

No. 616,488.

Patented Dec. 27, 1898.

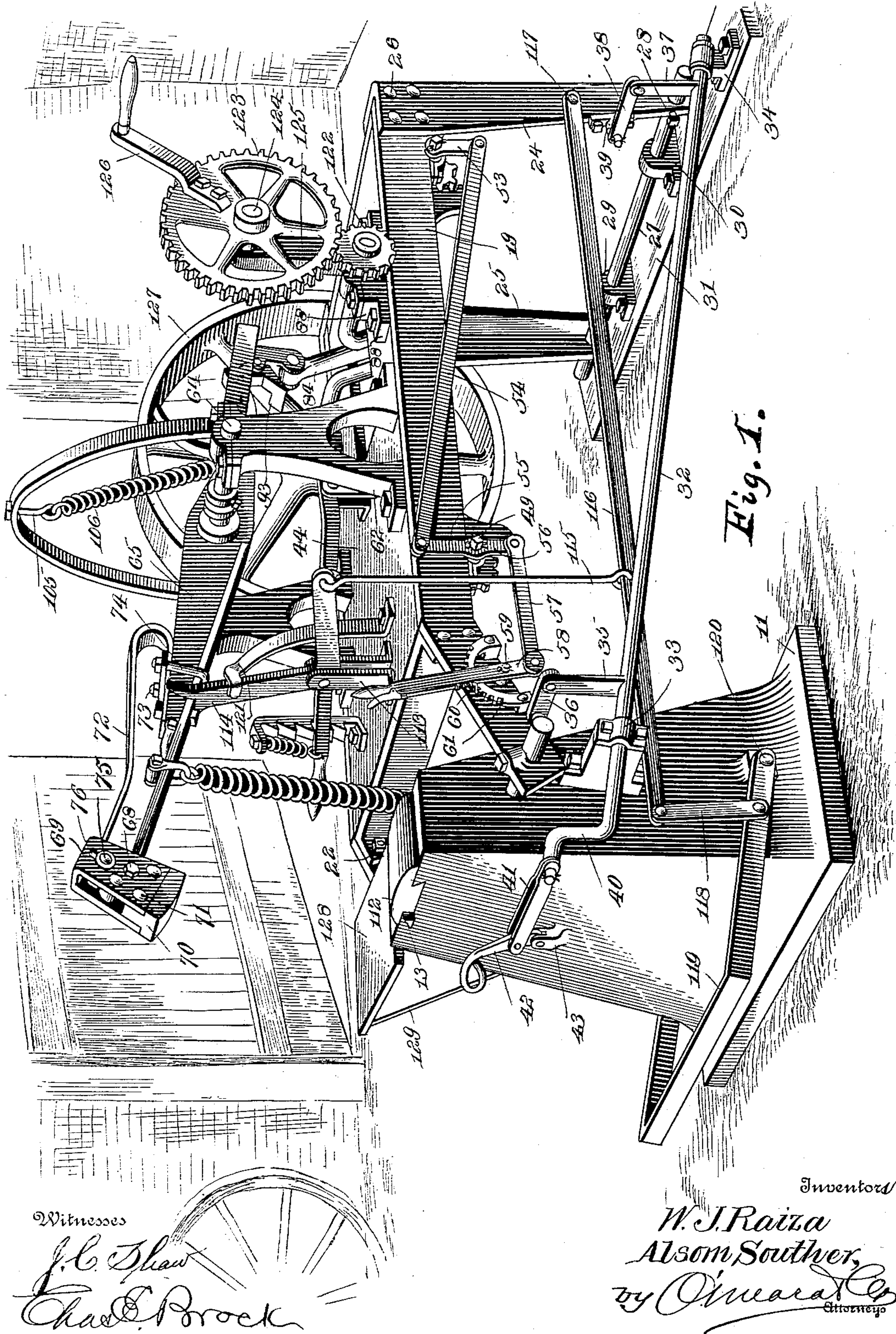
W. J. RAIZA & A. SOUTHER.

OLIVER.

(Application filed Jan. 29, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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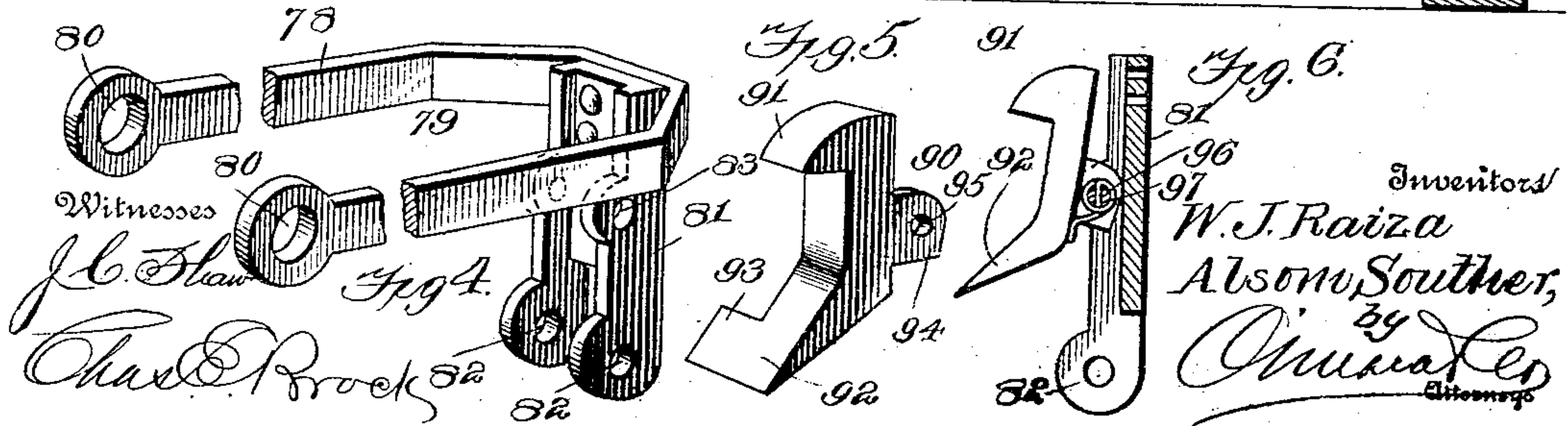
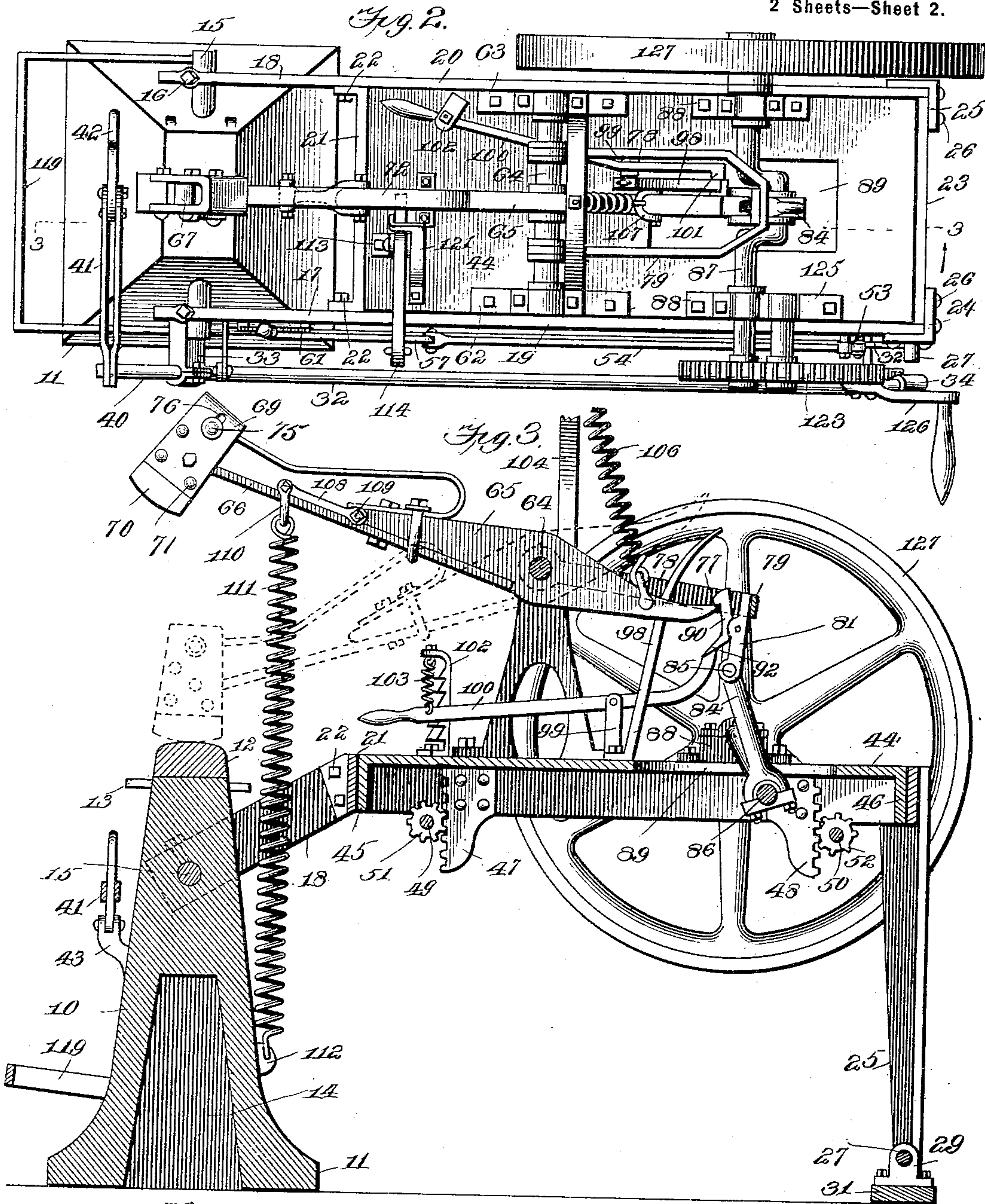
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2 Sheets—Sheet 2.



UNITED STATES PATENT OFFICE.

WILLIAM J. RAIZA AND ALSOM SOUTHER, OF BLUFFDALE, TEXAS.

OLIVER.

SPECIFICATION forming part of Letters Patent No. 616,488, dated December 27, 1898.

Application filed January 29, 1898. Serial No. 668,444. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM J. RAIZA and ALSOM SOUTHER, citizens of the United States, residing at Bluffdale, in the county of Erath and State of Texas, have invented a new and useful Oliver, of which the following is a specification.

This invention relates to that class of hammers, principally designed for the use of blacksmiths, known as "olivers," and which are generally operated by foot-power, but which may, by slightly altering the driving portions of the mechanism, be operated by any suitable power.

The object of this invention is to generally improve the construction and operation of such devices, whereby they are better adapted for the purposes for which they are used.

With this object in view the invention consists in improved means for mounting the hammer and its operating and adjusting mechanism with relation to the anvil, improved means for adjusting the length and strength of the blow of the hammer, improved means for converting the hammer from a trip-hammer to a continuously-operated power-hammer when desired, improved means for holding the hammer out of its operative position when desired, improved means for adjusting the hammer laterally with relation to the anvil, improved means for cushioning the blow of the hammer, and in the improved construction, arrangement, and combination of parts, hereinafter fully described and afterward specifically pointed out in the appended claims.

In order to enable others skilled in the art to which our invention most nearly appertains to make and use the same, we will now proceed to describe its construction and operation, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view illustrating the invention in position for practical operation. Fig. 2 is a top plan view of the same. Fig. 3 is a longitudinal vertical section on the line 3 3 of Fig. 2. Fig. 4 is a detail perspective view of the stirrup which carries the tripping-latch. Figs. 5 and 6 are detail views of portions of the tripping mechanism.

Like numerals of reference mark the same parts wherever they occur in the various figures of the drawings.

Referring to the drawings by numerals, 10

indicates the anvil, which is of special construction for adaptation for this invention. It is constructed substantially in the form of a frustum of a pyramid, having a horizontal flange 11 at the bottom to form an extended base, and provided with a dovetailed groove in its upper face to receive the die 12, which forms the face of the anvil and which is securely held in the dovetailed groove by means of a key 13.

The anvil 10 is preferably cast and made hollow, as at 14, for about one-half the distance from the base to the top, the upper portion being made solid, as clearly shown in Fig. 3. About centrally through the solid upper portion of the anvil is a laterally-extending bore or hole, in which is loosely mounted a cylindrical bar or shaft 15, projecting from both sides of the anvil and adapted to be rotated or moved longitudinally. Upon the projecting ends of this bar 15 are rigidly secured by means of set-screws 16 the downwardly-inclined ends 17 and 18 of the side bars 19 and 20 of the main frame of the machine. These side bars are parallel and are connected together at the front by a front bar 21, provided with flanges, through which bolts 22 pass to connect it to the side bars. The rear ends of the side bars are connected by a rear bar 23, and at the rear end of the frame legs 24 and 25, made of angle-iron, are secured by bolts or rivets 26 to the main frame. These legs 24 and 25 are mounted upon a horizontal bar 27 and secured thereon by means of set-screws 28, the bar 27 being loosely mounted in bearing-brackets 29 and 30, erected upon a base-board 31.

32 is a rod or bar journaled near its forward end in bearings 33, secured to the side of the anvil, and at its rear end in bearings 34, erected on the base-board 31. Near its forward end the bar 32 is provided with a crank-arm 35, which is connected by means of a link 36 with the inclined forward end 17 of the side bar 19 of the frame. Near its rear end the bar 32 is provided with a crank-arm 37, which is connected by a link 38 with a bracket 39, secured to the leg 24. At its forward end the bar 32 is formed into a crank 40, the outer end of which is connected by links 41 with a lever 42, pivoted in lugs 43, projecting from the face of the anvil, the lever 42 being provided with a handle within easy reach of the operator. By turning the

lever 42 upon its pivot the rod 32 will be turned by virtue of its connection with the lever through the medium of the link 41, and in consequence the crank-arms 35 and 37 will be swung in either direction on the rod 32 as a center and by reason of their connection with the frame of the machine through the medium of the links 36 and 38 will cause the whole frame of the machine and all the mechanism supported thereon to be moved laterally, the rod 15 sliding in its socket or bearing in the anvil and the rod 27 sliding in the brackets 29 and 30.

44 is the top of the frame, which consists of a metal plate of the proper size to fit within the frame composed of the side bars 19 and 20 and end bars 21 and 23, said top 44 being provided with depending flanges 45 and 46 and with depending brackets 47 and 48, formed as racks along one of their faces.

Shafts 49 and 50 are journaled in brackets secured to the lower edges of the side bars 19 and 20 and carry gear-wheels 51 and 52, which mesh with the teeth of the racks 47 and 48. Upon the shaft 50 is a downwardly-depending crank-arm 53, which is connected by a rod or link 54 with an upwardly-extending crank-arm 55, secured to the shaft 49 and extended beyond the shaft at 56, where it is connected by a link 57 with a lever 58, pivoted at 59 to the inclined end 17 of the side bar 19. This lever 58 is provided with a spring-pawl 60, whose lower end engages in the teeth of a semicircular rack 61, also secured on the face of the inclined end 17 of the side bar.

Nearly all of the operative parts of the machine are mounted upon the top or table 44, and the sole supports of the top or table are the wheels 51 and 52 by virtue of their engagement with the rack-teeth of the brackets 47 and 48.

When it is desired to elevate or lower the hammer and its connecting mechanism supported upon the table, it is only necessary to release the pawl 60 from engagement with the teeth of the rack 61 and by moving the lever 58 in either direction upon its pivot 59 to cause the shafts 49 and 50 and their gear-wheels 51 and 52 to be rotated. By virtue of the engagement of the teeth of these wheels with the rack-teeth of the brackets 47 and 48 the table and all of its superimposed mechanism will be raised or lowered as the shafts are rotated by means of the movement of the lever 58 on its pivot. Upon the release of the pawl 60 it will automatically reengage with the teeth of the rack 61 and hold these parts firmly in the position to which they are adjusted.

62 and 63 are brackets mounted on the table 44, near the edges thereof, which serve as bearings for the shaft 64, which carries an arm 65, to which is secured the bar 66, upon the outer end of which the hammer is mounted. The outer end of the bar 66 is formed with an eye 67, (see Fig. 2,) which engages around a bolt 68, which passes through the

frame 69 of the hammer. This frame 69 is U-shaped and carries between its outer ends the die or face 70 of the hammer, it being secured by bolts or rivets 71.

A spring-plate 72, bent upon itself at its rear end and secured by bolts 73 and a clip 74 to the arm 65 and bar 66, projects outwardly substantially parallel to the bar 66 into the frame 69 of the hammer, where it also is provided with an eye which embraces the bolt 75, which passes through slots 76 in the hammer-frame.

The blows of the hammer are made by swinging the arm 65 on the shaft 64, as will be hereinafter explained, and by means of the provision of the supplementary spring-support—i. e., the spring-plate 72—the blow is made more elastic, allowing the hammer to give a little either forward or backward, which is very necessary at times in order to prevent the hammer-supporting arm from breaking.

The arm 65 is extended rearwardly beyond the shaft 64, upon which it is mounted, and is provided with a point 77, which is turned slightly upward. On the same shaft 64 are pivotally secured the forward ends of the legs 78 of a U-shaped stirrup 79, said legs being provided with eyes 80 to fit over the shaft 64. A bracket 81 depends from the rear end of the stirrup 79 and is provided at its lower ends with eyes 82 and about midway of its length with eyes 83. A pitman 84 is pivotally connected by means of a pin 85 passing through the eyes 82 in the bracket 81, while at its opposite end it is mounted on a crank 86, formed on a shaft 87, mounted in bearings 88 on top of the table, an opening 89 being provided through the table to permit of the rotation of the crank.

90 is the tripping-dog, provided at its upper front end with a tooth 91 and at its lower front end with a tooth 92, having a lateral extension 93. It is also provided with a rearwardly-projecting lug 94, having an eye 95 to receive a pin 96, by means of which it is pivoted to the bracket 81, said pin passing through the eyes 83 of the bracket 81 and being provided with a coiled spring 97, which by bearing under the tooth 92 of the dog 90 tends to normally throw the upper tooth 91 in the direction of the bracket and out of contact with the point 77 of the arm 65.

98 is a finger or bar secured at its lower end to the table 44, curved upwardly and rearwardly in the same plane as the lateral extension 93 of the tooth 92 of the tripping-dog 90, the point of this finger reaching to a position in which it will contact with said lateral extension 93 at the upper end of the stroke of the tripping-dog.

99 is a pair of brackets mounted upon the table and having pivotally secured between their upper ends a lever 100, the rear end of which is curved upwardly and which is provided with a lateral extension 101 to contact with the under side of the lateral extension 93 of the tooth 92 of the dog 90 when the dog

is at the bottom of its throw. The elevation of this lever is regulated by the engagement of its forward end with the teeth of a rack-bracket 102, mounted on the table near its forward end, a spring 103 serving to hold the forward end of the lever 100 normally pressed upward against said teeth.

104 is a metal arch raised upon the top of the brackets 62 and 63 and secured by the same bolts which secure the rear ends of the bearing-plates upon said brackets. From the center of this arch at the top depends an eye-bolt 105, to which is connected a spring 106, which is connected at its lower end to a stirrup 107, pivotally secured to the arm 65 in the rear of its pivot.

108 is an arm connected by the bolt 109 to the forward end of the arm 65 and resting upon the bar 66. A stirrup 110 depends from the forward end of the arm 108, embracing the bar 66. A spring 111, connected to this stirrup, is connected at its opposite end to a lug 112 on the rear side of the anvil. The springs 104 and 111 both tend to increase the force of the blow of the hammer.

113 are a pair of brackets mounted upon the table 44, in the upper end of which is pivoted at its angle an elbow-lever 114, the upper end of the upright arm thereof being notched to engage the arm 66 when desired. At the outer end of the horizontal arm of the elbow-lever 114 is pivotally attached a rod 115, which connects it with a lever 116, which is pivotally connected at 117 to the leg 24 at the rear of the machine and extends forward alongside of the anvil. Its front end is connected by the link 118 with a treadle 119, pivoted at 120 upon lugs on the ends of the anvil. The spring 121, secured to the table, tends to press the upright arm 114 of the elbow-lever into the proper position to intercept the arm 66.

112 is a pinion mounted on the end of the crank-shaft 87, which meshes with a gear-wheel 123 on a shaft 124, mounted in bearings in the upper ends of arms 125, mounted on the table 44 and formed integrally with the bearing 88 of the crank-shaft. To the gear-wheel 123 is secured a crank-handle 126, by means of which it may be turned. The crank-shaft 87 is provided at one end with a fly-wheel 127, and when desired belt-pulleys or other means for connecting either of the shafts 87 or 124 with any suitable motor may be provided, by means of which the hammer may be run by steam or other power instead of by foot-power.

The machine having been adjusted to the proper height by the manipulation of the lever 58 and having been adjusted laterally with relation to the anvil by the manipulation of the lever 42 the work lying upon the anvil may be held or supported upon a shelf 128, resting upon the leg 129, or held in tongs, as usual, in position to be struck by the hammer, which is operated by the turning of the crank-handle 126 on the gear-wheel 123, which

in turn causes the gear-wheel 122 and crank-shaft 87 to rotate. When the pitman 84 rises, it will carry the bracket 81 and dog 90 with it until the dog at the top of its stroke is caused to engage the point 77 at the rear of the hammer-supporting arm 65. The normal position of this end of the hammer-support is upward and the engagement of the tooth 91 of the dog 90 with the point 77 is caused by the contact of the top of the projection 93 of the tooth 92 of the dog with the bar 98, which presses the tooth 92 downward and the tooth 91 frontward over the point of the hammer-arm. Upon the return stroke of the pitman this engagement of the tooth 91 of the dog will cause the rear portion of the hammer-arm to be thrown downwardly against the action of the two springs 106 and 111, raising the hammer. At the lower end of the stroke of the pitman the under side of the lateral projection 93 of the tooth 92 of the dog 90 will contact with the upper rear end of the lever 100, which will press the tooth 92 upward and release the tooth 91 from the rear point of the hammer-arm, permitting the hammer to descend under the influence of its own weight and the springs 106 and 111.

The lever 100, as before stated, is adjusted to vary the height of its rear end by engaging it with either of the teeth of the rack-bracket 102. The lower the adjustment of its rear end the longer will be the stroke of the hammer, and vice versa.

Should it at any time be desired to operate the hammer continuously instead of tripping it, as described, the lever 100 will be adjusted to bring its point below the lowest point reached by the tooth 92 of the dog 90 in its downward movement. This will prevent the tripping of the dog and will result in continuous strokes of the hammer as the pitman is moved by the rotation of the shaft.

Whenever it is desired to hold the hammer in its upright position, the upright arm of the elbow-lever 114 is allowed to pass under it, which will hold the hammer in its upper position and the rear end of its arm so low that the dog 90 will have no connection therewith, so that the hammer may be held out of action while the shafts and gearing are continuously rotated.

We propose to use ball-bearings wherever we find them necessary or desirable.

From the foregoing the construction and operation of this invention will be readily understood, and while we have illustrated and described what we consider at this time to be the best means now known to us for carrying out our invention we do not wish to be understood as restricting ourselves to the exact details of construction shown and described, but hold that any slight changes, such as might suggest themselves to the ordinary mechanic, would properly fall within the limit and scope of our invention.

Having thus fully described our invention,

what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with the anvil having the horizontal bore therethrough, of a rod, 5 loosely mounted in said bore, the side bars of the framework, mounted on said rod, the legs of the framework, provided with holes near their lower ends, a cross-bar, secured in said holes, and brackets, erected on a suitable foundation, in which said cross-bar is loosely 10 mounted, and suitable means for laterally adjusting the frame and its cross-bars in their bearings, substantially as described.

2. The combination with the anvil and the 15 frame of the machine, mounted to move laterally with respect thereto, of a bar mounted in bearings and extending longitudinally of the machine, a crank at the forward end of said bar, a lever pivoted to the anvil, a link 20 connecting the crank with the lever, crank-arms extending laterally from the longitudinal bar, and links connecting said crank-arms with the laterally-moving frame, substantially as described.

3. The combination with the frame, comprising side and end bars, of the table, provided with depending flanges and loosely fitted in the frame, rack-brackets depending 30 from the table, shafts, mounted in bearings secured to the under side of the side bars of the frame, gear-wheels on said shafts, engaging the rack-brackets, crank-arms on said shafts, a rod connecting the crank-arm of one shaft with that of the other, a pivoted hand- 35 lever and adjusting-latch secured to the side bars of the frame, and a link connecting the crank-arm of one of the shafts to the adjusting-lever, substantially as described.

4. The combination with the frame, the 40 hammer and its supporting-arm pivotally mounted on the frame, of an elbow-lever, pivoted in brackets erected on the frame, the upright arm of which is adapted to engage under the hammer-arm, a lever, pivoted to 45 the rear legs of the frame, a rod connecting it with the horizontal arm of the elbow-lever, a treadle, pivoted to the anvil, a link connecting the pivoted lever with the treadle, and a spring, mounted on the table and normally 50 holding the upright arm of the elbow-lever in a vertical position under the hammer-arm, substantially as described.

5. The combination with the table, of brackets mounted at the sides thereof and provided, at their upper ends, with bearings, a 55 shaft, mounted in said bearings and carrying the hammer-arm, a metal arch, raised above said bearings and secured thereto by the same bolt that secures the bearing-plates, and a spring, adjustably secured at its upper end 60 to the center of the arch, and secured at its lower end to the hammer-arm, in the rear of its shaft, substantially as described.

6. The combination with the table, the bearings, the shaft mounted therein and the hammer-arm carried by said shaft and provided

with a point at its rear end, of a stirrup, pivoted on the hammer-arm shaft, a bracket secured thereto, a crank-shaft, a pitman thereon, connected with the bracket, and a dog, 70 pivoted to the bracket and adapted to engage the rear point of the hammer-arm, substantially as described.

7. The combination with the pivoted hammer-arm, having a point at its rear end, and 75 the bracket carrying the pivoted dog, with means for moving the bracket upward and downward, the spring for normally holding the dog out of contact with the point of the hammer-arm, and the upright bar secured to 80 the frame in the path of the dog, to cause it to engage the point of the hammer-arm at the upper end of its stroke, substantially as described.

8. The combination with the hammer-car- 85 rying arm and its shaft, of the stirrup, mounted on the shaft, the bracket carried by the stirrup, the dog, pivoted on the bracket and having an upper and lower tooth, the crank-shaft, the pitman thereon, connected 90 with the lower end of the bracket, and the rigid arm, mounted on the table and adapted to contact with the lower tooth of the dog, to throw its upper tooth into contact with the point of the hammer-arm at the end of its 95 upward stroke, substantially as described.

9. The combination with the hammer-arm and its shaft, of the stirrup pivoted on the shaft, the bracket carried thereby, the crank- 100 shaft, the pitman thereon, connected with the bracket, the dog, pivoted to the bracket and provided with an upper and lower tooth, and the lever mounted to contact with the bottom of the lower tooth of the dog at the lower end of its stroke, to trip its upper tooth from the 105 hammer-point, substantially as described.

10. The combination with the hammer-arm and its shaft, of the stirrup, the bracket, the pitman, the crank-shaft, the pivoted dog, having an upper and lower tooth, the rack-bracket 110 mounted on the top of the table, the lever pivoted in brackets on top of the table, in position to engage the lower tooth of the dog at its rear end and the teeth of the rack-bracket at its forward end, and the spring, connect- 115 ing the lever at its forward end with the rack-bracket, to hold the lever in engagement with the teeth, substantially as described.

11. The combination with the hammer, of its supporting-arm provided with an eye, the bolt 120 passing through the hammer and said eye, the bent spring-arm secured upon the top of the hammer-arm and having an eye at its forward end, and the bolt passing through the eye of the spring-arm and the hammer-frame, 125 substantially as described.

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Witnesses:

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