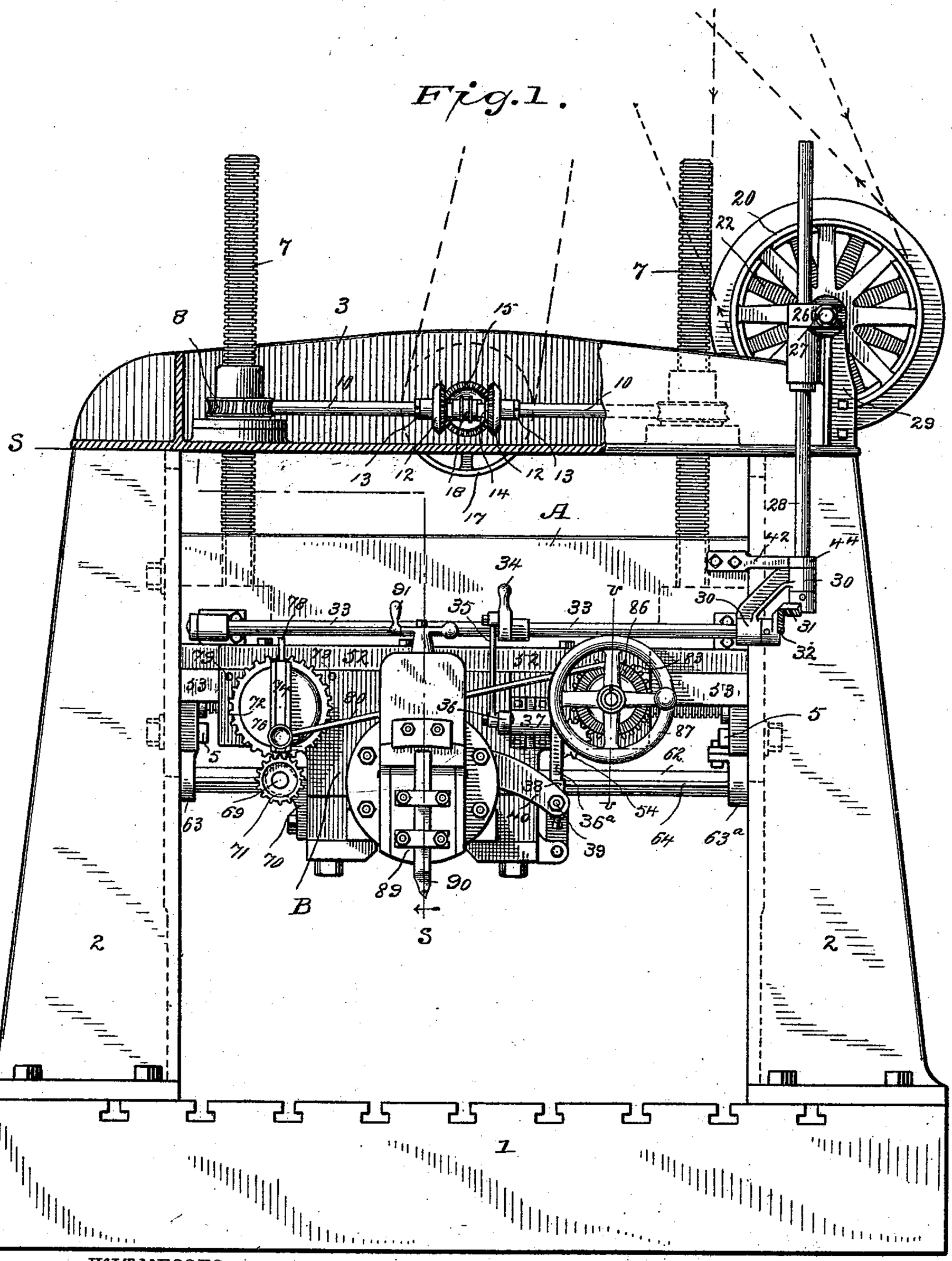
(No Model.) 5 Sheets—Sheet 1.

H. J. HENDEY.

SUSPENSION METAL-SHAPER.

No. 517,612. Patented Apr. 3, 1894.

Fig. 1.



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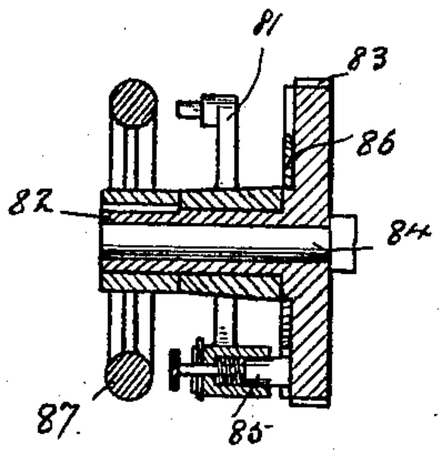
SUSPENSION METAL SHAPER.

No. 517,612. Patented Apr. 3, 1894.

Fig. 2.

Fig. 2.a



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SUSPENSION METAL SHAPER.

No. 517,612. Patented Apr. 3, 1894.

Fig. 3.

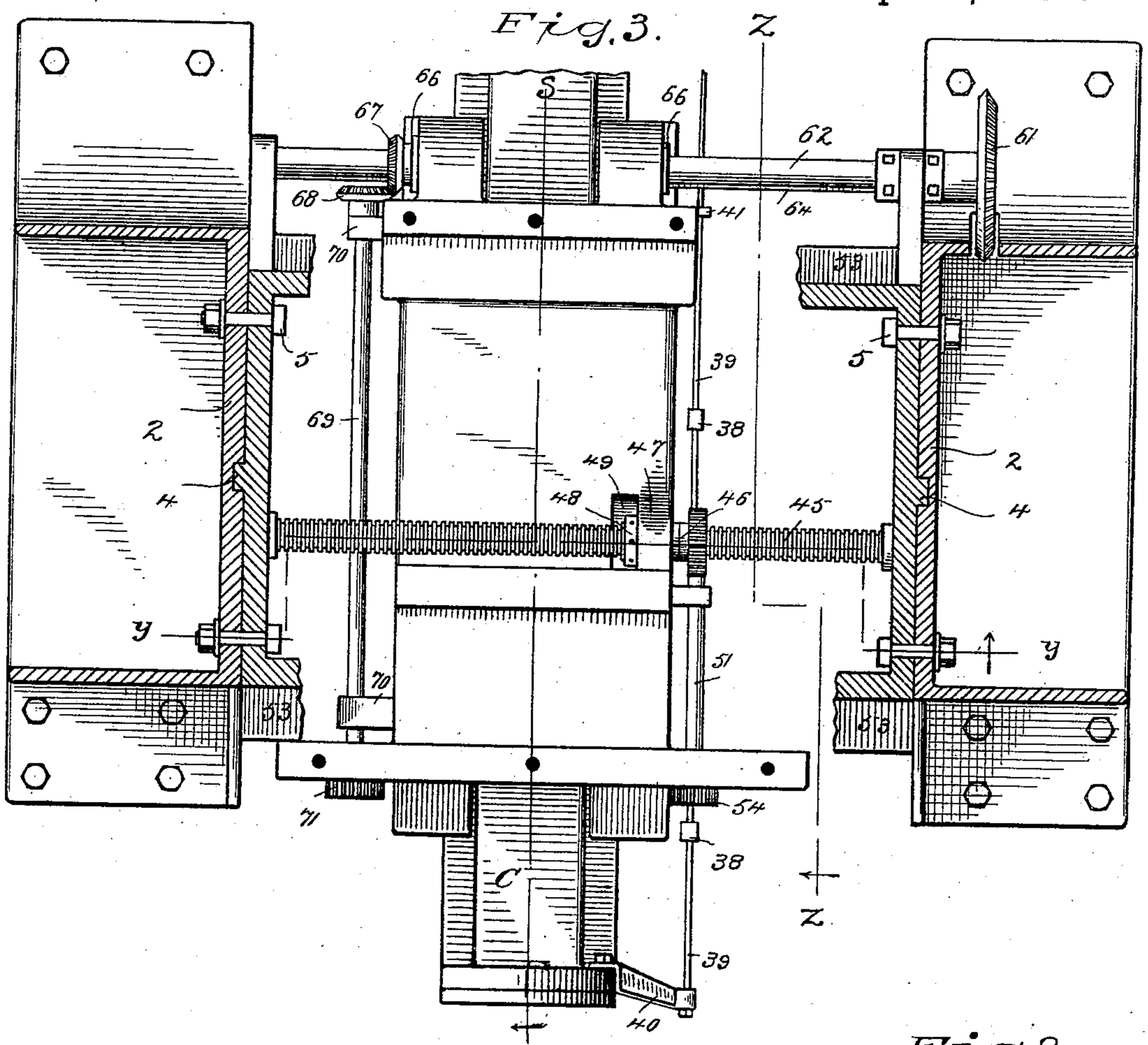


Fig. 4.

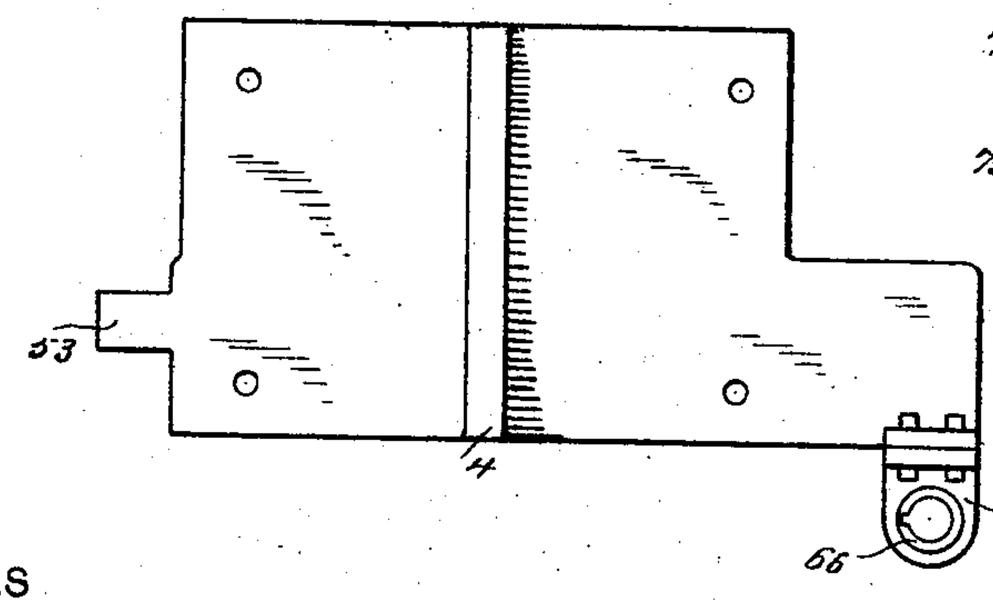
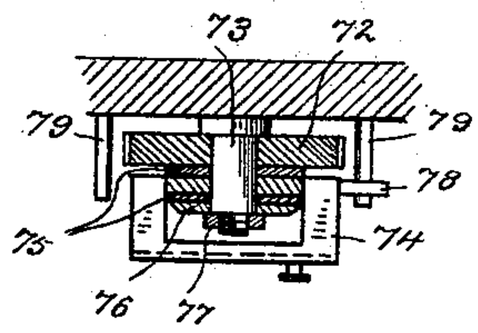


Fig. 9.



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No. 517,612. Patented Apr. 3, 1894.

Fig. 5.

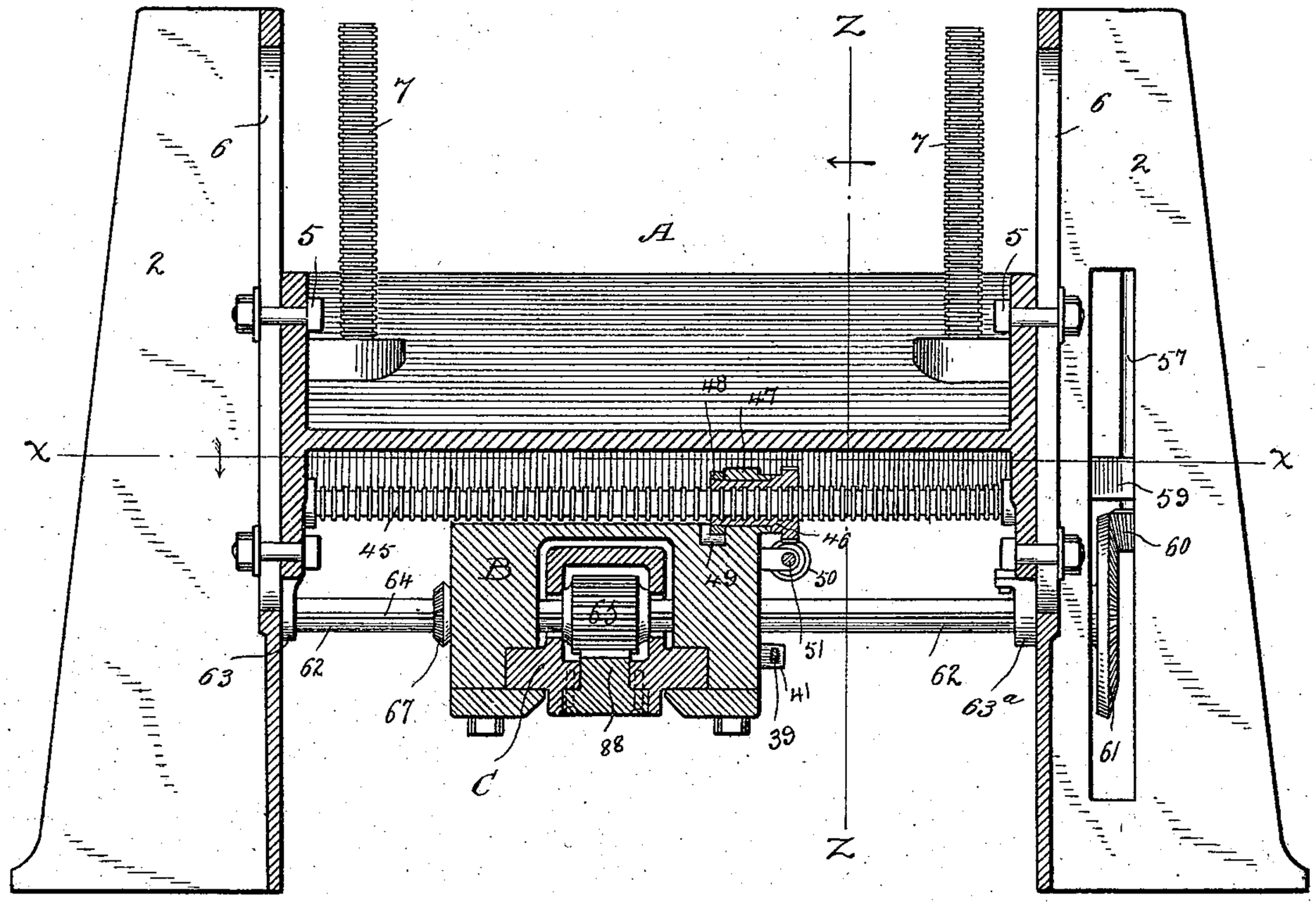
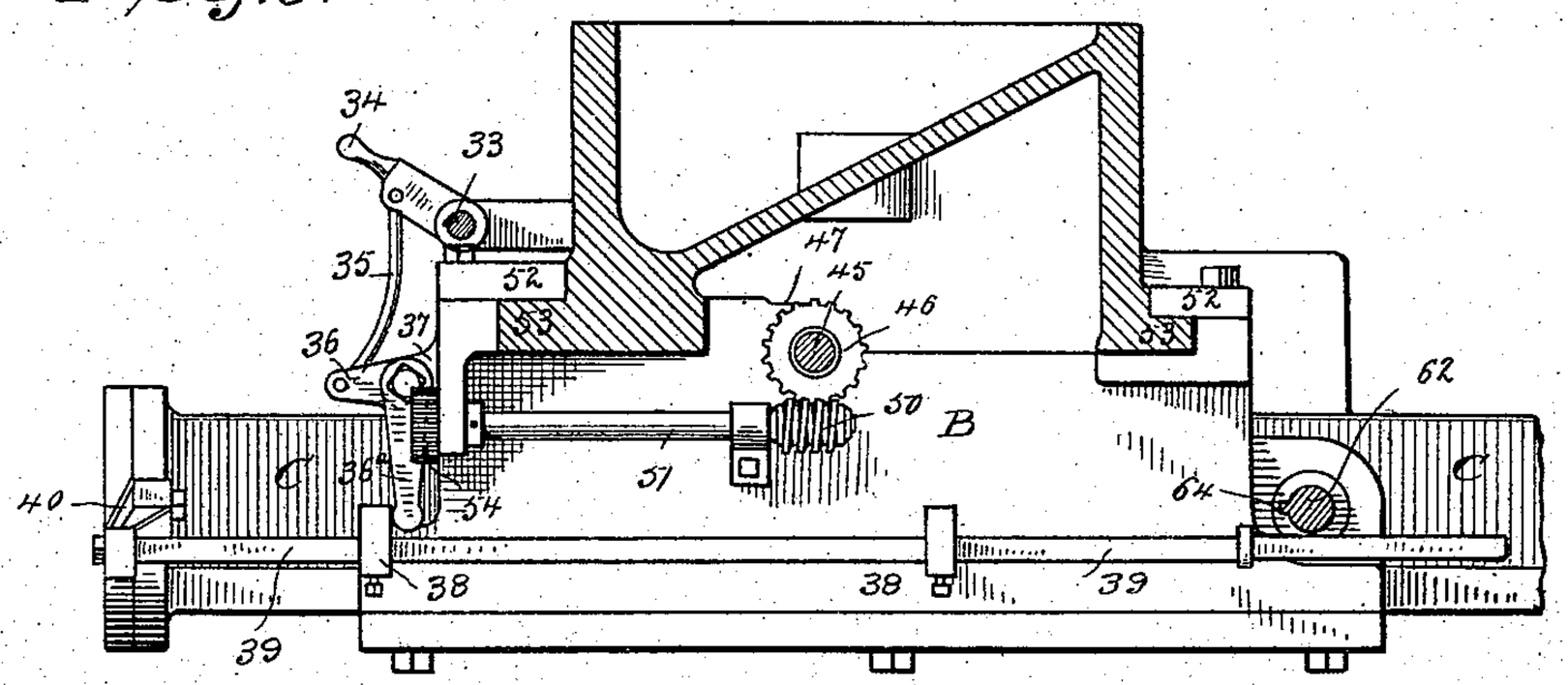


Fig. 6.



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SUSPENSION METAL SHAPER.

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Fig. 7.

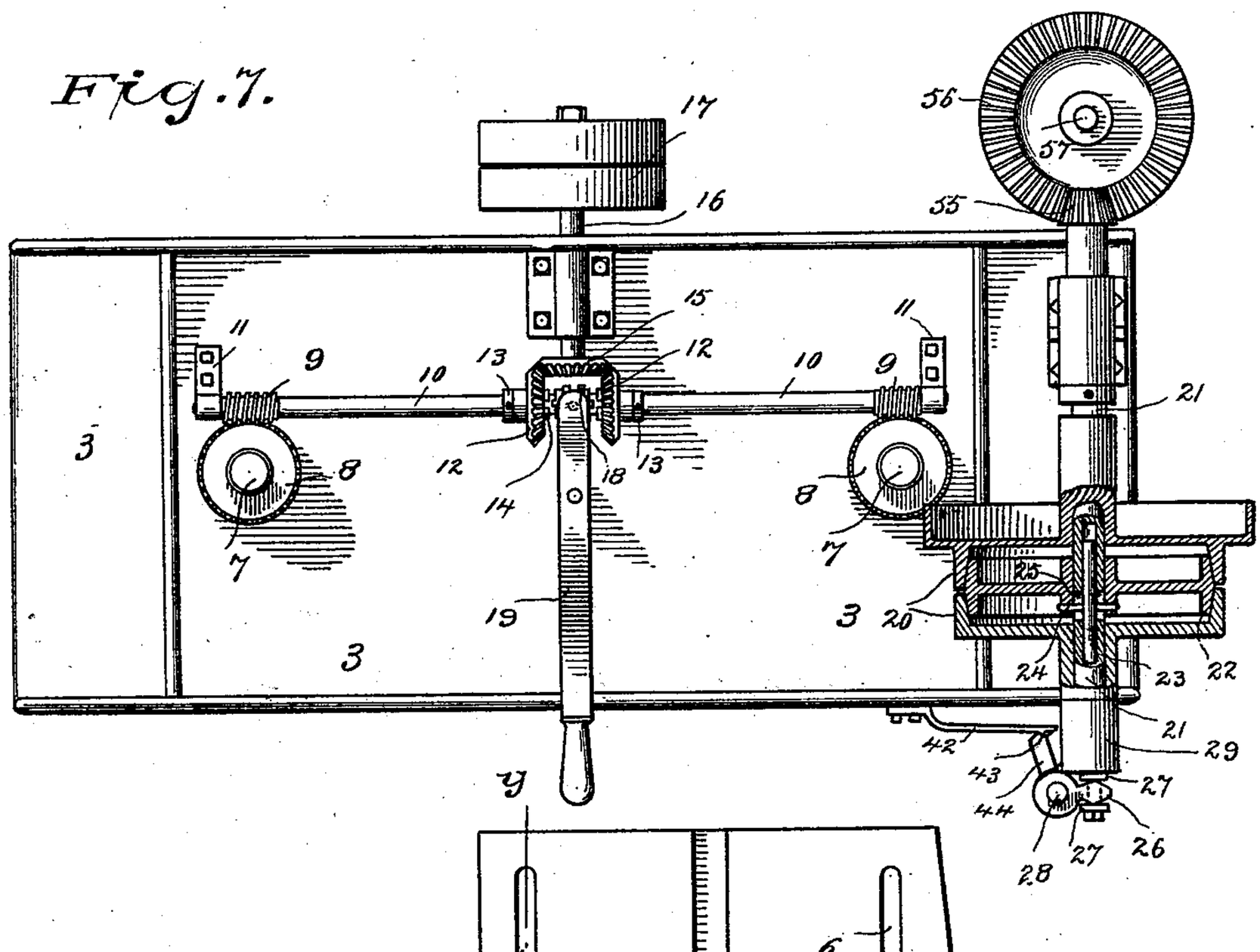
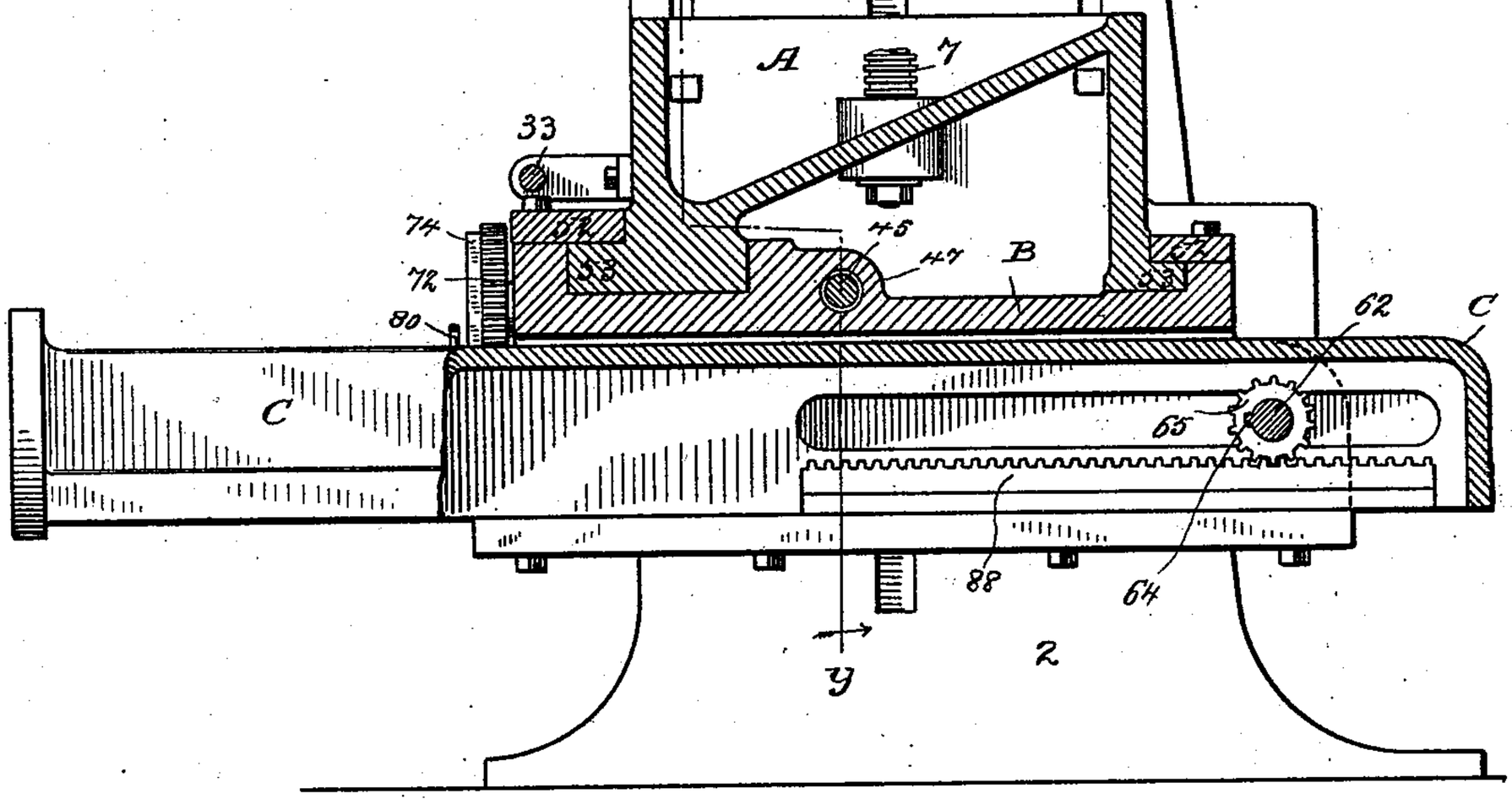


Fig. 8.



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UNITED STATES PATENT OFFICE.

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SUSPENSION METAL-SHAPER.

SPECIFICATION forming part of Letters Patent No. 517,612, dated April 3, 1894.

Application filed August 5, 1893. Serial No. 482,429. (Nomodel.)

To all whom it may concern:

Be it known that I, HENRY J. HENDEY, a citizen of the United States, residing at Torrington, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in Suspension Metal-Shapers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to simplify and improve the construction of metal shapers, the special object being to provide a construction of shaper having a stationary bed and adapted to receive very large and long pieces of work, to receive in fact any shaped piece of work too large to be moved.

With these ends in view I have devised a novel form of machine which is all open under the cross head, the saddle being suspended from the cross head and the cutter bar suspended in the saddle. It should be understood however that my novel improvements are not restricted in their application to large sized machines, as I make smaller sized machines upon the same principle and find my novel improvements in the details of construction to work admirably in such smaller sized machines.

In the accompanying drawings forming part of this specification Figure 1 is a side elevation of the machine complete a portion of the girder being broken away to show the operation of the mechanism for raising and lowering the cross head; Fig. 2 an end elevation as seen from the right in Fig. 1; Fig. 2ª a detail sectional view on an enlarged scale corresponding with Figs. 1 and 2, the line being indicated by *v v* in Fig. 1; Fig. 3 a horizontal section on the line *x x* in Fig. 5, the cross head being partially broken away to show the saddle; Fig. 4 an end elevation of the cross head detached; Fig. 5 a vertical longitudinal section on the line *y y* in Fig. 8 looking toward the right, the same line also appearing in Fig. 3; Fig. 6 a vertical transverse section on the line *z z* in Figs. 3 and 5 looking toward the left; Fig. 7 a plan view of the top of the machine, a portion of the reversing mechanism appearing in section; Fig. 8 a vertical transverse section on the line *s s* in Figs. 1 and 3 looking toward the left; Fig. 9 (see Sheet 3) a detail sectional view on an enlarged scale of parts appearing in Fig. 1, the position of the parts being changed.

1 denotes the bed, 2 the housings or uprights, 3 the girder, A the cross head, B the saddle, and C the cutter bar. The three essential movements of the machine are a vertical reciprocatory movement of the cross head carrying the saddle and cutter bar, a horizontal reciprocatory movement of the saddle carrying the cutter bar, and a horizontal reciprocatory movement of the cutter bar at right angles to the line of movement of the saddle. The cross head is provided with vertical tongues 4, see Fig. 3, which engage corresponding grooves in the inner faces of the housings. The cross head is additionally secured in place by bolts 5 which pass through the ends of the cross head and move in vertical slots 6 in the housings, see Fig. 5. The vertical movement of the cross head by which it is adjusted in use is imparted by means of screws 7 the lower ends of which engage the cross head, see Fig. 8, and which pass through worm wheels 8 which are internally threaded to receive them and which are themselves engaged by worms 9 on a shaft 10 journaled in brackets 11. At the mid-length of shaft 10 are two bevel gears 12 which face each other. These gears are loose on the shaft, are held against outward movement by collars 13 and are provided on their inner faces with clutch members 14. Both of these bevel gears engage a bevel gear 15 on a shaft 16, to which power is applied by a belt running over a pulley 17. Between bevel gears 12 is a sliding clutch member 18 which is keyed to the shaft so as rotate therewith and is adapted to engage either of the clutch members 14, said sliding clutch member being controlled by a hand lever 19, see Fig. 7. In the drawings, sliding clutch member 18 is shown as disengaged from both clutch members which is its normal position, shaft 10 being stationary except while the cross head is being moved up or down. It is apparent that movement of the hand lever in one direction will cause shaft 10 to rotate in the direction to raise the cross head through the engagement of screws 7 with worm wheels

8, and that movement of the hand lever in the opposite direction will cause the shaft to rotate in the opposite direction and will lower the cross head.

Power to move the saddle and cutter bar is received from belts running over belt pulleys 20 both of which are loose on a shaft 21. One of these belt pulleys is provided with two diameters so that if desired the speed may be changed. As one of the belts is crossed, see dotted lines Fig. 1, it will be apparent that belt pulleys 20 will rotate in opposite directions. Between belt pulleys 20 and adapted to engage the inner periphery of either of them is a sliding friction clutch wheel 22 which is controlled by means of a sliding rod 23 within shaft 21, the sliding clutch wheel being connected to the rod by means of a pin 24 which passes through a slot 25 in the shaft. Rod 23 is moved in or out to reverse the movement of shaft 21 by a forked arm 26 which engages said rod between collars 27 and is carried by a rock shaft 28 which is itself supported by a bracket 29 on the girder in which it slides freely as the cross head moves up or down, and by a bracket 30 on the cross head. At the lower end of rock shaft 28 is a bevel segment gear 31 which engages a bevel segment gear 32 on a horizontal rock shaft 33 journaled in suitable brackets upon the saddle, one end in the present instance being journaled in bracket 30.

34 denotes a hand lever on shaft 33 which is keyed thereto so as to oscillate said shaft when it is moved, but which is free to slide longitudinally thereon as the saddle moves forward or backward on the cross head.

36 denotes a bell crank lever the arms of which are separated and the shank of which is journaled in a bracket 37 on the saddle, see Fig. 1.

35 denotes a rod which connects one arm of the bell crank lever with hand lever 34, see Fig. 2 in connection with Fig. 1. The lower arm of the bell crank lever which I have denoted specifically by 36^a lies in a position to be engaged by adjustable dogs 38 on a rod 39 one end of which is secured to a bracket 40 at the forward end of the cutter bar, the rear end thereof being free to slide in a guide 41 on the saddle, see Fig. 3. It will be seen therefore that the forward and backward movements of the saddle are controlled automatically by the engagement of dogs 38 with arm 36^a of the bell crank lever, said dogs being capable of adjustment in the usual manner to produce a long or short stroke, and that if desired the movement of the saddle may be reversed at any time by manipulation of hand lever 34.

Rock shaft 28 and sliding rod 23 are locked at either extreme of their movement by means of a spring latch 42, see Fig. 7, in connection with Figs. 1 and 2. This latch is secured to the cross head and is provided with a double incline 43 which is engaged by a corresponding double incline on an arm 44, see Figs. 1 and 7, which extends outward from rock shaft 28. The engagement of these inclines acts to hold the rock shaft and with it of course the sliding rod at either of its extremes of movement so that sliding friction clutch wheel 22 is held in engagement with either of the belt pulleys on shaft 21 until it is thrown out of engagement and into engagement with the other belt pulley. When rock shaft 28 is oscillated arm 44 will pass the double incline on the latch and the other faces of the inclines will be in engagement.

The reciprocatory movement of the saddle on the cross head is produced by means of a non-rotating screw 45 the opposite ends of which are rigidly secured to the cross head, see Fig. 3. This screw is engaged by a feed nut 46, see Figs. 3 and 5, through which the screw passes. This nut passes through a boss 47 on the saddle, see Fig. 3, its inner end consisting of a collar 48 which lies partially in a groove 49 in the top of the saddle. The outer end of feed nut 46 is provided with worm teeth adapted to engage a worm 50 on a shaft 51 journaled in suitable brackets on the saddle, see Fig. 5. The saddle is secured to the cross head by plates 52 which engage flanges 53 on the cross head and are rigidly bolted to the saddle. These plates hold the saddle firmly in place but leave it free to slide upon the cross head. The construction and operation of these parts will be clearly understood from Figs. 3, 5 and 6. At the opposite end of shaft 51 is a pinion 54. Intermittent motion is imparted to this pinion to turn the feed nut and thereby move the saddle on the cross head, in the manner which I will now describe. Turning to Figs. 2 and 7, at the opposite end of shaft 21 from sliding rod 23 is a bevel pinion 55 which engages a bevel gear 56 on a vertical shaft 57 the upper end of which is journaled in a bracket 58 upon the girder, and in a bracket 59 upon the saddle. Keyed to this shaft so as to slide freely thereon longitudinally is a bevel pinion 60 which meshes with a bevel gear 61 on a shaft 62 journaled in brackets 63 depending from the cross head, one of said brackets specifically denoted by 63^a being detachable. This shaft is provided with a spline 64 which engages and carries a sliding pinion 65, see Fig. 5 the function of which is to drive the cutter bar, as will presently be more fully explained, and also sliding sleeves 66 which are journaled in the saddle, see Fig. 3, and a sliding bevel pinion 67 which engages a bevel pinion 68 on a shaft 69 journaled in brackets 70 upon the saddle. At the opposite end of shaft 69 is a pinion 71 which engages a gear wheel 72 journaled on a hub 73 which projects outward from the saddle, see Fig. 9, in connection with Fig. 1. 74 denotes a rocker also journaled on hub 73.

75 denotes leather washers and 76 a metallic disk against which a nut 77 bears, said nut being in use tightened up sufficiently to cause the gear wheel to carry the rocker forward until a pin 78 on the rocker engages either of the

pins 79 which extend outward from the saddle. When the pin on the rocker engages one of the pins 79 the rocker is held thereby until the reverse movement takes place, gear wheel 72 continuing to move forward and slipping past the rocker.

80 denotes a connecting rod which is adjustably secured to the rocker in the usual manner to permit the feed at each actuation to be increased or diminished. The opposite end of the connecting rod is pivoted to a lever 81 journaled on a sleeve 82 extending outward from a gear wheel 83 itself journaled on a hub 84 extending outward from the saddle, see Fig. 2[a] in connection with Figs. 1 and 2. At the opposite end of lever 81 is a spring pawl 85 which is adapted to engage a double faced ratchet 86 on the face of gear wheel 83. This pawl is made reversible to provide for feeding in either direction, and suitable means is provided for locking it out of operative position.

87 is a hand wheel keyed to the outer end of sleeve 82. It will be apparent that each forward and backward movement of the connecting rod will oscillate lever 81 and by means of the spring pawl engaging the ratchet will move gear wheel 83 which meshes with pinion 54 and which in turn by means of worm 50 and feed nut 46 imparts movement in one direction or the other to the saddle. It will be obvious to those familiar with the art that each forward and backward movement of the cutter bar by means of adjustable dogs 38 and intermediate mechanism already fully described will reverse the movement of gear wheel 72 and the rocker which in turn produces a forward movement of gear wheel 83 and also a backward movement of lever 81, the spring pawl slipping over the teeth of the ratchet during the backward movement. By means of hand wheel 87 the operator is enabled to turn feed nut 46 and to place the saddle in any required position, notably when commencing pieces of work. In order to cause the saddle to be fed in the opposite direction after it has traversed the piece of metal being operated upon in one direction, it is simply necessary for the operator to lift spring pawl 85 out of engagement with the double faced ratchet, give it a half turn and let it drop back to place, it being of course understood that the back of the pawl is beveled in the usual manner so that when lever 81 is moved in one direction the bevel upon the back of the pawl will cause it to slip backward over the teeth of the double faced ratchet and when the lever is moved in the opposite direction the pawl will carry the ratchet forward. The reciprocatory movement of the cutter bar is imparted by sliding pinion 65 which engages a rack 88 forming part of the cutter bar, see Figs. 5 and 8. At the outer end of the cutter bar is the usual tool carrier 89 shown as carrying a tool 90.

91 is the usual adjusting screw for raising or lowering the tool carrier and tool.

Having thus described my invention, I claim—

1. The combination with the cross head carrying non-rotating screw 45, of the saddle having a boss 47 and a groove 49, a feed nut 46 which passes through the boss and engages the screw and is provided with a collar lying in groove 49 and with worm teeth, and shaft 51 carrying a worm engaging the worm teeth.

2. The combination with the cross head and the suspended saddle, of the cutter bar suspended in the saddle and having a rack 88, shaft 62, and a sliding pinion 65 keyed to said shaft by which the cutter bar is reciprocated.

3. The combination with the cross head and the suspended saddle, of the cutter bar suspended in the saddle and having a rack 88, shaft 62 having a spline 64, sliding sleeves 66 journaled in the saddle, sliding pinion 65 which engages the rack, and a sliding bevel pinion 67 through which said shaft and spline pass, and a bevel pinion 68 engaging pinion 67 by which shaft 62 is rotated and the cutter bar is reciprocated.

4. The combination with the cross head and the suspended saddle, of the cutter bar suspended in the saddle and having a rack 88, shaft 62, sliding pinion 65 on said shaft which engages the rack, sliding bevel pinion 67, shaft 69, carrying the bevel pinion and engaging pinion 67, and suitable means for rotating said shaft in either direction.

5. The combination with the cross head having brackets 63 and 63[a], sleeve 66 journaled in said brackets, and the saddle suspended from the cross head, of the cutter bar suspended in the saddle and having a rack 88, shaft 62 journaled in said sleeves and carrying a sliding pinion which engages the rack.

6. The combination with the cross head, non-rotating screw 45, the suspended saddle having pins 79, and feed nut 46 which receives the screw and engages the saddle, of shaft 69 carrying a pinion 71, gear wheel 72 which meshes with said pinion, hub 73 on which said gear wheel is journaled, rocker 74 also journaled on said hub and provided with a pin 78 adapted to engage either of the pins on the saddle, friction washers between said rocker and the gear wheel, gear wheel 83 having double faced ratchet 86, lever 81 carrying a reversible spring pawl 85 adapted to engage said ratchet, a connecting rod between the rocker and said lever, and suitable connections intermediate gear wheel 83 and the feed nut whereby the oscillation of the rocker is caused to impart intermittent rotary movement to the feed nut.

7. The combination with the saddle having pins 79 and the non-rotating screw, and feed nut 46 which receives the screw and engages the saddle, of gear wheel 42, rocker 74 having pin 78 and adapted to be driven by friction from gear wheel 72 until stopped by engagement of pin 78 with one of the pins 79, gear wheel 83 having double faced ratchet 86, lever 81 carrying a reversible spring pawl adapt-

ed to engage the ratchet, a connecting rod between the rocker, and the lever, and suitable connections intermediate gear wheel 83 and the feed nut whereby the oscillation of the rocker is caused to impart movement to the latter.

8. The combination with the feed nut having worm teeth, shaft 51 having a worm engaging said teeth and a pinion 54, of gear wheel 83 having a sleeve 82, hub 84 on which it is journaled, and a hand wheel keyed to the sleeve whereby a hand feed may be obtained.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY J. HENDEY.

Witnesses:
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ALBERT SPERRY.