

March 10, 1936.

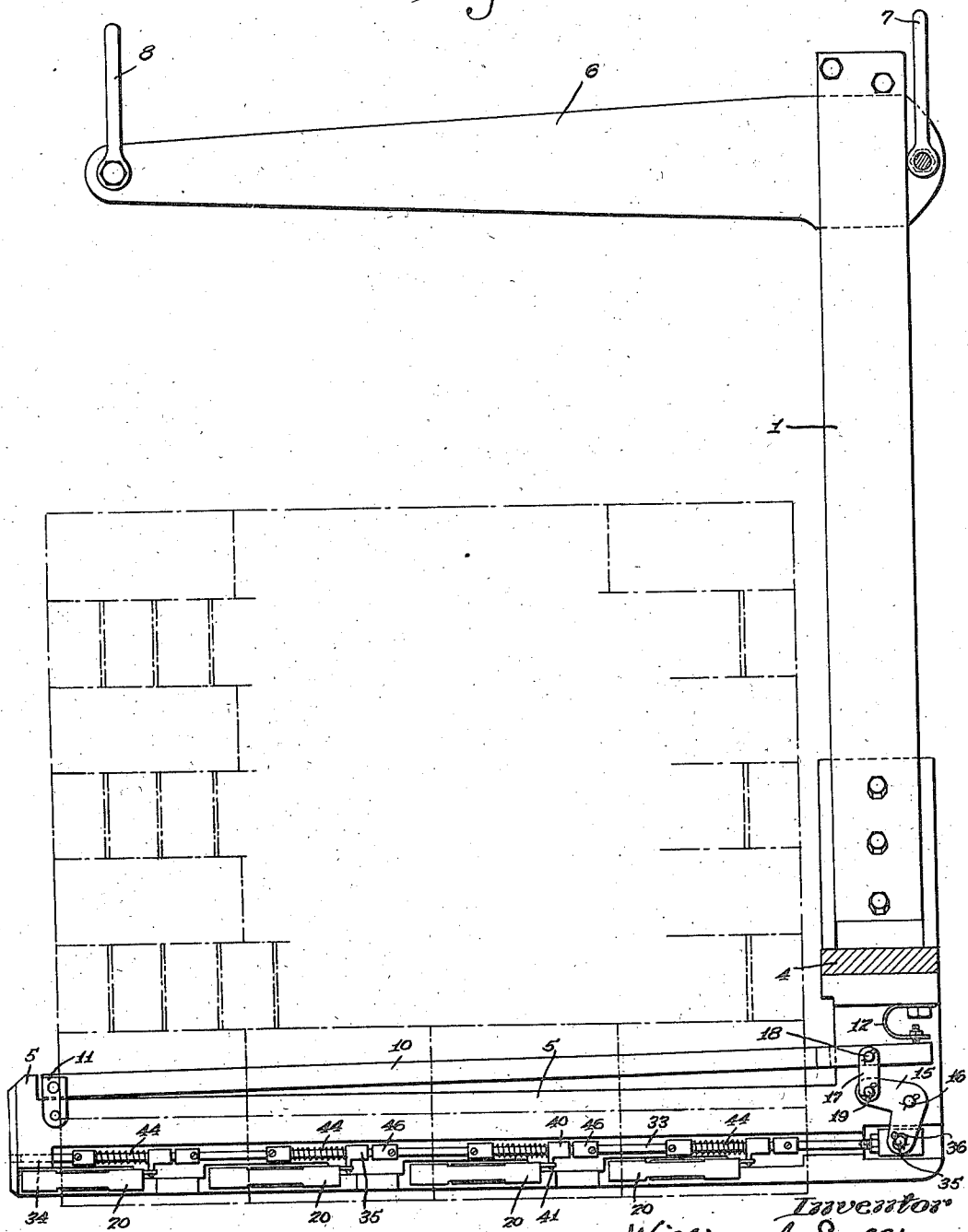
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2 Sheets-Sheet 1

Fig. 1.



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2 Sheets-Sheet 2

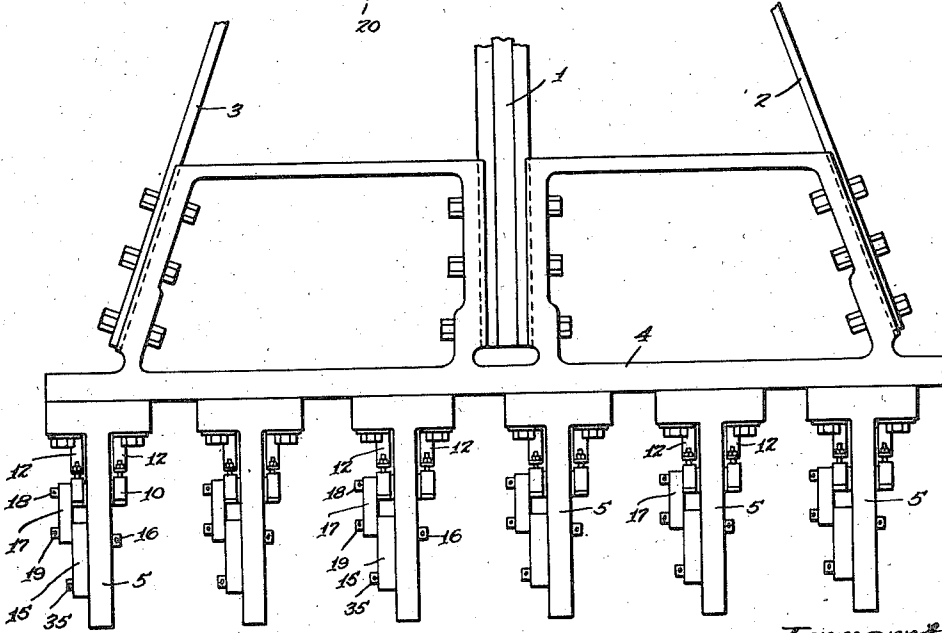
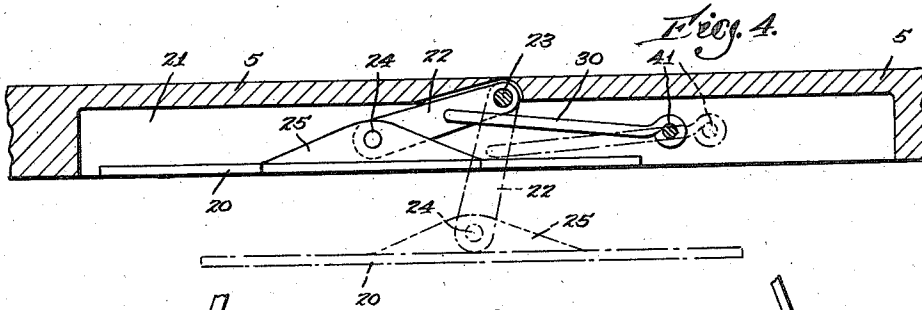
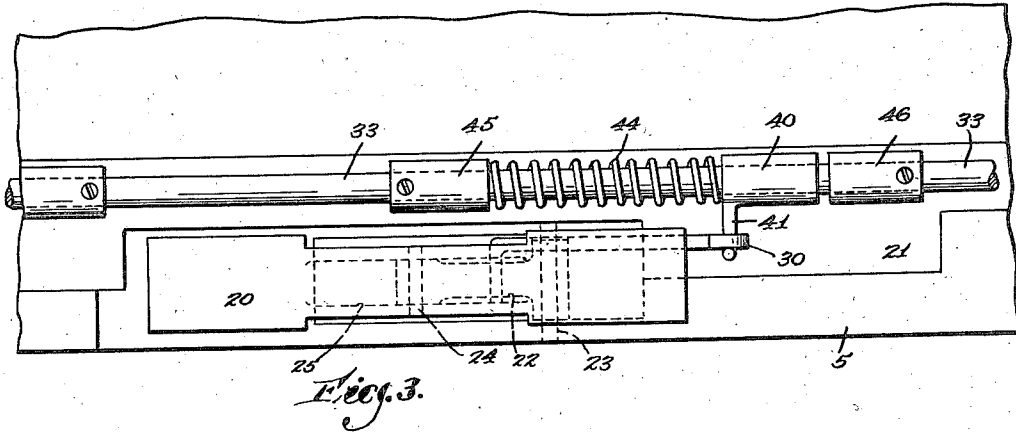


Fig. 2.

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UNITED STATES PATENT OFFICE

2,033,746

BRICK LIFTING DEVICE

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Application June 1, 1933, Serial No. 673,813

1 Claim. (Cl. 294—62)

My present invention is a novel and improved apparatus for lifting brick, and is particularly directed to the brick engaging mechanism.

Heretofore, it has been customary to utilize mechanical apparatus for lifting a row, stack, or unit of brick in the manufacture of same, in the building of a kiln therefrom, in loading and unloading, or transporting the finished or burnt brick from place to place.

My present invention is directed to improve and perfect such devices and to develop an improved novel and efficient brick-engaging device and lifting means.

A great difficulty with prior lifting devices, particularly when intended for use upon soft brick, i. e., not yet burnt and during manufacture, has been that the brick engaging devices and lifting fingers would indent or mar the unburned brick. An important object of the present invention is to eliminate such a difficulty.

A further object of the present invention is to have a brick engaging and lifting finger device which will act simultaneously and instantly to engage and clamp the brick at the initiation of the engaging action.

Thus in the mechanical handling of brick, particularly when units are being handled, a plurality of spaced rows are set, with the brick unit piled on top of the same, the spaces permitting the insulating of the lifting fingers of the brick handling apparatus. As the apparatus is raised, its weight actuates the clamping means which are adapted to lift the bottom row of brick, this being effected by a lateral clamping action on the side of the bottom row of brick between the ground floor or support on which they rest, and the height of the individual brick in the bottom row.

This clamping action therefore must be instantly operative to catch the bottommost brick of the unit or stack and lift the same with the rest of the stack. My invention improves these clamping instrumentalities, which engage instantly and quickly to clamp a brick, preferably below the center of the brick, in the bottom row, thus insuring their being carried up with the load on which the unit is set when released and the lever withdrawn or removed therefrom.

It is, therefore, an especially important feature of my present invention to improve and perfect the clamping action and to provide the operating instrumentalities which will effectually clamp or exert the clamping action with a degree, extent, and amount of force to insure the lifting of the bottommost row of brick. Furthermore, these

clamping devices automatically compensate for difference in thickness or thinness of the brick being clamped, softness or hardness of unburned brick, and still further insure the strength of the material in the devices. It will be appreciated that in the brick lifting fingers but a limited space is permitted for actuation of the clamping devices.

My invention permits a plurality of clamping devices or plates to be housed within the finger and to be simultaneously actuated by the movement of a single rod, although each plate is individually actuated through the intervention of a separate spring. Thus, I am enabled to make a strong, rigid construction, insuring instant, uniform, and positive action of the clamping plates either when being forced out in the clamping action or when being housed within the area of the brick lifting finger.

A further improved feature is that by my present construction the clamping plates are effectively locked or held in retracted or housed position. Also by my present method of construction the clamping plates will be held in their retracted position until a sufficiently substantial or great weight is exerted on the operating lever to overcome the locking position. This locking position is maintained by the combined action of a plurality of springs on the individual clamps, as well as on the weight construction and friction of the operating parts on each finger. This consequently insures the lifting grip of the plates on the bottom brick when the plates are moved into clamping position.

Prior constructions utilizing a single, small, thin rod to each lifting plate gave constant trouble, whereas my present improvement utilizing one single rod of substantial size and greatly increased strength eliminates the difficulty and danger of breakage and damage of such prior devices, and also necessarily actuates all the plates in the lifting finger connected with the rod simultaneously and uniformly.

A still further improvement and advantageous feature in my present construction is that the brick engaging plates or clamps on each finger are operated independently from those on each other finger, as well also as having each clamp operated independently through the instrumentality of the spring feature while they are all moved in unison with a single operated rod.

My present invention of a new and novel brick engaging device and lifting fingers has a further very important capacity of being readily attached to present existing types of lifting frames, brick setting devices, and brick handling forks.

Also my improved lifting and clamping finger and devices can be utilized with equal facility, both in brick handling apparatus for handling unburned brick—as in building kilns—or other unit stack formation, and also in handling burned brick in unit stack formation.

Thus my invention enables a brick handling machine to be utilized both for setting unburned brick in a kiln and for handling burnt brick for transporting from one place to another, or from cars, barges, or the like to wagons, trucks, etc. The ease, delicacy, and facility with which the fingers operate, enable a brick handling apparatus equipped with my present invention to grip and lift the unit stacks of brick when they are on uneven or non-level surfaces or supports, such for example as burnt brick after the kiln has settled unevenly, or on the decks of barges, which are curved or crowned substantially, my improved apparatus handling such unit brick with equal facility as in lifting and transporting from level surfaces, such as platforms, flat cars, or barges.

Referring to the drawings illustrating a preferred embodiment of my present invention,

Fig. 1 is an elevational view of a brick lifting frame incorporating my improved clamping fingers and devices;

Fig. 2 is a front elevational view;

Fig. 3 is an enlarged cross-sectional view showing the clamping device and operating means, and

Fig. 4 is a cross-sectional view of the showing of Fig. 3.

It is an important feature of my present invention that the improved clamping device and lifting finger mechanism may be utilized in the various mechanical brick lifting and brick setting frames now in general use and in the principal operation of the same. Thus, my present invention is applicable to the unit handling system whereby an entire unit of brick is lifted together with the bottom spaced rows of brick on which the unit is built but with a much quicker clamping action thereby. It is customary in handling units of brick to have the bottom or spaced row formed with two brick deep set edge-wise, thus giving a substantial height and an appropriate space to insert the lifting fingers of the handling apparatus.

As shown in Fig. 1, a typical handling frame is illustrated in diametric form, having vertical frame members 1, 2, and 3, carrying a rigid cross-frame 4, to which are secured rigid lifting fingers 5—5 by suitable connections with the cross bar 4. An upper framework 6 to which the lifting pulleys 7 and 8 may be attached either to a turntable, if desired, or directly to the lifting means are also shown.

Referring to Fig. 1, a unit stack of brick is designated in dotted lines illustrating the spaced brick for the bottom row in the finger course. Through these plurality of spaces in the unit are slid the individual fingers 5, and as the apparatus is lifted these fingers 5 contact with the bottom of the unit stack and raise the same, by clamping means meanwhile laterally expanding to engage and clamp the bottom row.

In order to effect quick operation of the clamping means, I mount an operating bar 10 pivoted at the outer end of each finger 5 to a link 11 and having the inner end adjacent the lifting frame and cross bar 4, secured by a spring 12. This operating bar is attached to a bell crank lever 15 pivoted at 16 to the finger 5 and having

a link 17 with one end 18 pivoted to the bar 10, the other end 19 pivoted to one arm of the bell crank lever 15. The opposite end of the bell crank lever 15 actuates the series of brick engaging clamps 20—20 in position to contact with and insert a clamping pressure upon the lowermost brick of the finger course in the unit or stack to be lifted. These clamping plates 20, see Figs. 3 and 4, are adapted to be normally housed within an appropriate recess 21 formed in the side of the finger 5, each plate being mounted on a link 22 pivoted to a stud 23 secured to the finger 5, and with the outer end of said link pivoted at 24 to a pair of depending flanges or ears 25—25 bent downwardly in the center part of the clamp 20, see Fig. 3.

To effect a quick expansion and contraction of the plate 20, I provide an actuating arm comprising the rod 30 attached to the link 22 between its fixed pivot 23 and the pin 24, uniting the opposite end of the link 22 to the clamping plate 20. Thus, a slight movement of the rod 30 effects a quick clamping action or a quick retraction of the clamping plate.

Preferably I arrange each clamping plate 20 to be independently and individually controlled by a spring clamping action. For this purpose, I provide a rod 33 adapted to be reciprocated within the finger 5, having a bearing at the outer end at 34, see Fig. 1, and at its inner end, being connected to one arm of the bell crank lever 15, preferably through the pin 35 and an enlarged slot 36 in the bell crank lever as shown. This rod 33 carries a plurality of hubs 40, each with a lug 41 extending therefrom and in position to engage the opposite end of the adjacent link 30. The hub 40 is mounted to slide freely on the rod 33 and each is normally held by its coiled spring 44, bearing between one end of the hub 40, and the collar 45 fixed to the shaft 33 to hold the clamps 20 housed within the recesses 21. The action of the spring 44 is to allow for varying thicknesses in a brick engaged by each clamp 20 so as to have an independent spring action on each, the distance between the sliding hub 40 and each adjacent stop 46 being sufficient to allow for this variation in thickness of the brick to be clamped. The main action of the clamps is controlled by the sliding movement of the rod 33 through the action of the bell crank lever 15, and the spring 12 operating in opposition to the weight of the brick stack on the rod 10 when said weight is relieved or removed.

Upon the lifting of the brick frame, however, the rod 10 contacting quickly with the bottom of the unit stack of brick will operate the bell crank lever 15, thus moving the rod 33 to the right, as shown in the drawings, and accordingly moving the rods 30, links 22, and clamps 20 into brick engaging and clamping position, as shown in dotted lines Fig. 4. Each individual brick clamp 20 is actuated in its clamping action by the compression of its spring 44, so that there will be an individual yielding grip or pressure on each clamp. A further stop 46 in the form of a collar secured to the shaft 33 may be supplied, as shown in Fig. 3, if desired, thus limiting the reciprocating movement of the sliding hubs 40.

It will be appreciated that the action of the bell crank lever accentuates the outward movement of the clamping plates 20 through engagement of the rods 30 intermediate the length of the links 22, insuring a clamping grip of each plate 20 on the lowermost brick of the finger rows. Also, by having the actuating parts, including the rod 33 and

connections, so arranged that the clamping plates 20 may be in substantial alignment with the extreme bottom portion of each finger 5, a further lower grip on the adjacent brick rows is assured.

5 My improved mechanism is extremely simple, strong, and efficient. Ample room is provided for the operating instrumentalities and by utilizing and arranging the sliding rod and individual springs for each clamp in the portion of the finger 10 above the clamp, breakage of these parts and need for replacement is eliminated, while the positioning of the clamp itself in the lowermost portion possible is of great importance in insuring gripping of the bottom row of brick before the entire frame is lifted materially.

15 Also, by means of my operating rods 10, which are engaged by the brick stack in advance of the engagement of the lifting finger itself with the bottom of the stack, a still further quick gripping action is secured. The action of the plurality of springs 44, either independently or in cooperation with the spring 12, and the mechanism including the bell crank 15 and lever 10 all act to hold and, in effect, lock the plates in housed position with the non-positive or impositive action, so that 25 this locking effect will have to be overcome by substantial force applied to the operating bar 10.

30 Consequently when the force or weight on the bar 10 is sufficient to overcome this impositive locking of the clamping plates in their housed or retracted position, it insures that ample force will be available to effect the instant, firm clamping of the lower row of brick and prevents the brick from dropping or falling out. This action

of the bar 10 also is in advance of the fingers picking up the load of the stack or unit of brick, thereby still further insuring a gripping of the lowermost course of brick and the lifting of the same by the apparatus. Conversely, the same advantages and action result in setting down the stack of brick and releasing the apparatus, the clamping plates moving quickly or "snapping" back into housed position to facilitate the removal of the brick finger and the entire apparatus.

I claim:

Apparatus of the kind described adapted to engage, lift, transport, and release a stack of brick, having a spaced bottom row, comprising brick-lifting fingers to be positioned between the spaced 15 bottom row and to engage and lift the brick stack, including a plurality of brick-engaging side clamps to lift the bottom row of brick, a plurality of said clamps being associated with each finger, a rod lengthwise of each finger and a yielding 20 connection with each of said clamps, a bell crank lever at one end of each finger pivoted to said rod to move the rod longitudinally, a bar secured to said lever, a U-shaped spring having one end secured to said bar and normally holding said bar 25 in raised position, whereby the clamps are housed adjacent their respective finger and in inoperative position, said bar being depressed by the weight of the brick stack to thereby actuate the rod, exerting a pulling action on each clamp, and the 30 connections between the rod and each clamp increasing the speed of movement of the clamp relatively with the movement of the rod.

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