

1,360,842.

R. L. WILCOX.
HEADING MACHINE.
APPLICATION FILED NOV. 7, 1918.

Patented Nov. 30, 1920.

5 SHEETS—SHEET 1.

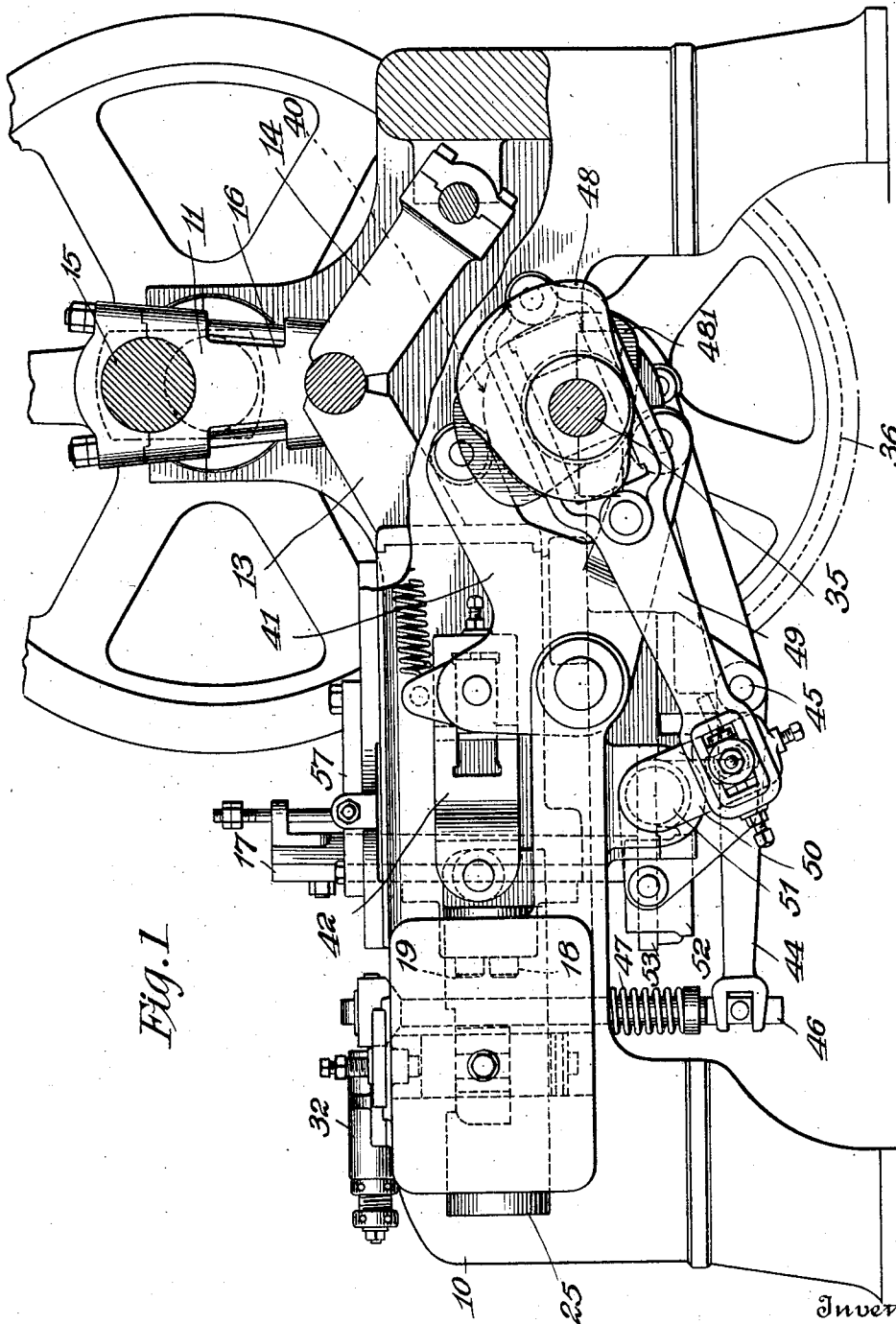


Fig. 1

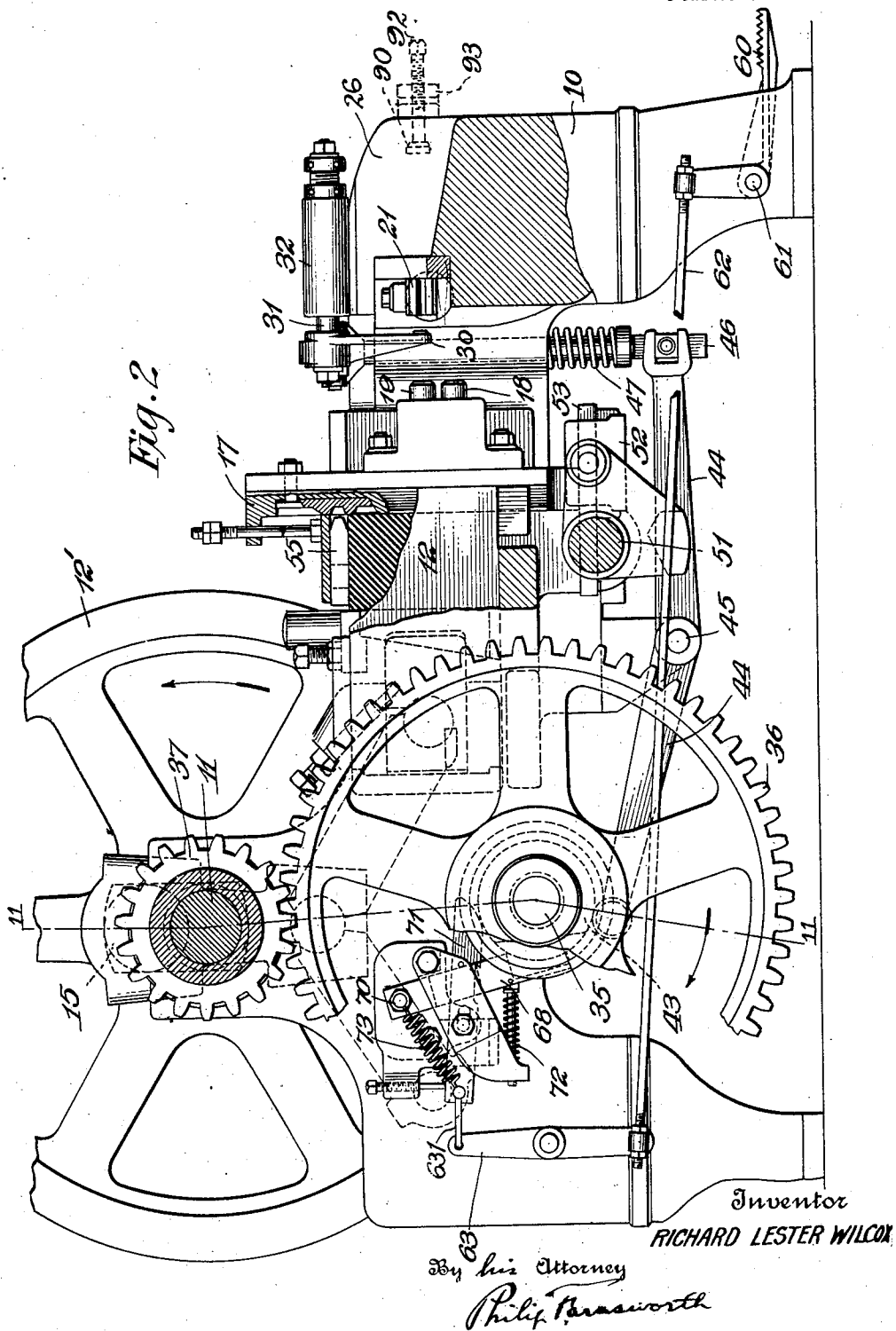
Inventor
RICHARD LESTER WILCOX

By his Attorney

Philip Farnsworth

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5 SHEETS—SHEET 2



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5 SHEETS—SHEET 3.

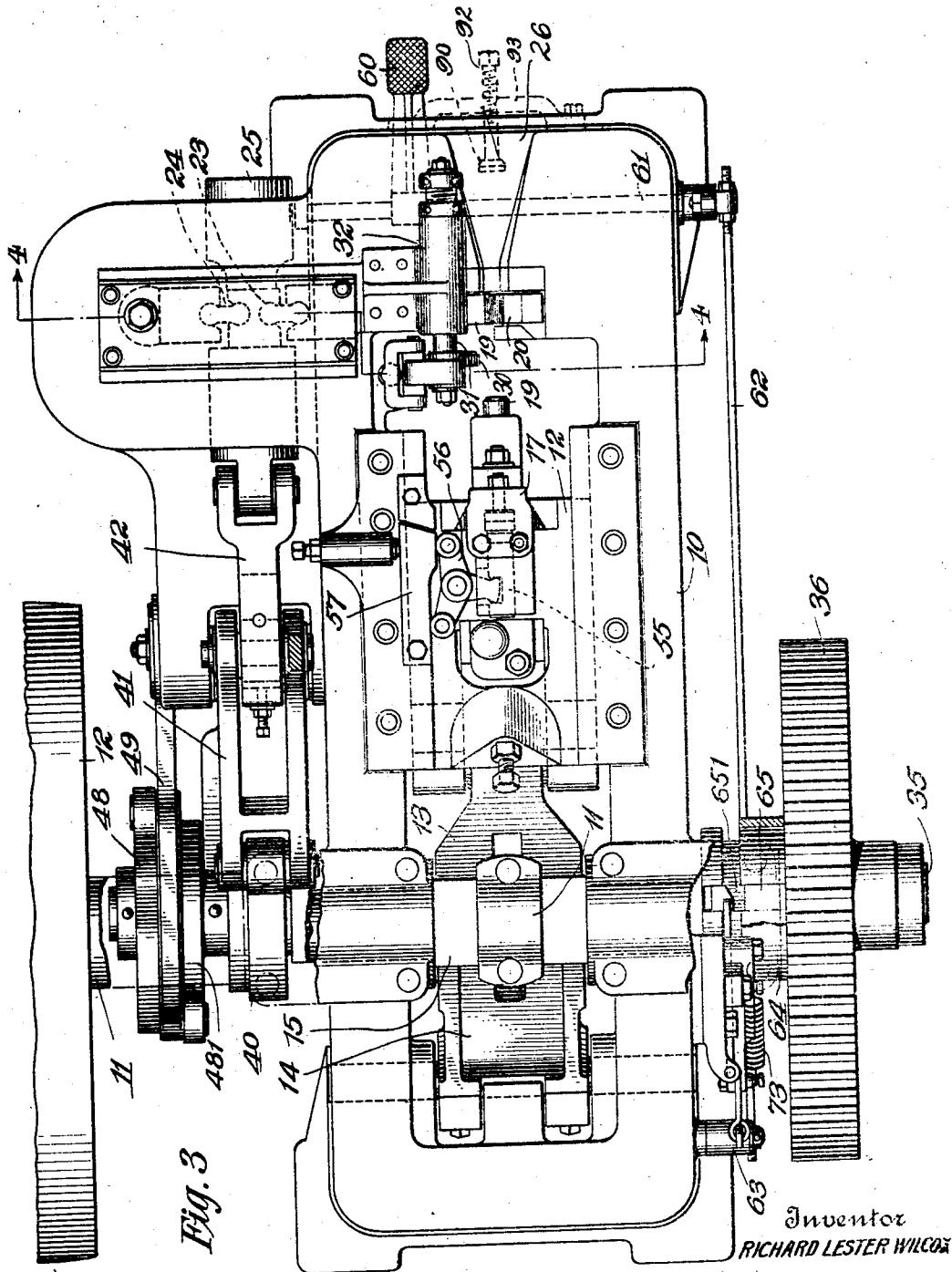


Fig. 3

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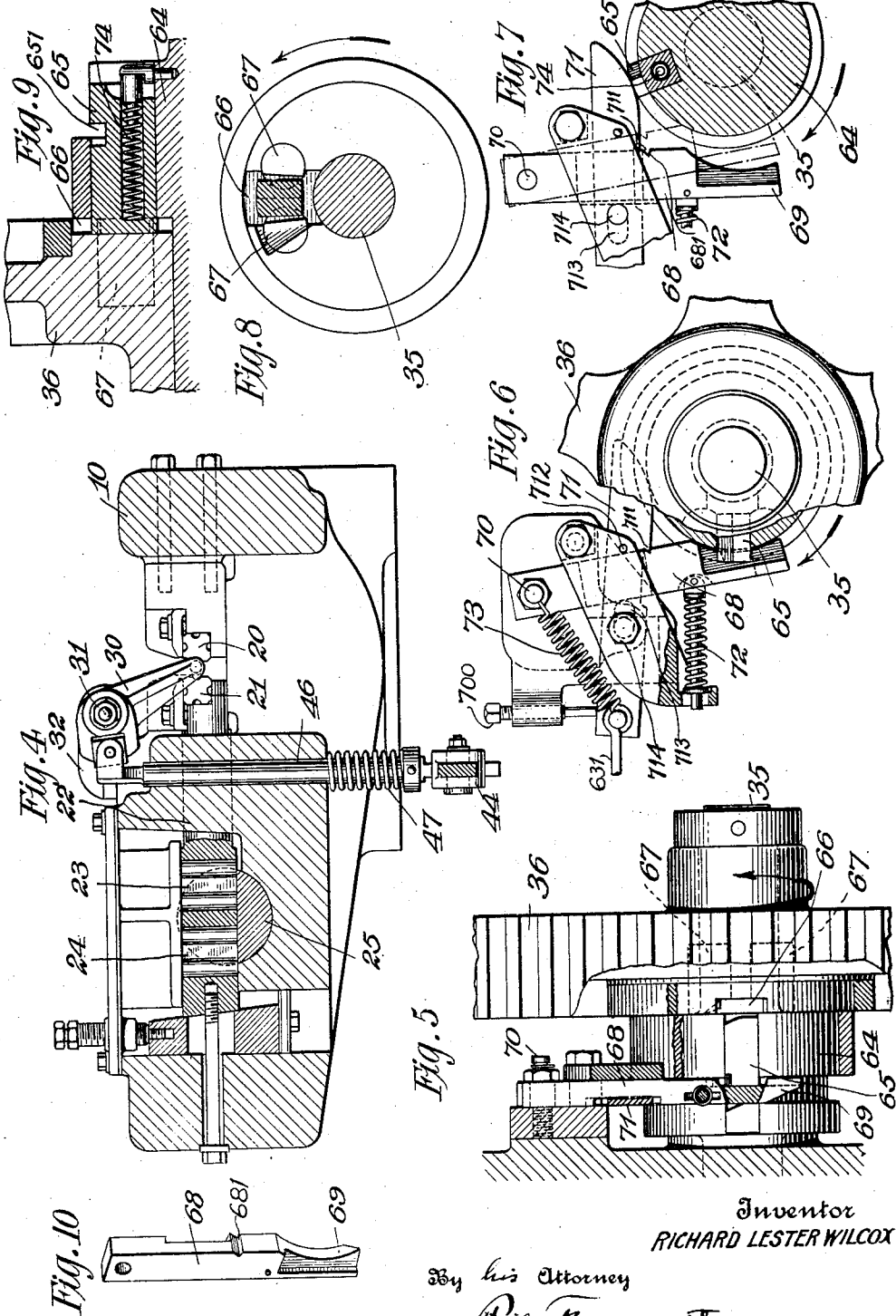
By his Attorney

Philip B. Bannworth

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5 SHEETS—SHEET 4.



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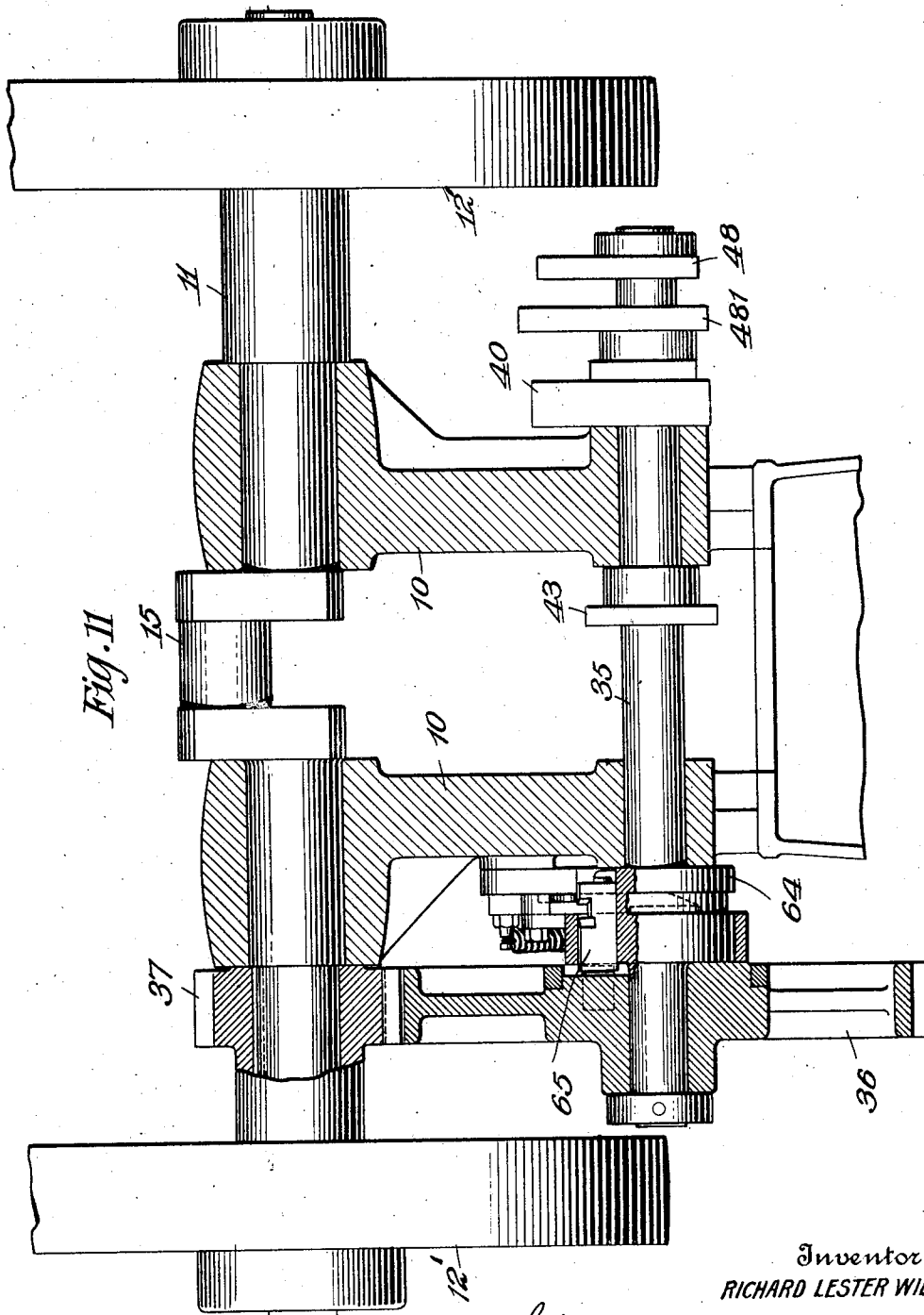
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5 SHEETS—SHEET 5.



Inventor
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UNITED STATES PATENT OFFICE.

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HEADING-MACHINE.

1,360,842.

Specification of Letters Patent.

Patented Nov. 30, 1920.

Application filed November 7, 1918. Serial No. 261,543.

To all whom it may concern:

Be it known that I, RICHARD LESTER WILCOX, a citizen of the United States, and a resident of Waterbury, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Heading-Machines, of which the following is a specification.

My invention relates to that class of machines in which one or more blows or pressures are applied to work presented to a hammer, punch, or the like, and particularly to a type of such machine in which the articles to be worked may be presented singly by hand to the machine. One of the more important applications of my present invention is to a machine for striking up heads on rods or the like, in which one or more blows may be required to form the head, and in which the rods are presented singly by the operator or otherwise to the punch or hammer.

One of the objects of my invention is to provide a machine in which the blows will be delivered at a high rate of speed while at the same time the operator will have ample time in which to change the work. Another object of my invention is to provide a machine which will be running continuously, but which will be arranged in such manner that the operator will have ample time to adjust the work before throwing the machine into striking operation and also one in which the operation is entirely automatic, not under control of the operator, after the operator has thrown it into operation.

Another object of my invention is to increase the output of such machines by avoiding the stopping and starting of parts which has been usual heretofore, so that, in effect, I provide a continuously running machine which will be operative only intermittently, at the will of the operator.

With these and other objects in view my invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and pointed out in the appended claims.

In the drawings, Figure 1 represents a side elevation, partly in section, of one form of machine embodying my invention which

I have chosen for purposes of illustration only, such machine in the present instance being a two-blow open die header for operating on the ends of cold rods.

Fig. 2 is a side elevation, partly in section, of the opposite side of the machine illustrated in Fig. 1.

Fig. 3 is a plan of my illustrative machine with some of the parts removed.

Fig. 4 is a sectional view taken generally along the line 4—4 of Fig. 3 looking in the direction of the arrow in that figure.

Fig. 5 is an enlarged fragmentary view of the clutch mechanism and adjacent parts.

Fig. 6 is an elevation of a portion of the clutch mechanism.

Fig. 7 shows some of the parts illustrated in Fig. 6 in different relative positions.

Fig. 8 is a face view of a portion of the clutch mechanism.

Fig. 9 is a section of a portion of the clutch mechanism.

Fig. 10 is a perspective view of the clutch lever.

Fig. 11 is a section on line 11—11 of Fig. 2 through the two shafts of the machine illustrated in Figs. 1, 2 and 3, with some of the parts omitted.

The corresponding parts are referred to both in the drawings and the specification by similar reference characters.

In the machine adopted for illustration, 10 is the frame in which, in suitable bearings, is mounted a driving shaft 11, provided with suitable flywheels 12'. Mounted in suitable slides on frame 10 is a gate 12 connected to toggles 13, 14, the toggle 14 bearing against a portion of the frame, as shown best in Fig. 1. Shaft 11 is provided with a crank 15 and a pitman 16 connected to toggles 13, 14.

Mounted on gate 12 is a slide 17 carrying, in the illustrative machine, a pair of punches 18, 19.

At the end of the machine opposite the driving shaft is a workholder comprising, in the form illustrated, a pair of dies 20, 21, with devices for moving such dies to close them on a rod, constituting the work in the illustrative machine, placed between the two dies to grip it, and to open the dies to release the work. Die 20 is held fixedly in a

holder attached to the frame 10, while die 21 is attached to a plunger 22 controlled by toggle members 23, 24 operated by a plunger 25. To the rear of dies 20, 21 is provided a suitable gap 26 in frame 10 through which the rod to be held in dies 20, 21 may project.

Between gate 12 and dies 20, 21 is mounted a work gage 30 supported on a shaft 31, which shaft is mounted so as to be adjustable longitudinally in a bracket 32 fastened to frame 10. In Fig. 4, gage 30 is shown in operative position in front of dies 20, 21.

Mounted in suitable bearings on frame 10 is a second shaft or cam shaft 35. On the end of shaft 35 is loosely mounted a gear wheel 36 meshing with a pinion 37 connected to shaft 11. In the illustrative machine, the ratio of this gearing is 3 to 1. On shaft 35 are a series of cams which, through suitable connections, operate the punch shifting devices, the gage moving devices and the workholder closing toggles.

The workholder toggle plunger 25 is reciprocated by cam 40 operating through suitable anti-friction rollers on cam lever 41 and through a connection 42.

Gage 30 is rotated on shaft 31 by a cam 43 on shaft 35, operating through a suitable anti-friction roller on a cam lever 44 pivoted at 45 and connected at the end opposite the cam roller to a rod 46 carrying a compression spring 47 and connected at its upper end to gage 30, as shown best in Fig. 4.

Slide 17 derives its motion crosswise the gate 12 from cams 48 and 481 operating through suitable anti-friction rollers, on the connection 49 connected at one end to a lever 50 on a short shaft 51. Shaft 51 carries a suitable slide guide 52 through which a suitable slide 53 connected to punch slide 17 may move as the gate 12 reciprocates. The punch slide 17 is locked in one of its positions by a bolt 55 operated during the reciprocation of gate 12, by a lever 56 which is moved by a fixed cam 57, all as shown best in Fig. 3.

The gear 36 may be connected to the shaft 35 by the operator through any suitable clutch controlled, in the machine illustrated, by a pedal 60 on a rod 61 which, through a connection 62, transmits pressure to a lever 63.

In the particular form of clutch illustrated, a member 64 forming part of the shaft 35 is provided with a suitable passage in which is slidingly mounted a key 65. In the hub of gear 36 is provided a slot 66 into which the key 65 may be projected to be engaged by vertical faces on steel blocks 67, 67 set in the hub substantially parallel with the sides of the slot. Key 65 is provided with an angular groove 651 and adjacent the normal position of this groove, as shaft 35 and member 64 rotate, is a clutch lever 68 pivotally supported at 70 and having a

cam shaped end 69 arranged so that when lever 68 is in the position of Fig. 6, its cam shaped end 69 will enter groove 651 in key 65 and move the key in a direction away from the hub of gear 36, that is to the left of Fig. 5 and to the right of Fig. 9. Lever 68 is provided with a notch 681 to be engaged by a hook 711 formed on a latch 71 connected to the lever 63 by connection 631. Latch 71 is a thin member adjacent lever 68 and is provided with a slot 713 through which projects bolt 714 to support latch 71 and permit it to move longitudinally. Pin 712 serves as a limiting stop for lever 68. Spring 72 holds clutch lever 68 normally in the position shown in Fig. 6 and a spring 73 holds latch 71 normally in the position shown in that figure with its end against stop screw 700.

The operation of the clutch is as follows:—With the parts in the position shown in Fig. 6, the clutch will be disengaged because key 65 will be in the position shown in Fig. 5 out of contact with the hub of gear 36. When the operator presses pedal 60, he swings lever 63 and, through connection 631, pulls latch 71 to the left of Fig. 6 into the position of Fig. 7, carrying with it, by reason of the notched connection between the latch and the lever, lever 68 to the full line position of Fig. 7. Bolt 714, by engaging with one end of slot 713, limits the motion of latch 71. Thereupon spring 74 (Fig. 9) moves key 65 longitudinally so that its end is moved into slot 66 when that slot reaches the position of the key as gear 36 is rotated by pinion 37. Thereupon the shaft 35 and gear 36 rotate together, thus carrying the key 65 around to the position shown in Fig. 7, at which time the top of the key engages with the cam shaped end of latch 71, lifting the latch and thereby moving it out of contact with the notch in lever 68. This permits the lever 68 to be returned to its dotted line position of Fig. 7, even though the operator still has pedal 60 depressed. As shaft 35 completes a single rotation, the groove in key 65 engages the cam end of lever 68 and the key is withdrawn from slot 66 and thus out of engagement with the hub of gear 36. This brings shaft 35 to rest. If the shape of the cams on shaft 35 are not such as to bring the shaft to rest at substantially the same position each time that the clutch is disengaged, I may provide a suitable brake, preferably of the constant friction type, to act to stop the shaft when the clutch is disengaged.

The machine illustrated is designed to upset a head on a rod in two blows, the first being a preliminary upsetting of the rod and the second a finishing blow. With the clutch disengaged, as it will be normally, the machine will be in operation with shaft 11 rotating and gate 12 reciprocating back

and forth. Because of the position at which shaft 35 has been brought to rest when the clutch was disengaged, neither of the punches 18 and 19 will be in striking alinement with the dies 20 and 21 and at rest before the space between the work gage 30 and open dies 20 and 21 as shown in Fig. 4. It will be seen, therefore, that so far as the safety of the operator is concerned, he may place a rod in the gap 26 in frame 10 with its end between dies 20, 21 and against work gage 30 precisely the same as if the whole machine were at rest. Then, with the rod thus correctly positioned, he depresses treadle 60 which, through the operation of the clutch, throws the shaft 35 into operation in timed relation with the reciprocation of the punches. As shaft 35 begins to rotate, by the action of cam 40, the dies 20, 21 close on the rod to grip it and then cam 43 swings the work gage 30 to the left of Fig. 4 out of alinement with the punches. At the same time, rotation of cams 48 and 481 moves the punch slide 17 to bring punch 19 into alinement with the work held in the dies 20, 21. The first blow is struck and farther rotation of shaft 35 will, in the next reciprocation of the gate 12, bring punch 18 into alinement to strike the second blow. Further rotation of shaft 35 will return slide 17 to its position out of alinement with the center line of the dies 20, 21 and, at the same time, the clutch is thrown out of engagement to bring shaft 35 to its rest position, the last portion of its rotation serving to open dies 20, 21 and to swing work gage 30 into its operative position. The operator removes the headed rod, inserts and adjusts a new one and repeats the above described operations by again depressing pedal 60.

By the means illustrated, the shaft 11 may rotate at a high speed so that the successive blows from the punches are struck in very rapid succession, and yet it will be observed that this high speed in no way affects the time in which the operator is required to adjust the work. Moreover, because the flywheels and the parts connected with shaft 11, including gears 36 and 37, are in constant operation, there is very little additional inertia to be overcome when treadle 60 is depressed.

It will be understood that, in its broader aspects, my invention may be applied to many different types of machines and I do not desire to limit it to the specific form which I have adopted for purposes of illustration only. It will also be obvious that in heading machines, the number of blows to be struck to complete the work may be one or as many more, as is found necessary. Preferably, however, I arrange the machine so that the gate is given one more reciprocation to each cycle than the number of blows to be struck, in order that, during this

idle reciprocation, the cams may have sufficient time to function before the effective strokes begin. By so doing, I am enabled to provide a higher speed for the effective strokes than would be possible if the cams functioned initially during the first effective stroke.

Upon reviewing the invention hereinbefore described, it will be apparent, important features thereof are the following: Firstly, the machine is capable of being operated intermittently with continuously operating primary or power mechanism which includes the crank shaft and a tool carrying gate or member deriving motion from said crank shaft. Secondly, the machine includes secondary or operative mechanism comprising means for holding the work piece while operation thereon is being performed, and means for actuating a movable gage, when such is employed, for determining the relative position of the work piece, and when a plurality of punches or tools are employed, means are included for alternately moving the same into working positions relatively to the work piece during a complete operation of the machine; or, when only one punch or tool is employed said latter means alternately moves the punch or tool into and out of an engaging position relatively to the work piece. Thirdly, the invention includes a clutch device and means operatively associated therewith whereby the operator may at will throw in the said clutch device, and said associated means will then automatically, in proper sequence and timed relation with the movement of the primary mechanism, operate all the inclusive means of the secondary mechanism, also in proper sequence and without any judgment of the operator being exercised. And further, in the event of the failure on the part of the operator to release the treadle in throwing the clutch, said associated means will automatically break the coöperative relation between the primary and secondary mechanism at the completion of said operation.

While preferably I provide a movable gage, as illustrated, it is obvious that this is not essential. The workman may use any fixed point on the work to determine the amount of projection beyond the dies or a gage may be provided for the rear end of the work, as shown in dotted lines in Figs. 2 and 3 in which form of gage 90 is the work gage mounted on the end of a screw 92 threaded into the bracket 93 bolted to the frame 10.

The construction of many of the parts, particularly as to the means for adjustment and the like, are similar to those used in heading machines now in use, such as are illustrated, for instance, in my prior Patent No. 1,036,047, and consequently a detailed

description of these parts is not necessary to the understanding of my present invention, since they form no part thereof.

It will also be understood that the construction and operation of the various parts of the machine may be widely varied without departing from my invention.

I claim—

1. In a machine of the class described, a tool, a workholder, means to reciprocate the tool toward and away from the workholder, the tool being positioned to move at times in a path out of operative relation with the work in the workholder, and means initially under the control of the operator, to automatically move the work in the workholder and the tool relatively to each other to bring the tool and the work into operative relation in timed relation with the reciprocation of the tool.

2. In a machine of the class described, a tool, a workholder, means to reciprocate the tool toward and away from the workholder, the tool being positioned to move at times in a path out of operative relation with the work in the workholder, and means initially under the control of the operator, to automatically move the workholder and the tool relatively to each other across the direction of reciprocation of the tool, to bring the work and the tool into operative relation in timed relation with the reciprocation of the tool.

3. In a machine of the class described, a tool, a workholder, means to reciprocate the tool toward and away from the workholder, the tool being positioned to move at times in a path out of operative relation with the work in the workholder, and the workholder being normally open, and means, initially under the control of the operator, to automatically close the workholder on the work and move the tool relatively thereto to bring the tool and the work into operative relation in timed relation with the reciprocation of the tool.

4. In a machine of the class described, a plurality of tools, a workholder, means to reciprocate the punches toward and away from the workholder, the tools being positioned to move at times in paths out of operative relation with the work in the workholder, and means, initially under control of the operator, to automatically move the workholder and the tools relatively to each other to bring the work and each of the tools in succession into operative relation in timed relation with the reciprocation of the tools.

5. In a machine of the class described, a plurality of tools, a workholder, means to reciprocate the tools toward and away from the workholder, the tools being positioned to automatically move at times in paths out of operative relation with the work in the workholder, and means, initially under con-

trol of the operator, to move the workholder and the tools relatively to each other across the direction of reciprocation of the tools, to bring each of the tools in succession into operative relation with the work in the workholder in timed relation with the reciprocation of the tools.

6. In a machine of the class described, a plurality of tools, a workholder, means to reciprocate the tools toward and away from the workholder, the tools being positioned to move at times in paths out of operative relation with the work in the workholder, and the workholder being normally open, automatically operating means initially under the control of the operator to close the workholder on the work and to move the work and the tools relatively to each other to bring each of the tools in succession into operative relation with the work in timed relation with the reciprocation of the tools, such means being arranged to automatically move the tools and the work relatively to each other out of operative relation and to open the workholder after all tools have engaged the work.

7. In a machine of the class described, a tool, a workholder, means to reciprocate the tool toward and away from the workholder, the tool being positioned to move at times in a path out of operative relation with the work in the workholder, automatically operating means, initially under the control of the operator, to move the work in the workholder and the tool relatively to each other to bring the tool and the work into operative relation in timed relation with the reciprocation of the tool, and means to move the tool and the work automatically out of operative relation after a predetermined number of reciprocations of the tool and to hold the parts in such position at the will of the operator.

8. In a machine of the class described, a tool, a workholder, means to reciprocate the tool toward and away from the workholder, the tool being positioned to move at times in a path out of operative relation with the work in the workholder, automatically operating means, initially under the control of the operator, to move the workholder and the tool relatively to each other across the direction of reciprocation of the tool, to bring the work and the tool into operative relation in timed relation with the reciprocation of the tool, and means to move automatically the tool and the workholder relatively into normal position and to hold the parts in such position at the will of the operator.

9. In a machine of the class described, a tool, a workholder, means to reciprocate the tool toward and away from the workholder, the tool being positioned to move at times in a path out of operative relation with the

work in the workholder, and the workholder being normally open, automatically operating means, initially under the control of the operator, to close the workholder on the work and to move the workholder and the tool relatively to each other to bring the tool and the work into operative relation in timed relation with the reciprocation of the tool, and means to move automatically the tool and the workholder relatively into normal position and to open the workholder and to hold the parts in such positions at the will of the operator.

10. In a machine of the class described, a tool, a workholder, a work gage adjacent the holder, the workholder being at times open and the gage being at the same time in operative position, means to reciprocate the tool toward and away from the workholder in a path so as to be out of operative relation with the work in the workholder, and automatically operating means, initially under the control of the operator, to close the workholder and to move the workholder and the tool relatively to each other to bring the tool and the work into operative relation and to move the gage out of gaging position.

11. In a machine of the class described, a tool, a workholder, a work gage adjacent the holder, the workholder being at times open and the gage being at the same time in operative position, means to reciprocate the tool toward and away from the workholder in a path so as to be out of operative relation with the work in the workholder, automatically operating means, initially under the control of the operator, to close the workholder and to move the workholder and the tool relatively to each other to bring the tool and the work into operative relation and to move the gage out of gaging position, and means to move automatically the tool and the workholder relatively into normal position, to open the workholder and to move the gage into gaging position and to hold the parts in such positions at the will of the operator.

12. In a machine of the class described, a continuously running driving shaft, a tool, connections between the shaft and tool to cause the tool to reciprocate continuously, a second shaft, a clutch arranged to connect the second shaft and the driving shaft at the will of the operator, means brought into action upon engagement of said clutch for automatically operating mechanism in timed relation with the reciprocation of the tool, said mechanism including a workholder toward and from which the tool reciprocates, a work gage adjacent the workholder and at times in operative position, the tool at the same time being positioned out of operative relation with the work in the workholder, and mechanism connected to the second shaft and constructed and arranged to

move the tool across its direction of reciprocation and to move the gage out of operative position, when the second shaft is rotated by the driving shaft.

13. In a machine of the class described, a continuously running driving shaft, a tool, connections between the shaft and tool to cause the tool to reciprocate, a second shaft, a clutch arranged to connect the second shaft, means brought into action upon engagement of said clutch for automatically operating mechanism in timed relation with the reciprocation of the tool, said means including a workholder toward and from which the tool reciprocates, a work gage adjacent the workholder and at times in operative position, the tool being at the same time positioned out of operative relation with the work in the workholder, and mechanism connected to the second shaft and constructed and arranged to move the tool across its direction of reciprocation and to move the gage out of operative position, when the shaft is rotated by the driving shaft, and additional means to disengage the clutch automatically so as to leave the tool and the gage respectively in an inoperative and an operative position after a predetermined number of reciprocations of the tool.

14. In a machine of the class described, a continuously running driving shaft, a tool, connections between the shaft and tool to cause the tool to reciprocate continuously, a second shaft, a clutch arranged to connect the second shaft and the driving shaft at the will of the operator, means brought into action upon engagement of said clutch for automatically operating mechanism in timed relation with the reciprocation of the tool, said mechanism including a workholder toward and from which the tool reciprocates, the tool being at times positioned out of operative relation with the work in the workholder, and mechanism connected to the second shaft and constructed and arranged to move the tool across its direction of reciprocation when the second shaft is rotated by the driving shaft.

15. In a machine of the class described, a continuously running driving shaft, a tool, connections between the shaft and tool to cause the tool to reciprocate, a second shaft, a clutch arranged to connect the second shaft and the driving shaft at the will of the operator, means brought into action upon engagement of said clutch for automatically operating the mechanism in timed relation with the reciprocation of the tool, said mechanism including a workholder toward and from which the tool reciprocates, the tool being at times positioned out of operative relation with the work in the workholder, and mechanism connected to the second shaft and constructed and arranged to move the tool across its direction of reciprocation when

the shaft is rotated by the driving shaft, and means to disengage the clutch automatically so as to leave the tool in its first or inoperative position after a predetermined number of reciprocations of the tool.

16. In a machine of the class described, a continuously running driving shaft; a tool; connections between the tool and the shaft to cause the tool to reciprocate continuously; a second shaft; means, including a clutch, to connect the driving shaft and the second shaft to cause a plurality of reciprocations of the tool for each rotation of the second shaft, the clutch being constructed and arranged to connect the two shafts at the will of the operator; means brought into action upon engagement of said clutch for automatically operating mechanism in timed relation with the reciprocation of the tool, said mechanism including a workholder toward and from which the tool reciprocates, the tool being at times positioned out of operative relation with the work in the workholder; and mechanism connected to the second shaft, to move the workholder and the tool relatively to bring the work and the tool into operative relation, when the second shaft is rotated by the driving shaft.

17. In a machine of the class described, a continuously running driving shaft, a tool, connections between the tool and the shaft to cause the tool to reciprocate continuously, a second shaft, means, including a clutch, to connect the driving shaft and the second shaft to cause a plurality of reciprocations of the tool for each rotation of the second shaft, the clutch being constructed and arranged to connect the two shafts at the will of the operator; means brought into action upon engagement of said clutch for automatically operating mechanism in timed relation with the reciprocation of the tool, said mechanism including a workholder toward and from which the tool reciprocates, the tool being at times positioned out of operative relation with the work in the workholder, and mechanism connected to the second shaft, to move the workholder and the tool relatively to bring the work and the tool into operative relation, when the second shaft is rotated by the driving shaft, and additional means to disengage automatically the two shafts after the second shaft has made a single rotation.

18. In a machine of the class described, a gate constantly in motion while the machine is operating, a workholder, a work gage movably mounted adjacent thereto, and automatically operating means, initially under the control of the operator, to move the gage into and out of operative position with relation to the workholder without effecting the movement of said gate.

19. In a machine of the class described, a gate constantly in motion while the machine

is operating, a workholding clamp arranged to close on the work, a work gage movably mounted adjacent thereto, and automatically operating means, initially under the control of the operator, to move the gage into and out of operative position and to open and close the clamp without effecting the movement of said gate.

20. In a machine of the class described, a gate constantly in motion while the machine is operating, a tool, a clamp arranged to hold work in position to be operated on by the tool, a work gage movably mounted adjacent the workholder, and automatically operating means, initially under the control of the operator, to move the gage into and out of operative position and to open and close the clamp without effecting the movement of said gate.

21. In a machine of the class described, the combination with a continuously rotating driving shaft; of a gate operatively connected therewith; a tool carried by said gate; an auxiliary shaft; a workholder; a feed stop device; an operative connection between said workholder, feed stop device and auxiliary shaft; a make and break connection between said driving and auxiliary shafts, said connection being so arranged that when made between said shafts the several parts actuated thereby will operate in timed relation; and means whereby said connection may break upon the complete revolution of one of said shafts.

22. In a machine of the class described, the combination with a continuously rotating driving shaft; of a gate operatively connected therewith; a tool carried by said gate; an auxiliary shaft; a workholder; a feed stop device; an operative connection between said tool, workholder, feed stop device and auxiliary shaft; a make and break connection between said driving and auxiliary shafts, said connection being so arranged that when made between said shafts the several parts actuated thereby will operate in timed relation; and means whereby said connection may break upon the complete revolution of one of said shafts.

23. In a machine of the class described, the combination with a continuously rotating driving shaft; of a gate operatively connected therewith and continuously operated thereby; a tool carried thereon; an auxiliary shaft; an operative connection between said tool and auxiliary shaft whereby relative movement is imparted to said tool upon said gate; a workholder; and means for disconnecting said last mentioned means, whereby said tool may be carried with said gate without relative movement thereon.

24. In a machine of the class described, the combination with a continuously rotating driving shaft; of a gate operatively connected therewith and continuously operated

thereby; a tool carried thereon, an auxiliary shaft; a workholder; an operative connection between said tool and auxiliary shaft; whereby relative movement is imparted to said tool upon said gate; and means for disconnecting said last mentioned means, whereby said tool may be carried with said gate without relative movement thereon.

25. In a machine of the class described, the combination with a gate; of a tool connected therewith; a workholder; a feed stop mechanism; means for operating said gate continuously; means for moving said tool relatively to said gate from the same source of power as operates said gate; and means for disconnecting said last mentioned means, whereby said tool will move with said gate without relative movement thereon.

26. In a machine wherein metal is upset by a compression tool and the relative position thereof determined by other mechanism; the combination with means for continuously moving said compression tool; of independent mechanism for determining the position of the metal in relation to said tool and of said tool in relation to its actuating means; and means for actuating said latter mechanism whereby it may be operated in timed relation therewith but at the will of the operator.

27. In a machine of the class described having continuously operating primary mechanism and intermittently operating secondary mechanism, said primary mechanism including power means and a gate driven thereby; means operating automatically, but initially under the control of the operator, for effecting cooperative relation between said mechanisms.

28. In a machine of the class described; primary mechanism including power means and a gate capable of operating continu-

ously; secondary mechanism deriving motion from said power means and capable of operating intermittently relative to said gate; and means operating automatically, but initially under the control of the operator, for establishing and breaking a cooperative relation between said primary and secondary mechanisms.

29. In a machine of the class described; primary mechanism including power means and a gate capable of operating continuously; secondary mechanism deriving motion from said power means and capable of operating intermittently relative to said gate, said secondary mechanism comprising a tool holder movable in its support, a movable workpiece holder, a movable workpiece gage, and means for operating said members in determined sequence; and means, operating automatically, but initially under the control of the operator, for establishing and breaking a cooperative relation between said primary and said secondary mechanisms.

30. In a machine of the class described; primary mechanism including power means and a gate capable of operating continuously; secondary mechanism deriving motion from said power means and capable of operating intermittently relative to said gate, said secondary mechanism comprising a tool holder movable in its support, a movable workpiece holder, and means for operating said members in determined sequence; means operating automatically, but initially under the control of the operator, for establishing and breaking a cooperative relation between said primary and said secondary mechanisms; and a gage for determining the position of the workpiece within said workpiece holder.

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