates 23 intermediate the lower and grasping end and the upper and hingedly supported end support a pivot block 27 and said pivot block supports a pair of links 28, which extend upwardly and at their upper ends are offset as at 29. The upper ends of these links are connected by a spacer 30, and supported thereby is an upper toggle link 31 at each side of said spacer 30. The upper toggle link 31 together with another from the opposite clamping plate 23, is connected at 32 to a lifting or draw bar 33 which is rigidly connected as shown at 34 in Figs. 3 and 4 to the bottom armature bar 22. Thus movement of the core and bottom armature bar will raise the draw bar 33 and therefore, move the pivot 32. When this occurs, the toggle links 28 at their upper ends move outwardly and since the bottom ends of said links at 27 support the pivoted clamping plates 23, said plates move inwardly. This is because the fulcrum forming links 35 prevent separating movement of said links in the plane of the links 35, and therefore, if the upper portion of the links move outwardly or separate, the lower portion moves inwardly to compensate therefore. When this movement occurs the article or brick 11 is grasped in clamping relation while on the moving belt 10. The springs 36 are interposed between the slidably supported hinge and spring seat forming member 26 and the cradle 17, and normally tend to prevent the hinge member and gripping plates from rising. Thus the first motion of the core and draw bar operate through the toggle linkage to bring the clamping plates into contact with the article to be grasped instead of raising immediately. Further application of force results in pressure on the article without motion of any kind until enough force is applied to compress the spring, whereupon the hinge seat, clamping plate, toggle linkage and brick are all raised. It is plain that with a heavy spring the grasping force must be greater than with a light spring before the lifting can take place. By changing the size and character of the springs the grasping pressure can be varied from nothing to about 75% of the total pull of the solenoid. Washers 136 secure spring adjustment.

From the foregoing it will likewise be understood that when the coils are deenergized the springs tend to lower the clamping plates providing such opening movement is not automatically accomplished through the weight of the several parts, particularly the toggle linkages which would tend to return to their original position. Friction between parts may, however, require spring action. It will be apparent, therefore, that upon the release of the applied force, to wit, the deenergization of the coils, the articles grasped are immediately dropped from the grasping plates and therefore no support is necessary to support the articles to accomplish the release thereof from the grasping mechanism. It is to be understood, however, that wherever it is desirable to first deposit the article upon a support and then release the clamping device, such action may be utilized but the same is not necessary and in many cases is undesirable.

The foregoing is a detailed description of the essential parts of a single unit. These units, as shown in Figs. 1 and 6, may be connected together for successive operation and when such successive or continuous operation is desirable, a suitable inter-control is provided whereby one of the units controls the next successive unit and so on in turn, and herein two types of such inter-controls are illustrated, the first being of the electrical type and the second being of the mechanical

type. The first is shown in detail in Figs. 2 to 5 inclusive, while the second type is shown in Fig. 6. Reference will be had first to that type of control shown in Figs. 2 to 5 inclusive, with particular reference to the first three figures for a detailed description of the structural mechanism. Carried by the lower end of the draw bar 33 is a pair of yoke forming members 40 which support a pin 41 and a bushing 42. The yoke forming members 40 straddle a pair of links 44, which links lie within a pair of links 43. The pair of links 44 at one end carry a transverse connector 45 which is a spacer block. The links 44 are pivoted at 46 to a portion of the stationary framework. The links 43 lying outside the links 44 are connected at one end to the links 44 by the connecting links 47. The opposite ends of the links 44 and 43 are connected to an insulation block 48 and said insulation block carries a projecting finger or trigger 49. This trigger is adapted to be projected downwardly into the path of the articles movable beneath the unit gripper, and thereafter be moved out of the path or reset. A relatively stationary contact support 50 is of insulation and supports a contact member 51. The insulation block 48, pivotally supported by the bar or links 44, carries a stationary contact 52 and associated therewith is a spring actuated contact finger 53. Said members 48 and 50 are maintained in separated relation by a spring 54. When the contactor is positioned as shown in Fig. 4 the trigger is projected into the path of the article and the switch members 53 and 51 are out of contact. Immediately upon the mechanical engagement of the trigger by an article the electrical circuit through these contacts 51 and 53 is closed in opposition to spring 54. This immediately energizes the solenoid 18 and causes the article to be grasped and elevated. The foregoing action is substantially instantaneous. The switch is maintained in closed circuit position by the engagement of the bar or pin 41 with links 43 to tilt the mechanism and maintain the same in closed circuit position, while the armature and core is in the elevated position. In this movement the block 48 is tilted upwardly and inwardly through the action of the toggle or scissors construction.

Stationarily supported upon the framework is an insulation base 60 having a stationary contact 61. The pivotally supported block 63 carries a trigger 65 engageable by an arm 66 carried by draw bar 33 or equivalent mechanism. Thus in the upward movement of the draw bar, arm 66 engages trigger 65 to open the switch including the members 61 and 64. The rod 67 and spring 68 press down on the spacer block 45 and hold the entire contactor out of the path of the brick when there is no power on either the main coil or the auxiliary coil. The stem of the spring on the back of the auxiliary contact is fastened to the stationary insulation block 60, and passes through 64, so that this spring closes the auxiliary contact.

A coil 69 is mounted adjacent the spacing bar 45 and links 44 and associated therewith is a core 70 pivotally associated with said links at 71. When the solenoid 69 is energized core 70 is elevated, and therefore the links 44 are tilted upon their pivots 46 to drop the trigger 49 into the path of the oncoming article.

As previously explained engagement of the article with the trigger 49 closes the circuit to the main coil or solenoid 18 which elevates the article and the arm 66, which thereupon engages the trigger 65 and opens the switch 61—64. The connection for current to coil 69 passes through switch 61—64 so that when the brick is picked up this coil is deenergized and the trigger is allowed to be pulled into the position shown in Fig. 3.

Adjacent to coil 69 is the spring stem 67 carrying the spring 68. The stem 67 presses against the spacer block 45. When the brick have been dropped the yoke 40 drops also thus opening the contact 51—53 and closing the contact 61—64. The pressure of spring 68, however, maintains the link 44 and trigger 49 in the position shown in Fig. 3, until coil 60 is again energized.

Reference will now be had to Fig. 5. In said figure there is illustrated a main line 75 and another main line 76. The main switch 74 controls the aforesaid. Herein 8 units are illustrated diagrammatically so far as their wiring connections are concerned. A line 77 connects each of the switch members or trigger actuated members 53 with the main line 75. A line 78 connects each of the relatively stationary contacts 51 with the coils 18 and a shunt connection 79 connects said contact 51 with the switch member 61 of the next adjacent or successive unit. The switch member 64 of the switch 61—64 is connected to coil 69 and a line 86 is connected as a return to line 76. Each of the coils 18 by line 81 is connected to said common return. An initiating line 82 connects the first switch member 61 to the line 75. Thus when switch 74 is energized the normally closed switch 61—64 supplied current to coil 69 which immediately picks up the armature 70 and drops the first trigger 49 into the path of the oncoming articles. It will be noted that the switches 51—53 are normally open while switches 61—64 are normally closed. Engagement of the trigger 49 by the article closes the switches 51—53 of the first unit. This immediately supplies current to coils 18 and at the same time as shown in Fig. 5 supplied current to switch member 61 of the second unit. Thus simultaneously with the energization of coils 18, coil 69 of the second unit or adjacent unit is energized so as to immediately project

its trigger 49 into the path of the oncoming articles. After the coils 18 become effective the first unit engages the first initiating article to be grasped and elevated and in the continuing elevating movement, the arm 66 engages trigger 65 and opens the circuit of the coil 69 thereby deenergizing the same and permitting the links 44 to tilt, thus maintaining switches 53—51 in closed circuit position by reason of the engagement of the pin 41 with links 43. Thus energy is maintained through the return line 81 and supply lines 77 through the coils 18 for holding an article. Immediately upon the engagement of the trigger 49 of the second unit, the switch 51—53 is closed and current is supplied through its branch 77 to coils 18 and to the switch member 61 in the circuit of the coil 69 of the third unit. At the same time the second unit coils 18 are energized and maintained in that condition. Any number of units, therefore are automatically energized successively by successive individual engagement of articles with the individual triggers. When the entire battery of units is filled with articles they may be moved by moving the support 12. This can be accomplished in several ways. The switch 74 may be manually or mechanically actuated, and if desired the last switch 53 may be so arranged that it or a part of the toggle mechanism is adapted to mechanically control any desired motor motion to move the row of brick as desired. Upon opening the circuit 74 it will be apparent that all of the coils 18 are deenergized and all of the articles are released from the grasping mechanisms.

In Fig. 6 a modified form of the invention is illustrated and in this form of the invention the electrical connection between switch 51 through the shunt 79 to switch 61—64 and coil 69 and line 80, is replaced by a mechanical mechanism which in its broader aspect is the full equivalent of this electrical mechanism hereinbefore described, although, because of the ease of substitution in the event of repair and because of other operating conditions, the electrical equivalent is preferred. In Fig. 6 each of the units includes coil 18, the cradle 17, the draw bar 33 and the associated toggle linkage hereinbefore described.

The control mechanism includes the following: The cradle 17 supports a roller 83 and the cradle also provides a pivot 84 for a pair of links 85 between which are positioned another pair of links 86 which are pivotally supported at 87 by a pair of links 88 in turn pivotally supported at 84. The draw bar extension 89 carries a stop 90 and the pin 91. The pin 91 actuates the inner pair of links 86, which in reality constitute levers, to elevate the entire contactor mechanism controlling the coil 18 after said coil 18 has been energized. Pivotally supported in the opposite ends of the inner links 86 is an insulation block 92 upon which is yieldingly mounted a contactor 93. Also supported by said block is a tongue or trigger 94. Adjacent said contactor 93 is another contactor 95 supported by an insulated block 96, said contacts being maintained in open relation by a spring 97. Block 96 is supported by a U-shaped support 98 which has an extension 99 that extends beyond the ends of the levers or links 85 upon which the same is pivotally mounted.

It will be noted that the belt 10 conveys the brick or similar articles 11 beneath the mechanisms until one of the brick contacts the last trigger 94, whereupon the block 92, pivoted at the end of the links or levers 84, is tilted into closed circuit position causing contact 93 to close the circuit through contactor 95, thereby energizing coil 18 which causes the elevation of the draw bar 33 and the extension 89 thereof at the same time that the brick is clamped through the toggle linkage previously described and particularly illustrated in the preceding figures. Elevating movement of the draw bar causes the inner links 86 to be elevated and at the same time said movement elevates the outer links 85, positioning the several linkages as shown in the left hand third of Fig. 6. Simultaneously with this movement the extended end 99 of the second mechanism is caused to be tilted upon its pivot thereby moving the tongue or trigger 94 downwardly in the path of the oncoming brick, whereupon it is engaged thereby for tilting of the block, closing of the switch and energizing of the coil whereupon the cycle is repeated. After the coils 18 are deenergized the several linkages are returned to the position shown by the right hand third of Fig. 6. In this position the two pairs of levers 85 and 86 are in their lowermost position which maintains the trigger 94 in the uppermost position and the switch in the open circuit position. At the same time the trigger or extension 99 is in position to be actuated for projecting the trigger 94 into the lower or brick engageable position. Thus each successive switch actuating mechanism is adapted to be engaged by the oncoming article for energizing the lifting and clamping mechanism and simultaneously setting the trigger mechanism of the next adjacent lifting and grasping mechanism.

In Fig. 7 there is diagrammatically illustrated a plurality of individual lifting devices having the lifting and grasping coils or solenoid 18. The movably mounted switch 51—53 and the circuit thereto, said switch having the brick engageable portion or contactor 49. The solenoid 69 actuatable by brick engagement with the preceding contact for positioning the succeeding contactor for brick engagement, a switch 61—64 controlling and including in a circuit of said last mentioned solenoid and operable in the lifting movement of the grasping device. The

switch 53—51 controlled thereby, however, remains in actuatable relation or closed circuit position until the lifting and grasping solenoids 18 are deenergized which automatically opens said switch 53—51 and closes the switch 61—63 as well as permitting the clamping plates to return to the lowered and opened, or non-clamping position. A cross connection 100 between all of the devices in each successive row insures that upon the first engagement of a contactor 49 by brick the positioning solenoid 69 of each of the devices of the succeeding row will be energized to position all of the contactors of said succeeding row in position for brick engagement. Thus, in the event that the brick 11 on belt 10 are supplied in a plurality of streams and there is removed from the belt, a brick in any one of the streams (usually removed by the inspector or by accident) the brick would not pile up by reason of the remaining brick in the row from which the brick has been removed, engaging the contactors and actuating the same and leave the other tandem row deenergized.

Furthermore, in the event that any contactor is coated with clay or there is an open circuit to the lifting solenoid 18 through the switches, then said solenoid 18 will pick up since it secures energy through the cross connection 100 in spite of the aforesaid failures.

The invention claimed is:

1. In combination, for lifting brick, a brick support, a plurality of brick arranged in tandem relation upon said support, a plurality of brick grasping devices similarly arranged, said brick grasping devices and said support having relative movement with respect to each other in the tandem direction, and means associated with each grasping device for actuating the same to grasp and lift the brick substantially vertically.

2. In a device for lifting brick, the combination of a brick support, a plurality of brick grasping devices arranged in tandem relation, a support for said grasping devices, said supports being movable relatively of each other in the tandem direction, and means for actuating said grasping devices for grasping and lifting the brick substantially vertically, said devices each being adapted to straddle the brick to permit passage of non-grasped brick therethrough to the preceding grasping device.

3. In a device for lifting brick, the combination of a brick support, a plurality of brick grasping devices arranged in tandem relation, a support for said grasping devices, said supports being movable relatively of each other in the tandem direction, means for actuating said grasping devices for grasping and lifting the brick substantially vertically, said devices each being adapted to straddle the brick to permit passage of non-grasped brick therethrough to the preceding grasping device, and a control associated with each grasping device whereby successive brick will be grasped on by successive devices in succession.

4. In a device of the character described, the combination of a plurality of article grasping means, electrical means for each grasping means for operating the same, and a switch associated with each of said electrical means and operable by the article to be grasped for conditioning the successive article grasping means.

5. An article handling mechanism of the character described including a pair of fingers adapted to grasp and hold an article having resisting surfaces, linkage connecting said fingers and having a predetermined limiting position, and a single power means for moving said toggle linkage for first causing said fingers to grip the article and thereafter move the linkage to the limiting position and the article from its initial position.

6. An article handling mechanism of the character described including a pair of fingers adapted to grasp and hold an article having resisting surfaces, linkage connecting said fingers and having a predetermined limiting position, a single power means for moving said linkage for first causing said fingers to grip the article and thereafter move the linkage to the limiting position and the article from its initial position, and an anti-friction support for said fingers.

7. In a mechanism for lifting brick, the combination of a brick support, and a brick grasping device, a support for said grasping device, and means for actuating said grasping device for grasping and moving the brick, said brick and brick grasping device being relatively movable with respect to each other in two transverse directions, said actuating means permitting the brick to be released from said device for deposition upon a second support without first resting the brick.

8. In a device of the character described, the combination of a plurality of article-engaging fingers, means for operating one of said fingers including a single unidirectional movable plunger, and a connection between said plunger and said operated finger which causes said fingers to engage the article until further engagement is resisted by the article and the remainder of the plunger travel is transmitted to the fingers for lifting the same and the article.

9. In a device of the character described, the combination of a plurality of article-engaging fingers, means for operating one of said fingers including a single unidirectional continuously traveling plunger, and a connection between said plunger and said operated finger which causes said fingers to engage the article until further engagement is resisted by the article and the remainder of the plunger travel is transmitted to the fingers for lifting the same and the article.

10. In a device of the character described, the combination of a plurality of article-engaging fingers, means for operating one of said fingers including an electric solenoid, a slidable core operable by said solenoid, and a connection between said core and said operated finger arranged so that the initial power application is applied to said finger for article engagement and the remainder of the power application is applied to the fingers for elevating the article.

11. In a device of the character described, the combination of a plurality of article-engaging fingers, a toggle construction for operating said fingers, and a single means for exerting a uni-directional force upon said toggle construction, whereby said fingers are adapted to first engage an article and thereafter continue to hold the article and elevate the same with the continued application of said uni-directional force.

12. In a device of the character described, the combination of a plurality of article-engaging fingers, a single linearly movable means for providing a uni-directional movement of a predetermined amount, and a connection between one of said fingers and said uni-directional means, whereby the fingers first engage an article to hold the same only with the initial portion of the movement of the uni-directional means and the remainder of the travel of the uni-directional means is utilized for elevating the article and the fingers while holding the same.

13. An apparatus of the character described including a single linearly movable reciprocable means for applying a single force acting in one direction when moved in one direction for engaging an article and thereafter raising the same while engaged and upon return movement automatically release the article.

14. An apparatus of the character described including a single linearly movable reciprocable means for applying a predetermined uni-directional force when moved in one direction for engaging an article with just sufficient force to hold the same and applying the remainder of said force to elevate the same and upon return movement automatically release the article.

15. In combination, a support, an article upon said support, a plurality of fingers for engaging said article above the support, and a single means for causing said engagement and elevating the article when thus engaged, said article-engaging means being automatically returnable upon the removal of the constraining force applied thereto to permit the article to be released without prior deposition upon a support at the time of release.

16. In a device of the character described, the combination of a plurality of article-engaging fingers, and a power operable mechanism for actuating in one movement said fingers to engage an article and elevate the same, said fingers being automatically returnable into non-engaging position upon release from the power operable mechanism and for releasing the article through the weight thereof.

17. In a device of the character described, the combination of a plurality of article-engaging fingers and a single power operable mechanism for actuating said fingers to engage an article and elevate the same in one continuous movement, said article being automatically releasable by reason of its weight when the constraining force of the power operable mechanism is released.

18. An article handling mechanism of the character described including a pair of fingers adapted to grasp and hold an article having grasping surfaces, and a single solenoid for actuating said fingers to grasp the article and elevate the same.

19. An article handling mechanism of the character described including a pair of fingers adapted to grasp and hold an article having grasping surfaces, and a single solenoid means actuable by a predetermined force for actuating one of said fingers to grasp the article with only sufficient force to hold the same and continue the application of whatever balance of force is required for moving the article thus grasped.

20. An article handling mechanism of the character described including a pair of fingers adapted to grasp and hold an article having grasping surfaces, linkage connecting said fingers, a single solenoid for operating said linkage for causing said fingers to first grasp an article and when grasped to move the same, and an anti-friction support for said fingers.

21. In a clamp construction for plastic articles, the combination of a support, a clamping mechanism movably supported thereby, and a support for said mechanism positioned beneath said first mentioned support, said clamping mechanism including a pair of horizontally fulcrumed opposed clamping plates, and pressure operable means for causing said plates to move together to engage and clamp the plastic article, said clamping plates being automatically returned to and normally maintained in non-clamping relation by gravity, said pressure operable means actuating said plates in opposition to gravity.

22. In a brick lifter, the combination of a pair of clamping plates, a support for supporting the same, a linkage connected to one of said plates, means for actuating said linkage, a support for said actuating means, and yielding means interposed between said supports for normally opposing movement of the first mentioned support with respect to the second mentioned support until the article to be clamped and raised has been grasped with sufficient force to permit of raising the same.

23. In a brick lifter, the combination of a pair of clamping plates, a support for supporting the same, linkage connected to one of said plates, means for actuating said linkage, a support for said actuating means, yielding means interposed between said supports for normally opposing movement of the first mentioned support with respect to the second mentioned support until the article to be clamped and raised has been grasped with sufficient force to permit of raising the same, and an anti-friction mounting associating said supports together.

24. In a brick lifter, the combination of a pair of clamping plates, a support for supporting the same, a linkage connected to one of said plates, power means for actuating said linkage, and yielding means associated with said support, the grasping force applied by said clamping plates being directly proportional to the strength of said yielding means.

25. In a brick lifter, the combination of a pair of clamping plates, a support for supporting the same, a linkage connected to one of said plates, power means for actuating said linkage, and adjustable yielding means associated with said support, the grasping force applied by said clamping plates being directly proportional to the adjusted strength of said yielding means.

26. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem, and including a plurality of tandem arrangements, means connecting each device in the tandem arrangement for conditioning the same by the operation of the preceding device, and means connecting the devices in each row for insuring conditioning of all of the tandem arranged in the succeeding row.

27. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem and including a plurality of tandem arrangements, means connecting each device in the tandem arrangement for conditioning the same by the operation of the preceding device, and means connecting the devices in each row for securing operation of all of the tandem arranged devices in said preceding row upon operation of any one of said devices in said preceding row.

28. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices, arranged in tandem and including a plurality of tandem arrangements, means connecting each device in the tandem arrangement for conditioning the same by the operation of the preceding device, and means connecting the device in each row for insuring conditioning of the tandem arranged devices in the succeeding row and for securing operation of all of the devices in said preceding row upon operation of any one of said devices in said preceding row.

29. In combination, a plurality of brick clamping means, actuating means for each of said grasping means, a brick engageable member associated with each of said brick grasping means, a plurality of brick, and means connecting each of said brick grasping means for positioning the brick engageable member for brick engagement upon brick engagement of the preceding brick engageable member with a brick, the engagement of brick with the brick engageable member initiating said actuating means and positioning said brick in predetermined position with respect to the grasping means for grasping.

30. In a brick lifting device, the combination of a grasping solenoid, a movably mounted switch controlling the same engageable by a brick to be grasped for actuating said solenoid, and means for moving said switch into position for brick engagement and solenoid actuation.

31. In a brick lifting device, the combination of a plurality of brick grasping devices each including a solenoid, a movably mounted switch controlling the same engageable by a brick to be grasped for actuating said solenoid, and means automatically actuatable by brick engagement of the preceding switch for moving said succeeding switch into position for brick engagement and solenoid actuation.

32. In a brick lifting device, the combination of a grasping solenoid, a movably mounted switch for actuating the same, a solenoid for moving said switch into position for brick engagement, and means for actuating said second mentioned solenoid.

33. In a brick lifting device, the combination of a grasping solenoid, a movably mounted switch for actuating the same, a solenoid for moving said switch into position for brick engagement, means for actuating said second mentioned solenoid, and means associated with the solenoid and switch for automatically returning the switch to non-engageable position upon actuation of the first mentioned solenoid.

34. In a brick lifting device, the combination of a grasping solenoid, a movably mounted switch for actuating the same, a solenoid for moving said switch into position for brick engagement, means for actuating said second mentioned solenoid, and means associated with the first mentioned solenoid and switch for automatically maintaining said solenoid and switch in brick grasping relation and automatically returning said switch to non-engageable position upon actuation of the first mentioned solenoid.

35. In a brick lifting device, the combina-

tion of a grasping solenoid, a movably mounted switch controlling the same engageable by a brick to be grasped for actuating said solenoid, and means associated with said solenoid and switch for automatically positioning said switch in position for brick engagement and solenoid actuation and automatically returning said switch to non-engageable position upon actuation of the solenoid.

36. In a brick lifting device, the combination of a grasping solenoid, a movably mounted switch controlling the same engageable by a brick to be grasped for actuating said solenoid, and means associated with said solenoid and switch for automatically maintaining said solenoid and switch in brick grasping relation and automatically returning said switch to non-engageable position upon actuation of said solenoid.

37. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem and including a plurality of tandem arrangements, means connecting each row to the succeeding row for conditioning by a preceding device operation, the device in the successive row for operation, and means connecting the devices in each row for insuring conditioning of all of the preceding row of devices by any one of the devices in the preceding row.

38. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem and including a plurality of tandem arrangements, means connecting each row to the succeeding row for conditioning by a preceding device operation the devices in the succeeding row for operation, and means connecting the devices in each row for securing operation of all of the devices in said preceding row upon operation of any one of the devices therein.

39. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem and including a plurality of tandem arrangements, means connecting each row to each succeeding row for conditioning by a preceding device operation the devices in the succeeding row for operation, and means connecting the devices in each row for insuring conditioning of all of the succeeding rows of devices by any one of the devices in the preceding row and for securing operation of all of the devices in said preceding row upon operation of any of the devices therein.

40. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem and including a plurality of tandem arrangements, and means connecting said devices whereby all of the devices in a row are conditioned for operation upon operation of any devices in the preceding row.

41. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem and including a plurality of tandem arrangements, and means connecting said devices whereby all of the devices in a row are actuated upon operation of any device in said row.

42. In a device for lifting brick, the combination of a brick support adapted to support a plurality of brick, a plurality of rows of brick grasping devices arranged in tandem and including a plurality of tandem arrangements, and means connecting said devices whereby all of the devices in a row are conditioned for operation upon the operation of any devices in the preceding row and all of said devices in said row are actuated upon the operation of any device in said row.

43. In a device of the character described, the combination of a plurality of article grasping means, a power means for each grasping means for individually operating the same, and a device associated with each of said power means and operable by an article to be grasped for conditioning the succeeding article grasping means for grasping.

44. In a device for lifting brick, the combination of a brick support, a plurality of brick grasping devices arranged in tandem relation, a support for said grasping devices, said supports being movable relatively of each other in the tandem direction, means for actuating said grasping devices for grasping and lifting the brick substantially vertically, said devices each being adapted to straddle the brick to permit of passage of non-grasped brick thereto to the preceding grasping device, and a control associated with each grasping device operable by the brick to be grasped whereby successive grasping devices are successively conditioned for grasping brick.

45. In a clamp construction for plastic articles, the combination of a support, a clamping mechanism movably supported thereby a support for said mechanism positioned beneath said first mentioned support, said clamping mechanism including a pair of similarly fulcrumed and opposed clamping plates, and pressure operable means for causing said plates to move together to engage and clamp the article, said clamping plates being automatically returnable into non-clamping position upon return of the pressure operable means to initial condition.

46. In a brick lifter device the combination of a support, a pair of clamping plates for clamping and lifting brick, power means, means for elevating said plates, a normally

open control for said power means, a contactor engageable by the brick for operating said control, a connection between said control and the means for elevating the brick clamping plates for maintaining said control in the power applying position when the brick is elevated and a yielding mounting associated with said control permitting relative movement between the parts of said control for obtaining positive predetermined positioning of said control in the power applying position.

47. In a brick lifter device the combination of a support, a pair of clamping plates for clamping and lifting brick, power means, means for elevating said plates, a normally open control for said power means, a contactor engageable by the brick for operating said control, and a connection between said control and the means for elevating the brick clamping plates for maintaining said control in the power applying position when the brick is elevated, the maintaining connection including a linkage operable by the elevating means when the clamping plates are in clamping relation.

48. In a device for lifting brick, a solenoid for actuating said device to grasp and lift the brick, a member engageable by the brick for actuating said solenoid, a second solenoid actuable to position said brick engageable member for brick engagement, and a switch controlled by said first solenoid for deenergizing said second solenoid upon actuation of said first solenoid.

49. In an article initiating lifting device, the combination of a trigger engaged by the article to be lifted prior to the lifting for initiating the same, a normally open switch closed by the trigger when engaged by the article, and links for elevating the trigger with the article when lifted.

50. A device as defined by claim 49, characterized by the trigger elevating means including a link pivotally supported at one end, another link pivotally supported upon the opposite end of the first mentioned link and connected to the trigger, and a third link connected to the trigger, said links being arranged to maintain the trigger in switch closing position when lifted.

51. In combination a pair of relatively movable switch members, links associated therewith for securing relative movement therebetween, a solenoid for causing lowering movement of the links, another solenoid for causing upward movement of the links when the switch is closed, a normally closed switch controlling the first mentioned solenoid, and means operable in the elevational movement responsive to the second-mentioned solenoid for opening said second-mentioned switch and deenergizing said first-mentioned solenoid.

52. A device as defined by claim 51, characterized by the addition of a spring for cushioning the lowering movement of the links when the second-mentioned solenoid is deenergized.

53. A device as defined by claim 51, characterized by the addition of means for normally maintaining the links in the elevated position when the second mentioned solenoid is deenergized.

54. A device as defined by claim 51, characterized by the addition of means for normally maintaining the links in the elevated position when the second mentioned solenoid is deenergized, and means operative to energize said first-mentioned solenoid to actuate said links for lowering the same in opposition to said maintaining means.

In witness whereof, I have hereunto affixed my signature.

GRAFTON E. LUCE.