Oct. 25, 1949. S. E. RIKE 2,486,324

SEGMENTAL GRIPPER STRUCTURE

Filed March 12, 1947

FIG. 1

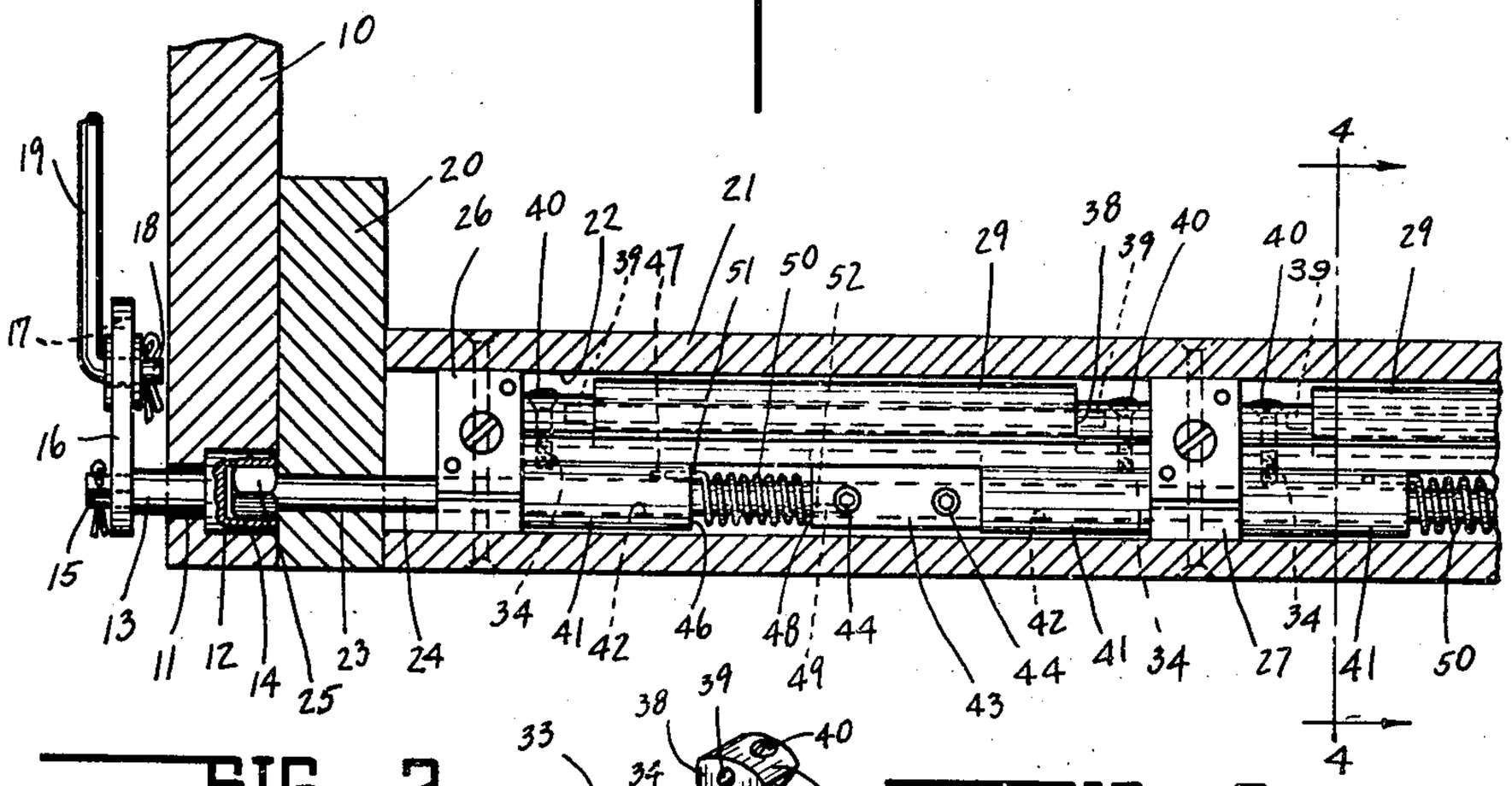


FIG. 2

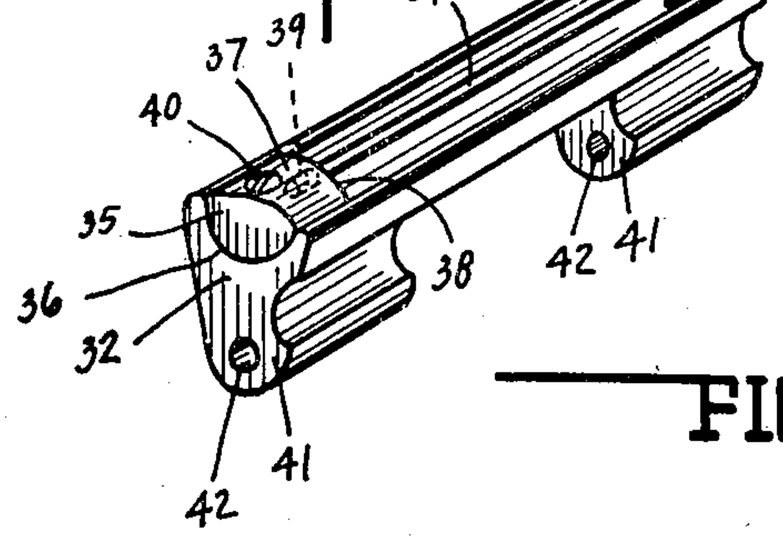


FIG. 3

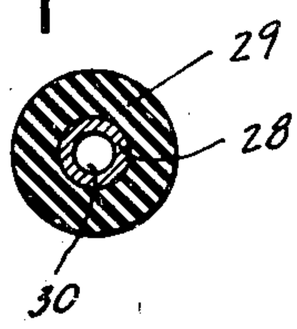
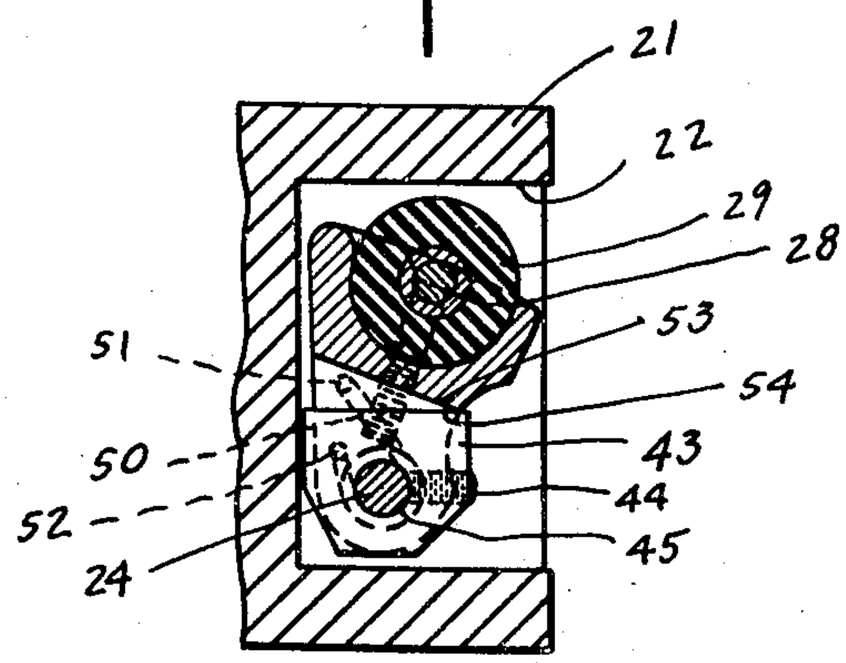


FIG. 4



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SEGMENTAL GRIPPER STRUCTURE

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11 Claims. (Cl. 214—65.2)

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This invention relates to a brick or like handling fork and more particularly the finger construction thereof.

This application is a continuation in part of application Serial No. 718,320, filed December 26, 1946, and entitled "Brick handling fork."

The finger herein, however, may be utilized in comparable fork apparatus and is not necessarily restricted in use to the particular fork disclosure of said copending application structure.

The chief object of this invention, like that of the copending application, is to improve the finger gripping of skid brick and retention thereof against dropping, tilting, etc., of the brick while finger suspended.

The chief feature of the present invention resides in the resilient cushion connection of the brick gripping element to the actuating mechanism for same, all being included in and supported by the finger element.

It is to be understood as shown in the copending application that a fork includes a plurality of elongated spaced fingers. Skid brick are disposed in the finger spacing and finger clamped when the fork is elevated, the stack of brick initially disposed on the skid brick being then directly supported on the top of fingers while the skid brick are clamped therebetween.

To insure complete nesting of all skid brick gripping elements in the finger at all times, except when gripping is desired, thereby protecting such element in finger application to and withdrawal from the skid brick and brick stacked thereon, the aforesaid resilient connection is provided.

Other objects and features of the invention will be set forth more fully hereinafter.

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 longitudinal sectional view through the supported end of a skid brick clamping and brick stack supporting finger, its support, one of finger grippers supported thereby and the actuating mechanism for said grippers being shown in elevation, a portion of a detachable connection in said mechanism being broken away to show same in section.

Fig. 2 is a perspective view of a gripper element in disassembled relation, the roll being omitted.

Fig. 3 is a transverse section through a roll.

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 1 and in the direction of the arrows.

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In Fig. 1 of the drawings 10 indicates a main fork body portion having bore 11 therein enlarged at 12. Oscillatable in said bore is rock shaft 13 having enlarged polygonal socket 14 seated in enlargement 12. The exposed end of the shaft is squared or flatted at 15 to take a complementary socketed end of an actuating link arm 16 having longitudinally disposed elongated slot 17 therein receiving angular end 18 of actuating rod 19. These parts are detachably retained together as illustrated or as desired.

Transversely disposed member 20 is detachably secured to portion 10 by means not shown. Projecting therefrom is the finger body portion 21 which on the brick confronting face is chambered as at 22. Extending through member 20 is bore 23 and pivotally mounted therein is rock shaft 24 which on its projecting end includes a complementary polygonal head 25 seatable in socket 14. Thus, when finger 21 and member 20 are detached from portion 10, the actuating mechanism for the rock shaft is simultaneously and automatically detached from shaft 24.

A single or dual finger 21 terminates in tapered ends as illustrated in Figs. 1 to 3 of said application and if the finger be of singular type it is similar to finger 35 and if of dual type it is similar to fingers 36 shown in the same figures of said application. The end of shaft 24 herein preferably terminates short of the end of 22 at the tapered end in a manner broadly similar to that shown in Fig. 1 of said application. Therein the shaft is intermediately supported by bearings which may be designated as of dual type with respect to the several longitudinally aligned gripping members therein disclosed.

Herein shaft 24 is supported at the end closest to portion 20 by a partable inserted bearing 26 and at the finger tip disposed end by a similar bearing. Therebetween is disposed similar intermediate bearings 27, there being one less intermediate bearing than there are gripping members. These bearings are illustrated as of the type shown in the aforesaid application and are similarly mounted and similarly supported and retain the finger coextensive rock shaft.

In Figs. 1 and 3 the roll is shown comprised of a metallic tube 28 enveloped by rubber 29 and same are coextensive in length. The exterior diameter is that required or desired. The tube bore 30 is of sufficient size to take the cylindrical rod 31, see Fig. 2, that in length is greater than the roll.

The roll support comprises an arcuately grooved elongated body portion 32 grooved as

at 33 to seat the aforesaid roll. The support is longer than the roll and longer than rod 31. Near each end the support is drilled and tapped as at 34.

At each end is a groove seated end bearing or roll retainer 35 having a periphery 36 conforming to the groove 33 and an opposite arcuate face 37. The confronting side faces 38 are bored as at 39 to nest the adjacent ends of rod 31. Countersunk screws 42 secure said bearings to body portion 32 at 34 when the roll is disposed on rod 31 and the ends thereof are seated in bores 39.

The rolls 29 may relatively freely rotate upon the rods 31 or may be clamped by bearings 35 to the support. In either event, as a longitudinal elemental portion of the roll exterior wears, an unworn portion may be presented for brick gripping.

When the entire periphery is unduly worn or damaged, removal of screws 40 permits ready replacement of a roll or rolls as desired.

Obviously, since only the rolls wear or may become damaged, replacement of any roll or all rolls can be expeditiously effected.

The skid brick may be of uniform thickness, fat or thin. The present invention in common with that disclosed in said application contemplates the formation of a sectionalized gripper structure for each finger, there being as many gripping rolls as the length of the finger laps skid brick. Also, as therein disclosed, each roll herein has a length appreciably greater than half the length of any such brick.

Projecting oppositely relative to the groove 33 and from support member 32 at opposite ends thereof are the spaced arm portions 41 and same have aligned bores 42 therethrough which rotatably and slidably receive shaft 24, although in normal use relative slidability is prevented by the shaft bearings 26 and 27.

Herein, there is rigidly secured to shaft 24 between arms 41 of a gripper structure an actuating arm 43 as by the set screws 44, the shaft 24 extending through bore 45 in said arm. Herein the arm confronting face 46 of an arm 41 is bored as at 47, see Fig. 1, and the adjacent face 48 of arm 43 is bored as at 49. A spring 50 is coiled about shaft 24 between said arms, and ends 51 and 52 thereof are seated in bores 47 and 49, respectively. The number of turns the ends have imposed therebetween determines the torsional force imposed upon the roll support tending to retract same, and more especially roll 29 into chamber or channel 22 of said finger.

The face 53 between arms 41 of roll support 32 constitutes a bearing face to be engaged by face 54 of said shaft secured arm 43 in opposition to the force of spring 50 tending to separate said faces. When shaft 24 is properly rocked to effect skid brick gripping by the rolls 29, the gripping action is cushioned and the skid brick, regardless of variation (within commercial tolerances) will be positively gripped and cannot escape or tilt, etc., until same is to be released intentionally.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein, as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In a fork finger supported brick gripping mechanism having a chambered, elongated finger, a shaft disposed longitudinally in and substantially coextensive with the chamber, and shaft bearing means in the chamber, the combination therewith of a plurality of longitudinally aligned, chamber nestable elongated brick grippers having longitudinal axes disposed parallel to longitudinal axes of the finger, each gripper being oscillatably mounted on said shaft and shaft oscillatable out of and into the chamber for brick gripping and release purposes, and means normally constraining the grippers in chamber nested and brick released position.

2. Mechanism as defined by claim 1 wherein each gripper comprises a cushioned face and spaced arms at the ends thereof and directed laterally toward the shaft for shaft support, an activating arm secured upon the shaft and disposed between said arms and opposite the cushioned face, said constraining means comprising a shaft enveloping torsion spring anchored at opposed ends to the confronting portions of one of the first mentioned arms and the shaft secured activating arm.

3. In a fork for brick and like engagement having a chambered, elongated finger, a rock shaft oscillatably supported therein, an elongated gripper oscillatably supported at the ends and by said shaft, the longitudinal axes of the gripper and finger being substantially parallel, an actuating arm carried by the shaft and engaging the gripper between the said ends, and resilient means normally constraining the gripper to chamber nested position, said arm and gripper having a lost motion connection engagement therebetween.

4. In a brick fork chambered, elongated finger having a shaft disposed longitudinally of and within the chamber, the combination therewith of an elongated gripper carried by the shaft and oscillatable thereby into and out of the chamber, the longitudinal axes of the gripper and the finger being substantially parallel, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting beyond the ends thereof, and bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation.

5. In a brick fork chambered, elongated finger having a shaft disposed longitudinally of and within the chamber, the combination therewith of an elongated gripper carried by the shaft and oscillatable thereby into and out of the chamber, the longitudinal axes of the gripper and the finger being substantially parallel, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting beyond the ends thereof, and bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation, said retainers being detachably secured to the gripper at the grooved face.

6. In a brick fork chambered finger having a shaft disposed longitudinally of and within the chamber, the combination of an elongated grip-

per carried by the shaft and oscillatable thereby into and out of the chamber, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting beyond the ends thereof, and bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation, said roll being of rubber-like material and cylindrical in character, the member comprising a cylindrical exterior member, the roll being rotatably adjustable on said member.

7. In a brick fork chambered finger having a shaft disposed longitudinally of and within the chamber, the combination of an elongated gripper carried by the shaft and oscillatable thereby into and out of the chamber, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting beyond the ends thereof, and bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation, said roll being of rubber-like material and cylindrical in character, the member comprising a cylindrical exterior member, the roll being rotatably adjustable on said member, said roll having a metallic tube centrally disposed therein for member accommodation.

8. In a brick fork chambered finger having a shaft disposed longitudinally of and within the chamber, the combination of an elongated gripper carried by the shaft and oscillatable thereby into and out of the chamber, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting beyond the ends thereof, and bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation, said roll being of rubber-like material and cylindrical in character, the member comprising a cylindrical exterior member, the roll being rotatably adjustable on said member, said retainers being detachably secured to the gripper at the grooved face.

9. In a brick fork chambered finger having a shaft disposed longitudinally of and within the chamber, the combination of an elongated gripper carried by the shaft and oscillatable thereby into and out of the chamber, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting

beyond the ends thereof, and bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation, said roll being of rubber-like material and cylindrical in character, the member comprising a cylindrical exterior member, the roll being rotatably adjustable on said member, said roll having a metallic tube centrally disposed therein for member accommodation, said retainers being detachably secured to the gripper at the grooved face.

10. In a brick fork chambered finger having a shaft disposed longitudinally of and within the chamber, the combination of an elongated gripper carried by the shaft and oscillatable thereby into and out of the chamber, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting beyond the ends thereof, bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation, and means providing a lost motion connection between said shaft and gripper for limited relative movement therebetween.

11. In a brick fork chambered finger having a shaft disposed longitudinally of and within the chamber, the combination of an elongated gripper carried by the shaft and oscillatable thereby into and out of the chamber, said gripper comprising a longitudinally grooved face, a roll partially seated in the face groove, a support member extending through the roll and projecting beyond the ends thereof, bearing type retainers secured to the ends of the gripper and supporting said member in spaced relation to the face groove and securing said member against longitudinal separation, means providing a lost motion connection between said shaft and gripper for limited relative movement therebetween, and means normally constraining the gripper into chamber nested position.

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