

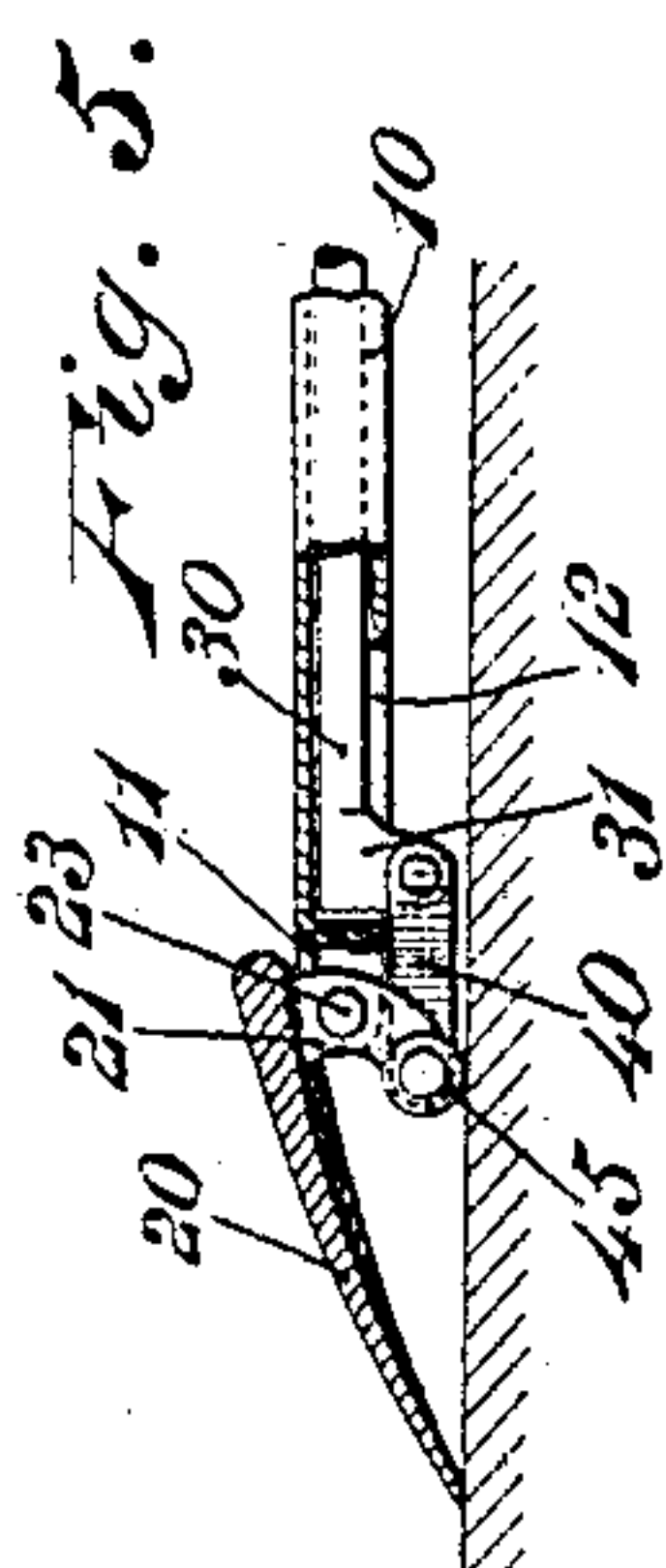
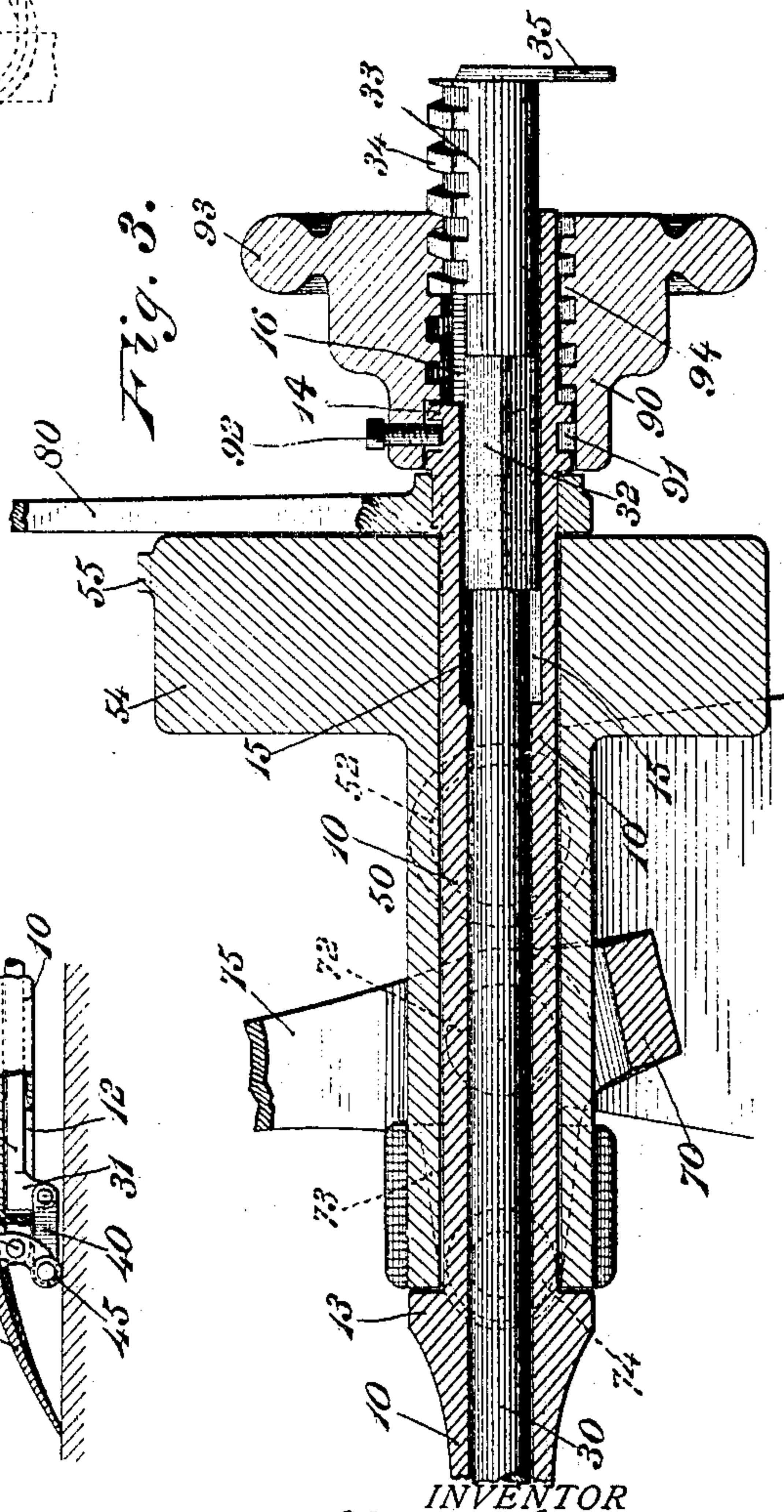
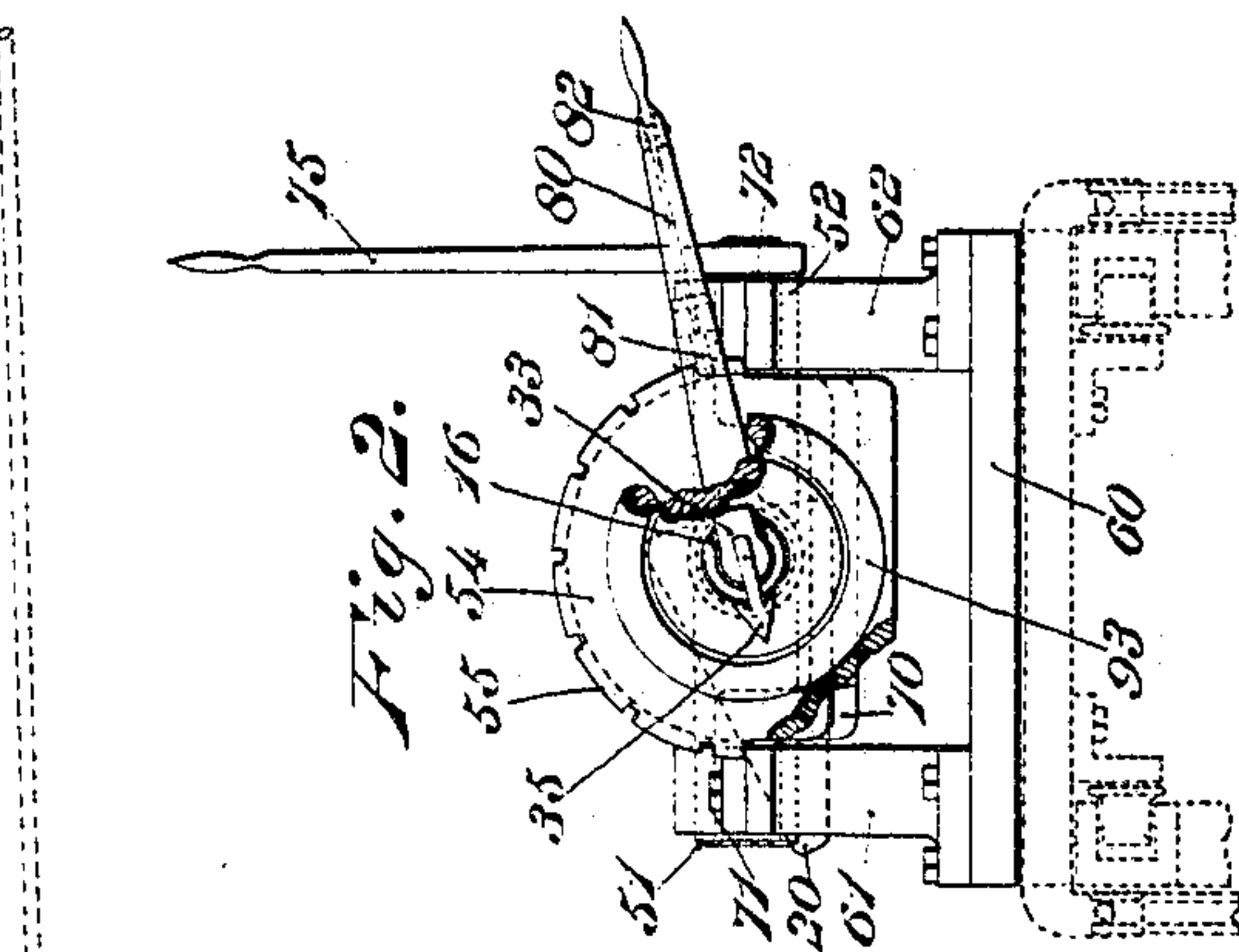
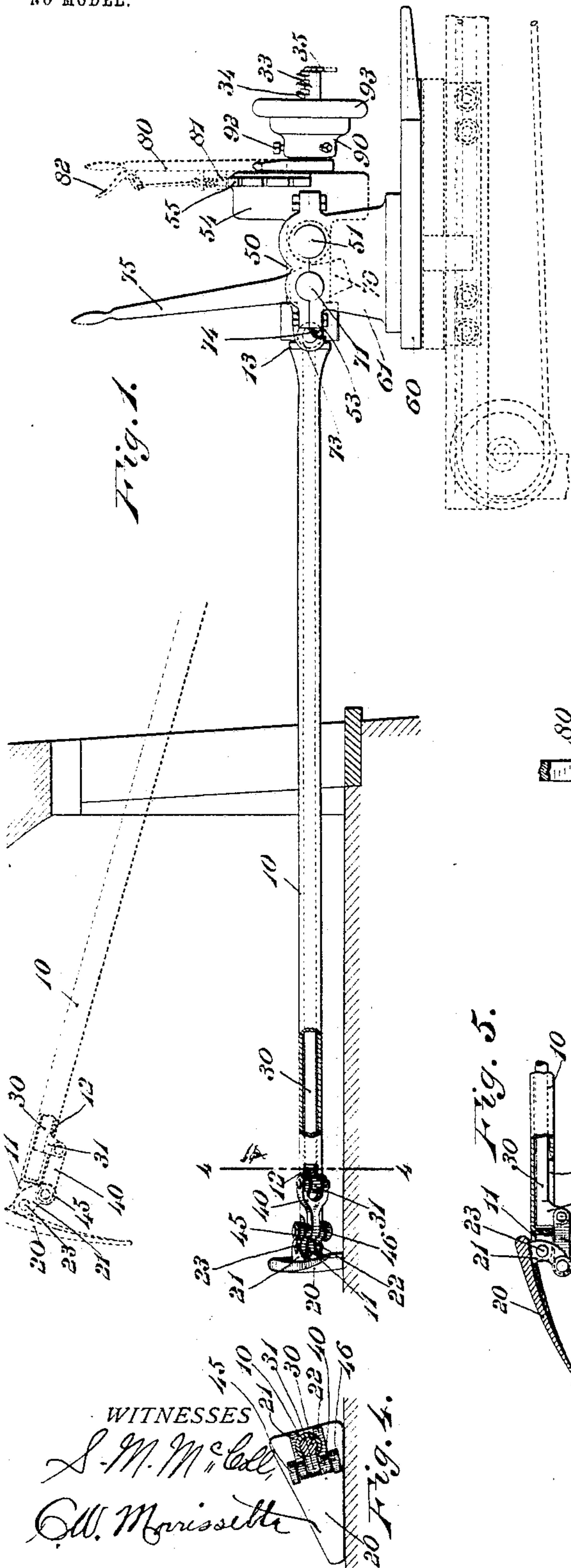
No. 775,275.

PATENTED NOV. 15, 1904.

H. KING.
COKE PULLER.

APPLICATION FILED MAR. 24, 1904.

NO MODEL.



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COKE-PULLER.

SPECIFICATION forming part of Letters Patent No. 775,275, dated November 15, 1904.

Application filed March 24, 1904. Serial No. 199,746. (No model.)

To all whom it may concern:

Be it known that I, HARRY KING, a citizen of the United States of America, residing at Washington, in the District of Columbia, have
5 invented certain new and useful Improvements in Coke-Pullers, of which the following is a specification.

This invention relates to a coke-puller designed to be operated by mechanical means
10 for pulling coke from coke-ovens, and it is particularly adapted for discharging coke from beehive coke-ovens. In the manufacture of metallurgical coke the oven known as the "beehive" oven, so called because of its
15 dome-shaped form, has been generally adopted, being found to give the best results. In the burning of the coal the coke is produced in a caked mass having a vertical stratification, and it is desirable to avoid as much as
20 possible breakage of the sticks and lumps extracted from the oven.

The invention relates more especially to a coke-puller of a type somewhat analogous to the ordinary duck-bill coke-puller.

25 The object of the invention is to provide simple and effective mechanical means for operating such a coke-puller in a manner similar to the hand method of manipulating coke-pullers of this type—that is, to impart to it a
30 vertical reciprocatory motion for clawing the coke within the oven, a lateral swing to engage coke at the sides of the oven, an axial motion to turn it upon its side to adapt it to act as a scraper for drawing out the coke, a
35 longitudinal reciprocatory motion for effecting the withdrawal thereof from the oven, and any desired compound movement as the resultant of any two or more of such motions.

Another object of the invention is to render
40 the blade adjustable into an approximately horizontal position to enable it to pass under the bed of coke along the bottom of the oven and act as an underworking wedge-like lifter to loosen the coke preparatory to the with-
45 drawal thereof from the oven.

Figure 1 of the accompanying drawings represents a side elevation, partly in section, of one embodiment of this mechanical coke-puller

mounted on a traveling carriage and operating within the coke-oven as a scraper for with- 50
drawing the coke, the dotted lines indicating the position of the coke-puller when elevated for clawing the coke from the top of the caked mass thereof. Fig. 2 represents a rear elevation of the coke-puller and its supporting-car- 55
riage, showing the means for axially oscillating and adjusting the coke-puller rod for changing the angle of the coke-puller blade, parts being broken out. Fig. 3 represents, on an enlarged scale, a longitudinal vertical 60
section of the rear end of the coke-puller rod and its immediate support. Fig. 4 represents a transverse section of the coke-puller bar on line 4 4 of Fig. 1, showing a rear elevation of the coke-puller blade. Fig. 5 represents a 65
longitudinal section of the front end of the coke-puller, showing the connection of the blade thereof with its supporting and actuating rods.

Similar reference characters indicate corre- 70
sponding parts in all the figures.

This coke-puller comprises a coke-puller bar 10, a coke-puller blade 20, a blade-adjusting slide-bar 30, a link 40, connecting the blade with said slide-bar, and means for sup- 75
porting and actuating said bars.

The coke-puller blade 20 has a pivotal connection with the bar 10 by any suitable means to enable it to be adjusted from a position at right angles, or substantially so, to said bar, 80
where it is adapted for use as a claw or scraper, to a position approximately in line with said bar, where it is adapted to a wedge-like action for lifting and loosening coke. The hollow bar 10 is provided at its outer end with a lug 85
11 and near said end with a slot 12. The coke-puller blade 20 is provided on its inner face near its upper end with a bent lug 21 and preferably with a corresponding bent lug 22, between which the lug 11 of the hollow bar 90
10 projects, and a pivot-pin 23 passes through said blade-lugs near their inner ends and through said intermediate bar-lug. The slide-bar 30 is provided at its outer end with a lug 31, which projects through the slot 12 in the 95
hollow bar 10, and the link 40 is pivoted at

its rear end to said lug of the slide-bar and at its front end to the outer ends of the blade-lugs outside the pivot thereof.

The coke-puller bar 10 is mounted in such a manner as to permit a vertical oscillation thereof to effect a clawing operation of the blade. Any suitable support may be provided for this purpose. The drawings show an oscillating coke-puller socket 50, which is provided with trunnions 51 and 52, journaled in bearings of standards 61 and 62, mounted on a coke-puller carriage 60. This socket is preferably provided at its rear end with a counterweight 54, operating to counterbalance, or partly so, the weight of the coke-puller projecting from said socket. This counterweight is preferably provided with a notched rim 55, adapted to constitute the fixed part of a lever-lock, as hereinafter explained. The coke-puller bar 10 is supported in this socket and is provided with a shoulder 13 in front of said socket and with a grooved collar 14 at its inner end behind said socket. The coke-puller bar is provided near its rear end with an angular socket 15 and beyond said socket with a longitudinal slot 16.

Means are provided for oscillating the coke-puller socket 50 to impart the clawing motion to the coke-puller. The means shown for this purpose are preferably within easy reach of the operator and comprise a yoke 70, disposed between the standards 61 and 62 and pivoted by trunnions 71 and 72 in said standards in front of the bearings for the trunnions of the oscillating socket 50. This yoke is provided with a crank-arm 73, which extends approximately parallel with the coke-puller bar 10 and is adapted to engage the socket to oscillate it. For this purpose the crank-arm may be provided at its outer end with an inwardly-projecting crank-pin 74, which engages a longitudinal slot 53 in the front portion of the oscillating coke-puller socket 50, as shown in dotted lines in Fig. 3, or the pin and slot may be reversed. A lever 75, herein called the "clawing" lever, is secured to one of the trunnions of the yoke 70, and the oscillation of this lever causes the crank-arm to lift and lower the outer end of the coke-puller socket 50, thereby swinging the coke-puller bar 10 in a vertical plane and imparting a clawing action to the coke-puller blade 20 within the oven.

Means are provided for axially oscillating the coke-puller bar 10 to adjust the blade or scraper 20 at different angles as desired. Any suitable means may be used for this purpose. The means shown comprise a lever 80, disposed at the rear end of said coke-puller bar between the collar 14 thereon and the rear end of the coke-puller socket 50, preferably adjacent to the counterweight 54 on the latter. This lever is provided with a spring-actuated bolt 81, which is adapted to engage the notches in the rim 55 of said counterweight

and with a finger-lever 82 at its outer end connected with said bolt and adapted to actuate the latter. A swing of the lever 80 toward the right or left will cause the bar 10 to turn on its axis and the blade 20 to assume a position at any desired angle, either horizontal or inclined, and the lever-lock will operate to fix the parts in such position. The lever 80 preferably projects from the axis of the bar in a direction opposite to the lateral projection of the blade.

Means are provided for adjusting the coke-puller blade from a position at substantially right angles to the bar, where it acts as a claw or scraper, to a position substantially in line with the coke-puller bar to adapt it to slide along the bottom of the oven and serve as a wedge for lifting and loosening the caked coke within the oven. The means shown for this purpose will now be described. The slide-bar 30 is preferably disposed within the coke-puller bar 10, the latter being made hollow to receive it. This slide-bar is provided at its front end with a laterally-projecting lug 31, which extends through the slot 12 in the bar 10. The link 40 is connected at its rear end with the lug 31 and at its front end to the outer end of the shanks or lugs 21 and 22 of the blade 20. The slide-bar 30 may be provided near its rear end with an angular enlargement 32, which fits into the angular socket 15 of the bar 10, whereby the slide-bar is made to turn in unison with the bar 10 when the latter is turned on its axis. The bar 30 is also provided beyond the angular enlargement 32 with a rib 33, adapted to slide in the slot 16 of the bar 10 and provided with a segmental screw-thread 34. An enlarged screw-nut 90, preferably having an elongated thickened body adapted to serve as a supplemental counterweight for the coke-puller, has a plain socket 91 at its front end, which is adapted to fit over the grooved collar 14 of the bar 10. This socket is provided with a fastening-screw 92, which projects through the wall of the socket and takes into the groove of the collar and holds the nut in connection with the bar, but permits it to turn freely on the latter. This nut is provided with interior screw-threads 94 beyond the end of the bar 10, which engage the segmental screw-threads 34 of the slide-bar 30. This nut is preferably provided with a hand-wheel rim 93, by which it is turned in either direction at the will of the operator. By turning the nut toward the right the slide-bar 30 is thrust outward, and the blade 20 is swung on its pivot, its pointed end moving outward approximately into line with the bar and its body assuming a wedge-like position, as shown in Fig. 5. The turning of the nut in the opposite direction will cause the blade to assume a position substantially at right angles to the bar, as shown in Fig. 1.

An indicator 35 is preferably attached to

the rear end of the slide-bar 30 and preferably projects laterally in line with the position of the blade 20 when adapted to act as a claw or scraper.

5 The coke-puller carriage 60 may be mounted upon any suitable support movable from oven to oven and made to travel toward and from the coke-oven by any suitable means for thrusting the coke-puller into the oven
10 and withdrawing it therefrom to pull out the coke.

The lugs or shanks 21 and 22 of the blade 20 are preferably provided with friction-rolls 45 and 46 to facilitate the movement of
15 the coke-puller along the bottom of the oven when used as a coke-loosener. These anti-friction-rolls may be placed on the front pivot-pin of the link 40.

In the use of this apparatus the machine-
20 car or other traveling or movable support for the coke-puller carriage is run into position in front of an oven from which the coke is to be drawn. The drawing operation is preferably performed in two steps, the first step in-
25 volving the loosening of the caked mass of coke within the oven preparatory to the withdrawal thereof and the second step consisting in pulling out the loosened coke. The loosening of the entire mass may be first effected
30 or the loosening and drawing may be performed in alternation. Preparatory to the loosening operation the operator turns the nut 90 toward the right, thereby thrusting the slide-bar 30 outward and swinging the blade
35 20 approximately in line with its supporting-bar 10 into position to have a wedge-like action upon the coke, as shown in Fig. 5. Then the carriage 60 is made to move toward the oven, the coke-puller bar 10 being held in
40 horizontal or approximately horizontal position, and the blade 20 rides in along the bottom of the oven and having a wedge-like action, operates to lift the coke under which it passes on its instroke and separates a strip of
45 coke equal to the width of the blade at its widest part from the caked mass of coke within the oven. Then the coke-puller carriage is caused to move away from the oven and the coke-puller withdrawn therefrom. Be-
50 fore the outstroke is begun the coke-puller bar 10 may be turned at ninety degrees on its axis and the blade 20 may be swung into transverse or scraping position, as shown in Figs. 1, 2, and 4, by means of the nut and
55 slide-rod to adapt it to act as a scraper and pull out loosened coke from the oven on the outstroke. The coke-puller bar 10 may also be turned a further ninety degrees on its axis before the outstroke, so as to cause the
60 blade to project upward to better engage the coke on the outstroke. In the withdrawing or discharging operation the blade 20 is adjusted to a position at right angles to the bar 10, in which it is best adapted to serve as a claw
65 or scraper. As the coke-puller carriage moves

toward the oven the operator swings the claw-
ing-lever 75 backward and lifts the coke-
puller into the dotted-line position of Fig. 1,
so that as it enters the oven it passes over the
top of the mass of coke therein. After the
70 coke-puller enters the oven a sufficient distance to make the proper stroke the operator swings the lever 75 backward and forward, thereby imparting a vertically-oscillating motion to the blade and causing it to claw or
75 break through the top of the coke within the oven if it has not been already broken by a wedging action of the blade. The blade 20 may be adjusted to different angles laterally
80 by the axial lever 80, and the coke-puller may be swung laterally to opposite sides of the oven by a traverse of the supporting-car or by a swiveling of the carriage-support on said car.

I claim as my invention—

85 1. In a coke-puller the combination of a coke-puller bar, a coke-puller blade having a pivotal connection with said bar and adapted to swing outward approximately in line there-
90 with to form a wedge-like coke-loosener or to swing substantially at right angles to said bar to form a claw, and means for swinging said blade into its different positions.

95 2. In a coke-puller the combination of a coke-puller bar, a coke-puller blade provided with a shank having a pivotal connection with said bar, and adapted to swing outward approximately in line therewith to form a wedge-
100 like coke-loosener or to swing substantially at right angles to said bar to form a claw, a slide-bar, and a link connecting said slide-bar with the shank of said blade.

105 3. In a coke-puller, the combination of a hollow coke-puller bar provided with a lug at its front end and a slot adjacent thereto, a blade provided with a shank pivoted to said
110 lug, a slide-bar disposed within said hollow coke-puller bar, and provided with a lug projecting through the slot thereof, and a link connecting the lug on the slide-bar with a
115 shank of the blade.

120 4. In a coke-puller, the combination of a hollow coke-puller bar provided with a lug at its front end and a slot adjacent thereto, a blade provided with a shank pivoted to said
125 lug, a slide-bar disposed within said hollow coke-puller bar and provided with a lug projecting through the slot thereof, a link connecting the lug on the slide-bar with a shank of the blade, and mechanical means for recip-
130 rocating said slide-bar relatively to said coke-puller bar for changing the position of said blade.

135 5. In a coke-puller, the combination of a hollow coke-puller bar, a blade having a piv-
140 otal connection therewith, a slide-bar disposed within said hollow bar and provided with a segmental screw-thread, means connecting said slide-bar with said blade, a nut adapted to turn on said hollow bar and provided with
145

screw-threads adapted to engage the screw-threads of the slide-bar for reciprocating the latter.

6. In a coke-puller, the combination of a hollow coke-puller bar, a blade having a pivotal connection therewith, a slide-bar disposed within said hollow bar and provided with a segmental screw-thread, means connecting said slide-bar with said blade, a nut adapted to turn on said hollow bar and provided with screw-threads adapted to engage the screw-threads of the slide-bar for reciprocating the latter, and means for locking said bars to turn axially in unison.

7. In a coke-puller the combination of a coke-puller bar, a support for said bar adapted to oscillate vertically, mechanical means for oscillating said support, a coke-puller blade having a pivotal connection with said bar and adapted to swing outward approximately in line therewith to form a wedge-like coke-loosener or to swing substantially at right angles to said bar to form a claw, and means for swinging said blade into its clawing position and into its wedge-like position.

8. In a coke-puller, the combination of a coke-puller bar, a support for said bar adapted to oscillate vertically, mechanical means for oscillating said support, a coke-puller blade having a pivotal connection with said bar, means for swinging said blade into a clawing position substantially at right angles to said bar or into a wedge-like position substantially in line with said bar, and means for turning said bar axially.

9. In a coke-puller, the combination of a pivoted coke-puller socket, means for oscillating said socket, a coke-puller bar supported in said socket, a coke-puller blade having a pivotal connection with said bar, a slide-bar, means connecting said slide-bar with said blade, means for reciprocating said slide-bar to shift said blade from a clawing position substantially at right angles to the bar to a wedge-like position substantially in line therewith or the reverse.

10. In a coke-puller, the combination of a pivoted coke-puller socket, means for oscillating said socket, a counterweight on said socket, a coke-puller bar supported in said socket, a coke-puller blade having a pivotal connection with said bar, a slide-bar, means connecting said slide-bar with said blade, and means for reciprocating said slide-bar to shift said blade from a clawing position substantially at right angles to the bar to a wedge-like position substantially in line therewith or the reverse.

11. In a coke-puller, the combination of a hollow coke-puller bar, a blade having a piv-

otal connection therewith, a slide-bar disposed within said hollow bar and provided with a segmental screw-thread, means connecting said slide-bar with said blade, and a counterweighting-nut adapted to turn on said hollow bar and provided with screw-threads adapted to engage the screw-threads of the slide-bar for reciprocating the latter.

12. In a coke-puller, the combination of a coke-puller bar, a blade having a pivotal connection therewith, means for swinging said blade into a clawing position substantially at right angles to said bar or into a wedge-like position substantially in line therewith, means for turning said bar axially to swing the blade laterally, means for swinging said coke-puller bar vertically, and means for reciprocating said bar longitudinally.

13. In a coke-puller, the combination of a coke-puller bar, a blade having a pivotal connection therewith, a slide-bar, means connecting said slide-bar with said blade, means for reciprocating said slide-bar relatively to said coke-puller bar to swing said blade into clawing position substantially at right angles to said bar or into wedge-like position substantially in line therewith, means for turning said bar axially to swing said blade laterally, means for oscillating said bars vertically, and means for reciprocating said bars longitudinally.

14. In a coke-puller, the combination of a coke-puller bar, a coke-puller blade having a pivotal connection therewith, a slide-bar disposed within said coke-puller bar, means for holding said bars to turn in unison, means for reciprocating said slide-bar to change the position of said coke-puller blade to adapt it to different purposes, a lever for turning said bars axially, and a lever-lock for holding said lever in different positions.

15. In a coke-puller, the combination of a coke-puller bar, a blade pivoted thereto and provided with a shank extending toward the point of the blade, a slide-bar, and a link connecting the slide-bar with said shank of the blade.

16. In a coke-puller, the combination of a coke-puller bar, a blade pivoted thereto, and provided with a shank extending toward the point of the blade, a slide-bar, a link connecting the slide-bar with said shank of the blade, and mechanical means for reciprocating said slide-bar relatively to said coke-puller bar for changing the position of said blade.

HARRY KING.

Witnesses:

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