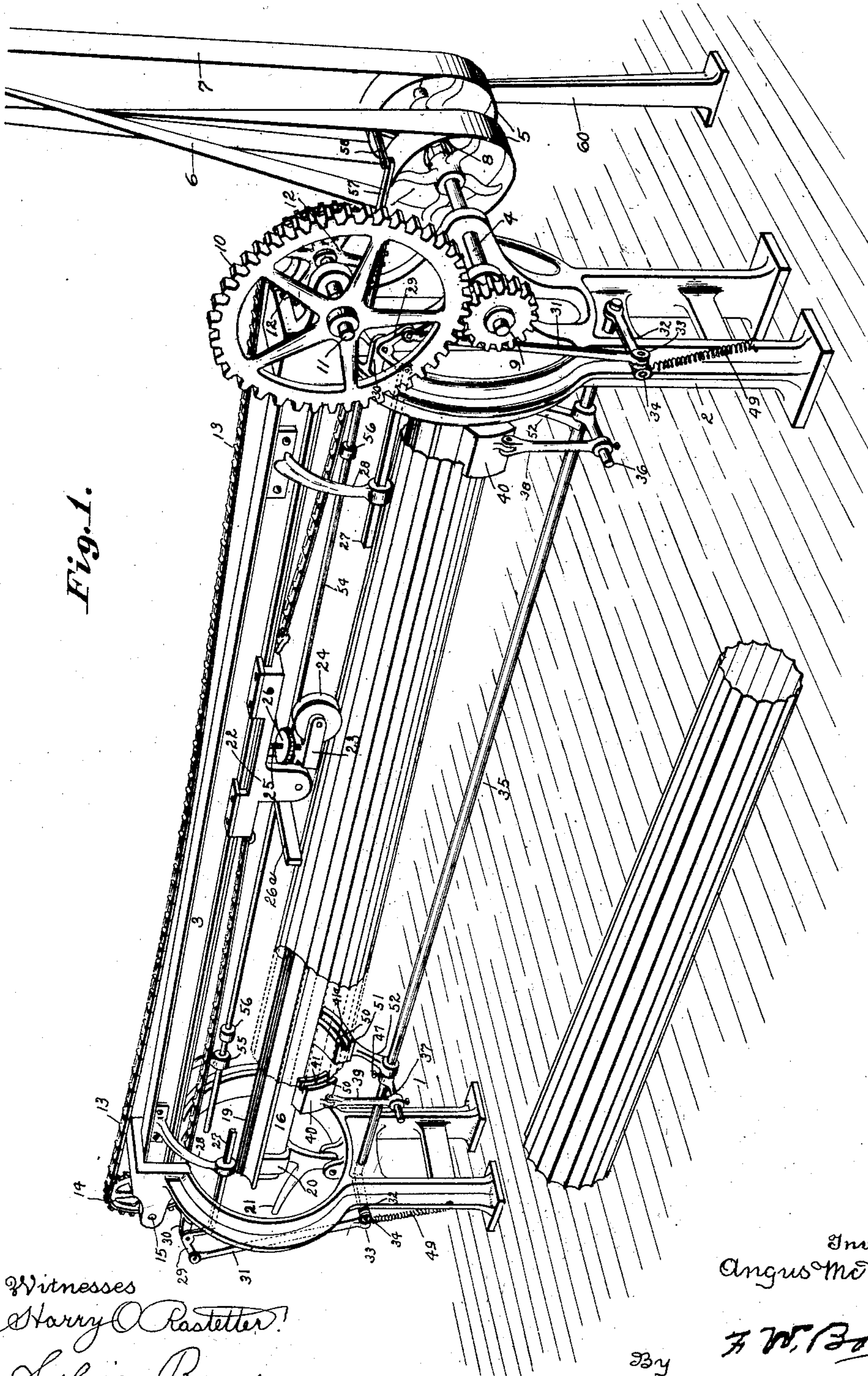


907,084.

A. McKENZIE.
COLUMN FORMING MACHINE.
APPLICATION FILED JULY 15, 1907.

Patented Dec. 15, 1908.
3 SHEETS—SHEET 1.



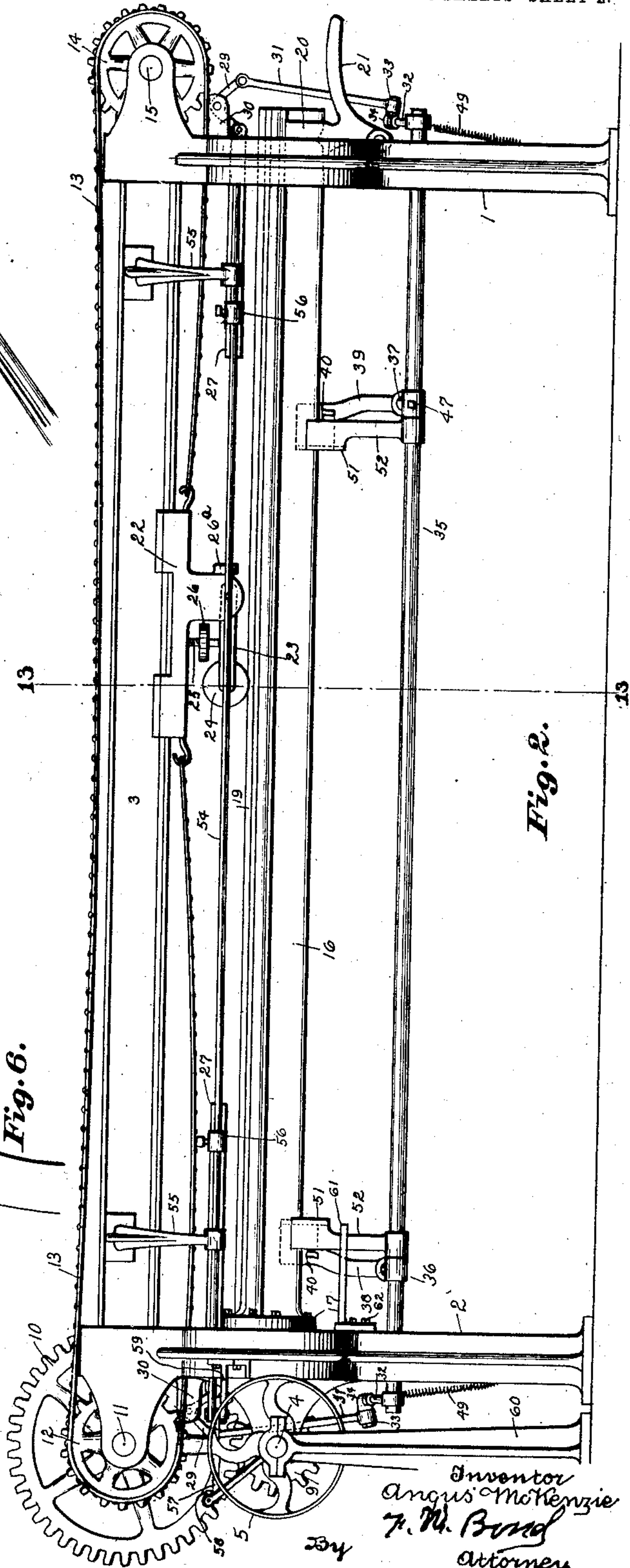
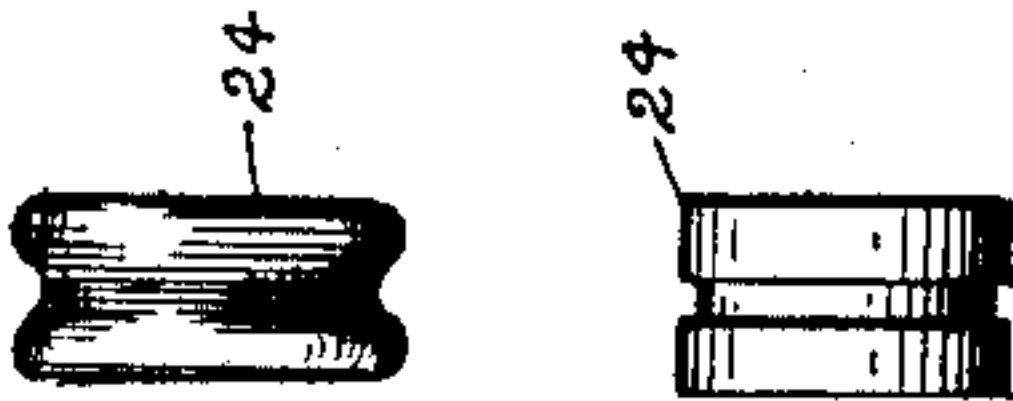
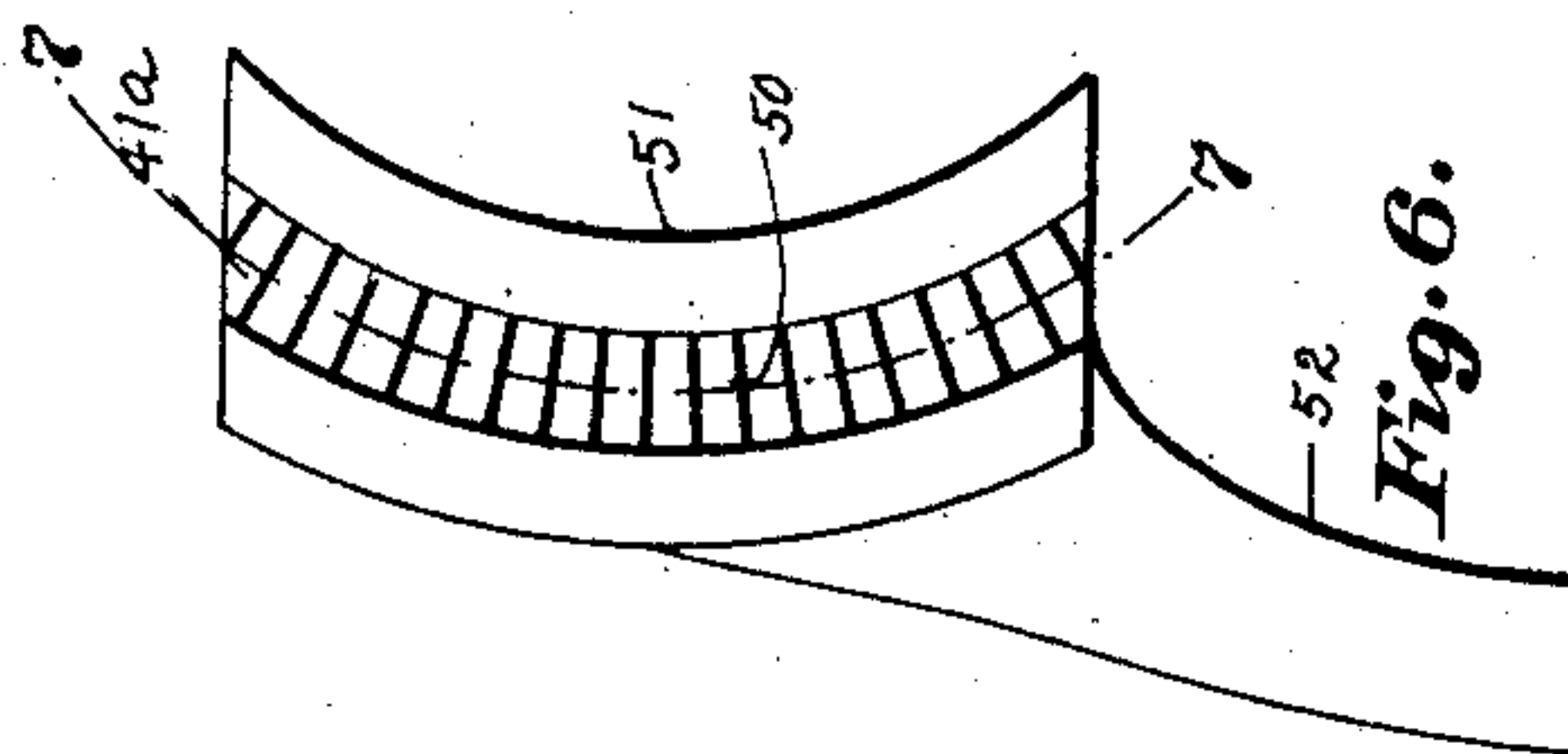
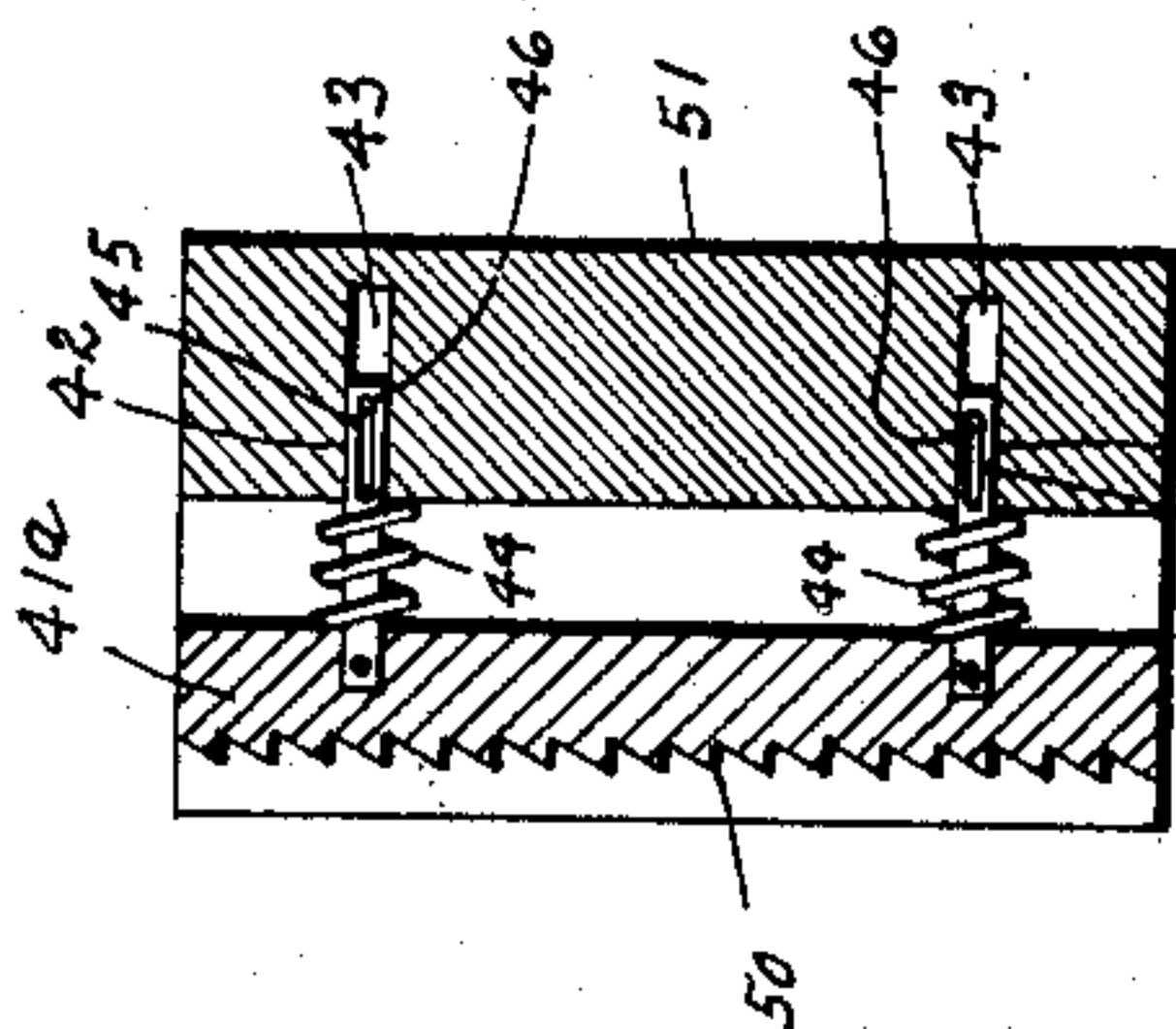
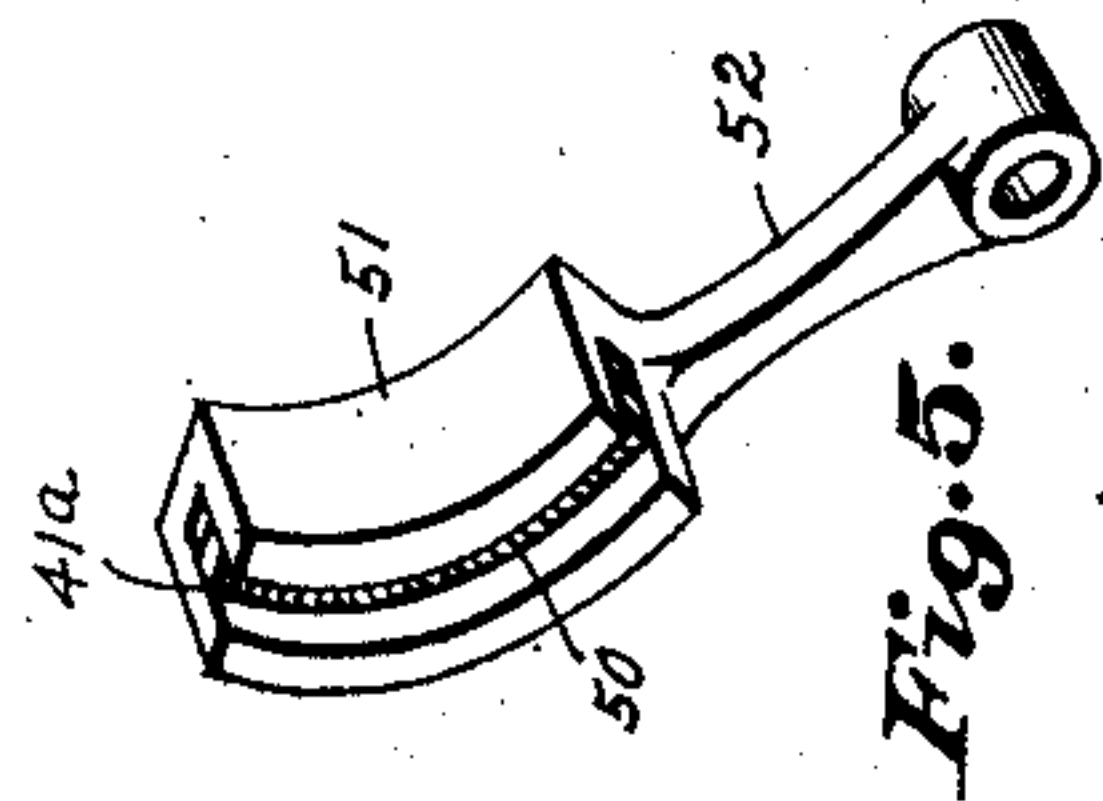
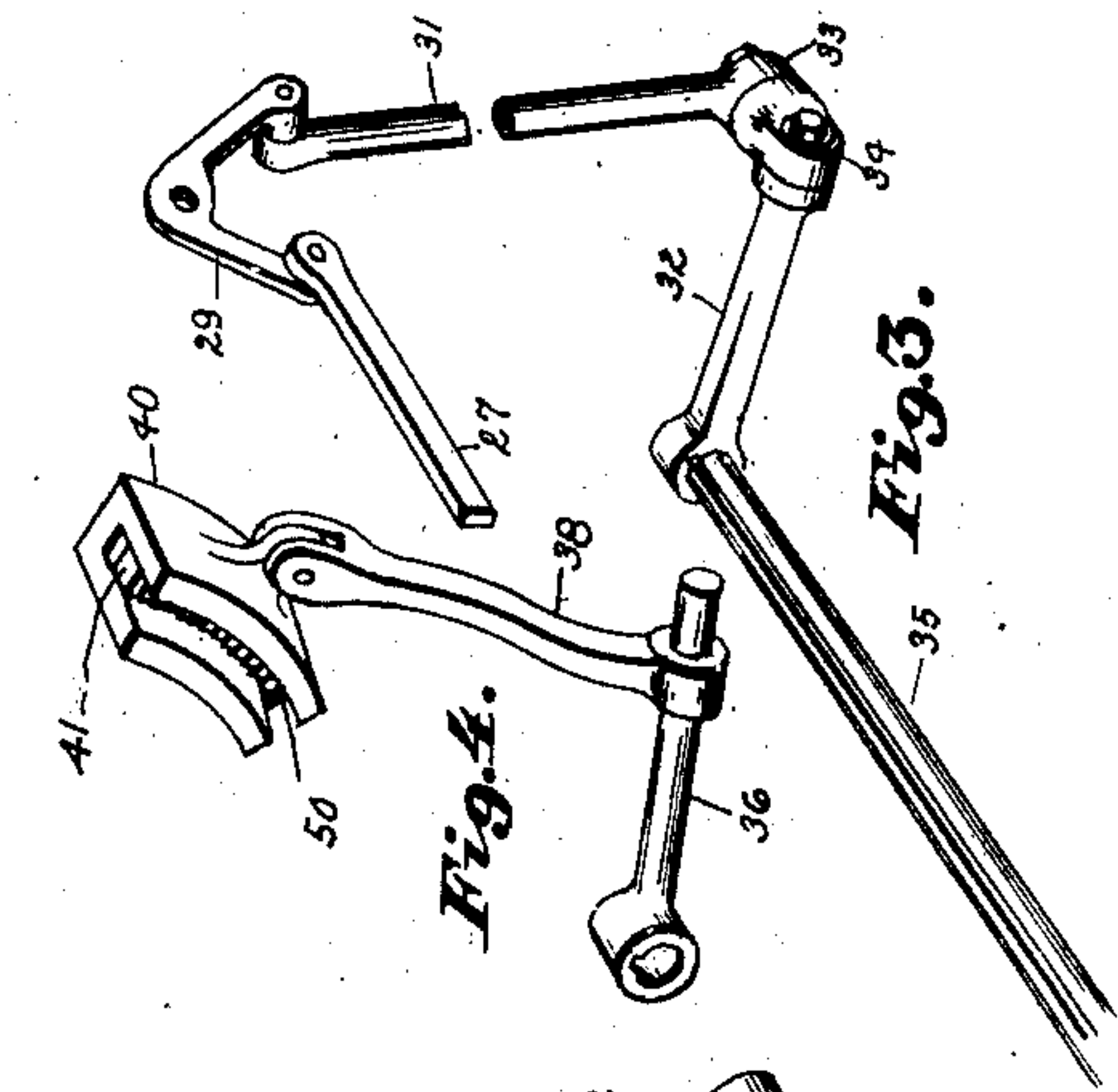
Witnesses
Harry O. Rastetter
Sylvia Boron.

Inventor
Angus McKenzie
By *F. W. Bond*
Attorney.

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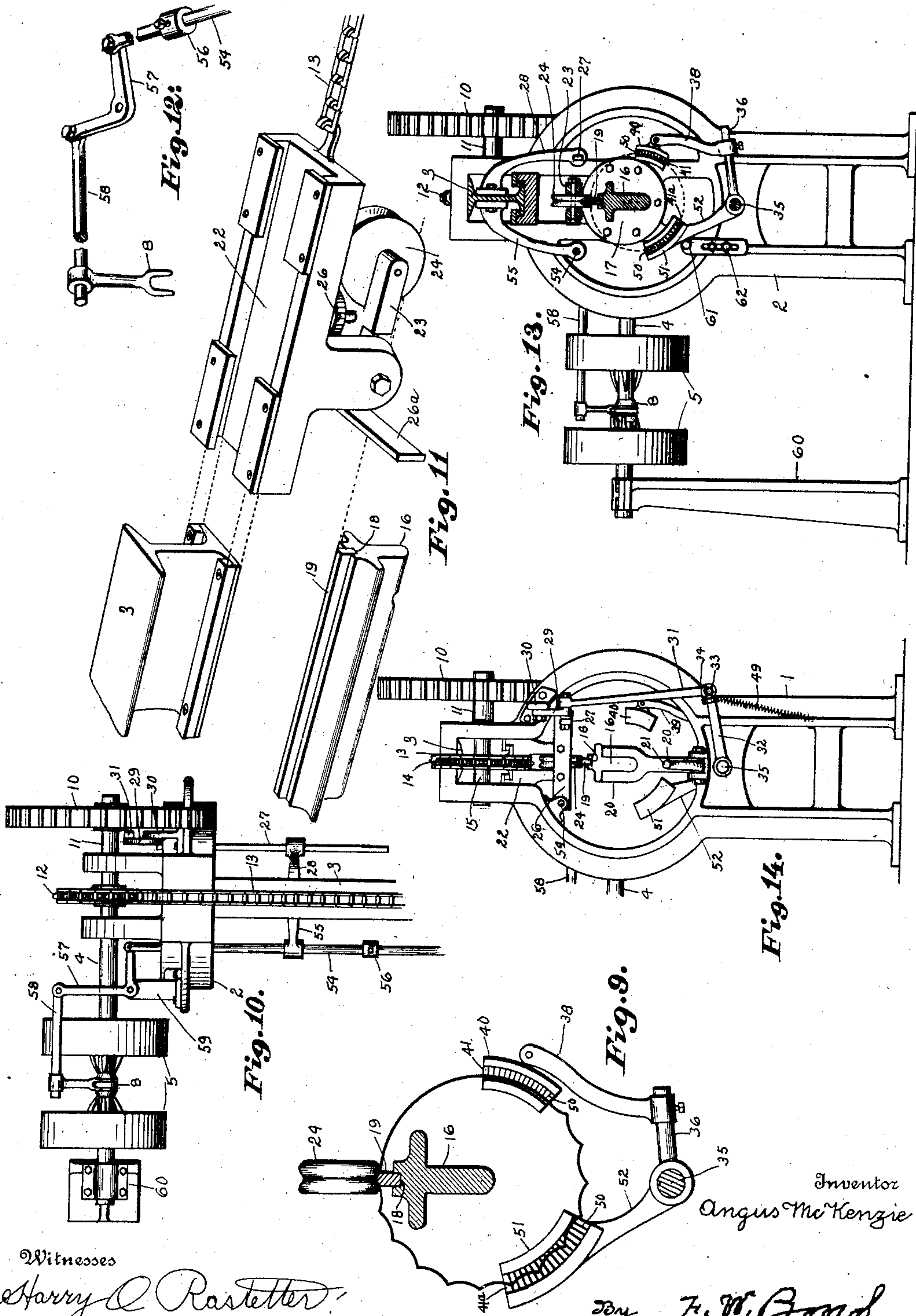
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Harry O. Rastetter
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Angus McKenzie
W. H. Bond
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3 SHEETS—SHEET 3.



Witnesses
Harry C. Rastetter
Sylvia Brown.

Inventor
Angus McKenzie

By H. W. Bond

Attorney.

UNITED STATES PATENT OFFICE.

ANGUS McKENZIE, OF CANTON, OHIO, ASSIGNOR TO THE UNION METAL POST COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

COLUMN-FORMING MACHINE.

No. 907,084.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed July 15, 1907. Serial No. 383,819.

To all whom it may concern:

Be it known that I, ANGUS McKENZIE, a subject of the King of Great Britain, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Column-Forming Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, and to the numerals and figures of reference marked thereon, in which—

Figure 1 is a perspective view of the machine, showing all of the different parts properly assembled; and a perspective view of a finished column. Fig. 2 is a side elevation of the machine. Fig. 3 is a view showing a portion of the pipe actuating arm shaft and one set of its operating levers and links. Fig. 4 is a detached view of one of the pipe actuating grips and its lever. Fig. 5 is a detached view of one of the loosely mounted pipe grips. Fig. 6 is a front view of the loosely mounted pipe grip. Fig. 7 is a sectional view on line 7—7, Fig. 6. Figs. 8 are views of the corrugating and seaming rolls. Fig. 9 is a transverse section of a partly finished pipe showing the grip heads connected thereto, and illustrating the pipe suspended upon the forming bar showing a forming roll in proper relation therewith. Fig. 10 is a top view showing the power end of the machine. Fig. 11 is a view showing a portion of the traveling frame supporting bar, showing the traveling frame and the forming bar and its support in proper relative position. Fig. 12 is a detached view of the clutch operating mechanism. Fig. 13 is a vertical section on line 13—13, Fig. 2, showing the power shaft and power wheel. Fig. 14 is an end view of the machine.

The present invention has relation to machines especially designed for the forming of columns or fluting sheet metal tubes either tapered or straight and it consists in the novel construction and arrangement of the different parts hereinafter described and particularly pointed out in the claims.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In the accompanying drawings, 1 and 2 represent the end standards, which are held in vertical position in any well known manner and their top or upper ends tied together

by means of the tie-bar 3. In the end standard 2 is journaled the power shaft 4, which power shaft has loosely mounted thereon the power wheels 5, which power wheels in this instance being driven by the cross and open belts 6 and 7, and between the power wheels 5 is located the clutch 8, which clutch may be of any desired construction, in as much as the clutch within itself forms no particular part of the present invention so far as its detail of construction is concerned, as its only purpose is to shift the power from one of the wheels 5 to the other. Upon the power shaft 4 is securely mounted the pinion 9, which pinion meshes with the gear wheel 10, which gear wheel is securely mounted upon the shaft 11, and upon the shaft 11 is securely mounted the sprocket wheel 12, from which sprocket wheel leads the chain 13, which chain extends around the sprocket wheel 14, said sprocket wheel being mounted upon the shaft 15 and the shaft carried by the standard 1.

To the standard 2 is securely attached the bar 16 by means of the flange 17. The top or upper face of the bar 16 is provided with a groove 18, in which groove is seated the die-bar 19, the top of which die-bar is formed of a shape to correspond with the shape designed to be given to the metal composing the column or pipe.

It will be understood different configurations or different shaped flutes or corrugations may be desired, and hence a number of die-bars may be employed, each having a different shaped working face and the die-bars changed from time to time, owing to the design designed to be given to any particular class of columns or pipes.

For the purpose of supporting the opposite end of the bar 16 during the time a column or pipe is being operated upon the pivoted support 20 is provided, which support is pivotally attached to the standard 1 in any convenient and well known manner.

For the purpose of operating the support 20 that is to say to bring it out of the way when it is desired to place the pipe in position, and to bring the support into position to properly support the bar the handle 21 is provided. Upon the bar 3 is slidably mounted the head 22, which head is connected at its opposite ends to the drive chain 13, said head being moved back and forth upon the bar 3, by the action of the drive chain as herein-

after described. To the head 22 is pivotally attached the bar 23, which bar carries the forming roll 24.

It will be understood that the forming roll 24 should be set so as to properly form the metal as it passes over or upon the pipe and in order to provide for the proper adjustment of pressure the screw threaded shaft 25 is provided, upon which screw threaded shaft is mounted the hand wheel 26, the screw threaded shaft being carried by the head 22, and when said head abuts against the bottom or lower end of the screw threaded shaft 25, it will limit its upward or hinge movement, thereby holding the forming roll in contact with the metal. After a pipe or column has been properly located upon the die-bar 19 as illustrated in Fig. 1 and the support 20 brought into the position illustrated in said Fig. 1, power is applied and by means of the chain 13 the head 22, together with the different parts carried thereby is moved over the pipe and the forming roll brought into action upon the metal or in other words, the metal is crimped or formed by the die-bar 19 and the forming roll 24. One full movement of the head 22 will form by means of the forming roll 22 carried by said head, one flute or configuration of the column or pipe. After the head 22 is brought into such a position that the forming roll 24 is carried beyond the end of the column or pipe, the bar 26^a carried by the head 22 will come in contact with one of the reciprocating bars 27, said reciprocating bars being held in the path of the bar 26^a by means of the brackets 28, which brackets are secured to the bar 3 or its equivalent. The opposite ends of the reciprocating bars 27 are pivotally connected to the bell cranks 29, which bell cranks are pivotally attached to the brackets 30, which brackets are carried by the end standards 1 and 2. To the bell crank 29 are pivotally attached the links 31, which links extend downward and are pivoted to the arms 32 by means of the compound joints 33 and 34.

It will be understood that when the outer portions of the bell crank 29 are moved by the reciprocating bars 27 the arms 32 will be moved upward by means of the links 31, thereby rocking the shaft 35, which shaft is journaled in the standards 1 and 2. To the rock shaft 35 are attached the arms 36 and 37, to which arms are attached the links 38 and 39 and to the top or upper ends of said links are pivotally attached the grooved heads 40, which grooved heads are each provided with the toothed bars 41, which toothed bars are located in the grooves formed in the heads 40 and are held by means of the pins 42, which pins are seated in the apertures 43 formed in the heads 40, and 51. Between the bars 41 and the seat of the grooves formed in the head and around the pins 42 are located the springs 44, which springs are for the purpose

of forcing the bars 41 away from the seats of the grooves formed in the heads 40. For the purpose of providing adjustment in addition to that allowed by the springs the pins 42 are provided with the elongated slot 45, through which elongated slots are passed the connecting pins 46, thereby allowing a limited movement of the pins 42.

It will be understood that the heads 40 should be so spaced from each other that the distance between said heads will be about equal to the length of the column or pipe designed to be acted upon, and for the purpose of varying the distances between the heads 40 from time to time the arm 37 is adjustably attached to the rock shaft 35, by which arrangement said arm can be moved to any desired point upon the shaft 35 and held in fixed adjustment by means of the set screw 47 or its equivalent.

It will be understood that when one of the reciprocating bars 27 is moved in the direction to elevate the outer end of one of the bell cranks 29 the heads 40 will be moved upward and by reason of the ends of the pipe being snugly seated against the toothed bars 41, the column or pipe will be carried with the head thereby setting the pipe for another or the next flute or configuration to be given the pipe or column.

For the purpose of bringing the heads 40 into their lowered positions after they have been elevated the springs 49 are provided, the top or upper ends of which are connected to the arms 32 and their lower ends connected to the standards 1 and 2.

It will be understood that the teeth 50 formed upon the bars 41 should be located so that when the heads 40 are moved upward the points of the teeth will engage the ends of the column or pipe but when the heads are lowered by the action of the springs 49 the teeth will slide upon the ends of the pipe or column.

For the purpose of preventing any back action of the pipe or column after the same has been moved by the heads 40 the grooved heads 51 are provided, which grooved heads are rigidly connected to the arms 52, which arms are loosely mounted upon the rock shaft 35. The grooved heads 51 are provided with toothed bars 41^a, which are similar to the toothed bars 41, located in the heads 40.

It will be understood that the heads 40 and 51 are curved to correspond substantially with the curvature of the column, or pipe and the toothed bars 41 and 41^a correspondingly curved.

It will be understood that the arms 52 should be loosely mounted upon the rock shaft 35 so that when the pipe is actuated by the heads 40 there will be no movement of the heads 51.

It will be understood that in order to pro-

vide for the proper handling of columns and pipes of different diameters the grooves formed in the heads 40 and 51 should be of such a width that the ends of the columns or pipes can be properly inserted in the grooves and the extreme ends of the pipe seated against toothed bars 41 and 41^a. Another object in forming the grooves of a width greater than the thickness of the metal composing the column or pipe is to allow the fluted or finished pipe, or the ends thereof to move through the grooves formed in the heads 40 and 51.

It will be understood that the head 22 must necessarily move in opposite directions and consequently the power shaft 4 must be shifted as to its direction of the rotation simultaneously or practically simultaneously with the shifting of the direction of the motion of the head 22 and consequently mechanism must be employed to shift the clutch 8 so that it will alternately engage the open and cross belt power wheels 5, and in order to provide for this action the reciprocating bar 54 is provided, which bar is held in proper position by means of the brackets 55, which brackets are connected to the tie bar 3 or its equivalent. Upon the reciprocating bar 54 are located the knocker-blocks 56, which knocker-blocks together with the reciprocating bar 54 are actuated by the bar 26^a carried by the head 22. The reciprocating bar 54 is pivotally attached to the bell-crank 57, to which bell-crank is pivotally attached the clutch operating bar 58. The bell crank 57 is properly connected to the bracket 59 or its equivalent, which bracket is connected to the proper standard.

The mechanism just above described is of no importance so far as its detailed construction is concerned as it will be understood that other mechanism may be employed to shift the clutch 8 without departing from the nature of my invention.

It will be understood that on one side of the standard 2 should be located the support or post 60, which post carries one end of the power shaft 4.

It will be understood that the forming roll 24 can be varied as to shape but I prefer to employ different rolls for different kinds of work.

For the purpose of providing a means for varying the distance between the flutes or corrugations or to provide for different widths or flutes the links 38 and 39 are adjustably attached to the arms 36 and 37 so that the bottom or lower ends of said links can be adjusted to or from the rock-shaft 35 by which arrangement the movement of the heads 40 is increased or decreased reference being had to the distance the links 38 and 39 are set from the rock shaft 35.

For the purpose of supporting the heads 52 in the desired adjustment the bar 61 is pro-

vided, which bar is attached to the end standard 2 and is held in place by suitable bolts 62.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is—

1. In a machine of the class described, suitable frames or standards, a bar secured in fixed position, said bar provided with a removable die-bar, a traveling head carrying a forming roll and means for imparting reciprocating movement to the traveling head, a rock shaft, means for rocking the shaft said rock shaft provided with arms one of the arms adjustably connected to the rock shaft links connected to the arms, said links provided with grooved heads and toothed bars carried by the heads, said toothed bars adapted for engagement with the ends of a column or pipe, substantially as and for the purpose specified.

2. In a machine for forming columns, a suitable frame, a column-supporting bar, a die-bar carried by said supporting bar, a reciprocating head provided with a pivoted bar, a forming roll journaled in said pivoted bar, means for reciprocating the head carrying the forming roll, and means for limiting the upward movement of said pivoted bar, substantially as and for the purpose specified.

3. In a machine of the class described, a suitable frame, a column supporting bar provided with a die-bar, a reciprocating head, a forming roll carried by the head, a rock shaft, means for rocking the shaft, grooved heads actuated by the rock shaft, and the grooved head adapted to axially rotate a column, substantially as and for the purpose specified.

4. In a machine of the class described, a suitable frame a column supporting bar secured to the frame, a pivoted support adapted to support one end of the column support, a die-bar carried by the column supporting bar, a reciprocating head, a bar pivoted to the reciprocating head, said bar provided with a forming roll, means for holding the pivoted bar carrying the forming roll in fixed adjustment, means for reciprocating the head carrying the forming roll and means for axially rotating a column, substantially as and for the purpose specified.

5. In a machine of the class described, a suitable frame, a bar secured to the frame, a reciprocating head carried by the bar, said reciprocating head provided with a pivoted arm, said pivoted arm provided with a forming roll, a column supporting bar and a die-bar detachably connected to the supporting bar, substantially as and for the purpose specified.

6. In a machine of the class described, a suitable frame, a rock shaft journaled in the frame, said rock shaft provided with arms adapted to be actuated by the movement of the rock shaft, arms loosely mounted upon

the rock shaft, all of said arms provided with grooved heads, toothed bars carried by the grooved heads, and means for rocking the shaft, substantially as and for the purpose specified.

7. In a machine of the class described, a suitable frame a column carrying bar and a die-bar carried by said column carrying bar reciprocating bars located at opposite ends of the frame, bell cranks carried by the frame, said bell cranks pivotally attached to the reciprocating bars links connected to the bell cranks and a rock shaft, said links operatively connected with the rock shaft, a reciprocating head and means carried by the head, adapted to actuate the reciprocating bars, and the reciprocating head provided with a forming roll and means for reciprocating the head, and the rock bar provided with fixed arms, having grooved heads, substantially as and for the purpose specified.

8. In a machine of the class described, a suitable frame a column carrying bar and a die-bar carried by said column carrying bar, reciprocating bars located at opposite ends of the frame, bell cranks carried by the frame, said bell cranks pivotally attached to the reciprocating bars, links connected to the bell cranks and a rock shaft, said links operatively connected with the rock shaft, a reciprocating head and means carried by the head adapted to actuate the reciprocating bars, and the reciprocating head provided with a forming roll, and means for reciprocating the head, and the rock bar provided with fixed arms having grooved heads, and the rock bar provided with loose arms, said loose arms having rigidly connected thereto column grip heads, substantially as and for the purpose specified.

9. In a machine of the class described, a suitable frame, a die-bar carried by the supporting bar, a column supporting bar carried by the frame, a reciprocating head provided with a forming roll and means for reversing the movement of the reciprocating head, and means for holding the forming roll in fixed

adjustment, substantially as and for the purpose specified.

10. In a machine of the class described, a suitable frame, a column supporting bar carried by the frame, a detachable die-bar carried by the column supporting bar, a reciprocating head provided with a forming roll, means for adjusting said forming roll to and from the die-bar, and means for reversing the movement of the reciprocating head, substantially as and for the purpose specified.

11. In a machine of the class described, the combination of a suitable frame, a column supporting bar carried by the frame and secured at one end to said frame, a pivoted support adapted to support the free end of the column supporting bar, a bar fixed to the frame, and having mounted thereon a reciprocating head, said reciprocating head provided with a bar, reciprocating bars located at opposite ends of the frame, and located in the path of the bar carried by the reciprocating head, a power shaft and power wheels mounted upon the shaft, a clutch adapted for alternate engagement with the power wheels and means intermediate the reciprocating bars located at the end of the frame to actuate the clutch, substantially as and for the purpose specified.

12. In a machine of the class described, the combination of a suitable frame, a die-bar held in fixed position, a reciprocating head provided with a forming roll, means for reciprocating a rock shaft, said rock shaft provided with arms carrying grip heads, arms loosely mounted upon the rock shaft, said loosely mounted arms provided with fixed grip heads, and means for rocking the shaft, substantially as and for the purpose specified.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

ANGUS McKENZIE.

Witnesses:

J. A. JEFFERS.

F. W. BOND.