June 5, 1934.

C. H. SAMPSON

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Filed Jan. 18, 1929

1,961,644

21 Sheets-Sheet 1

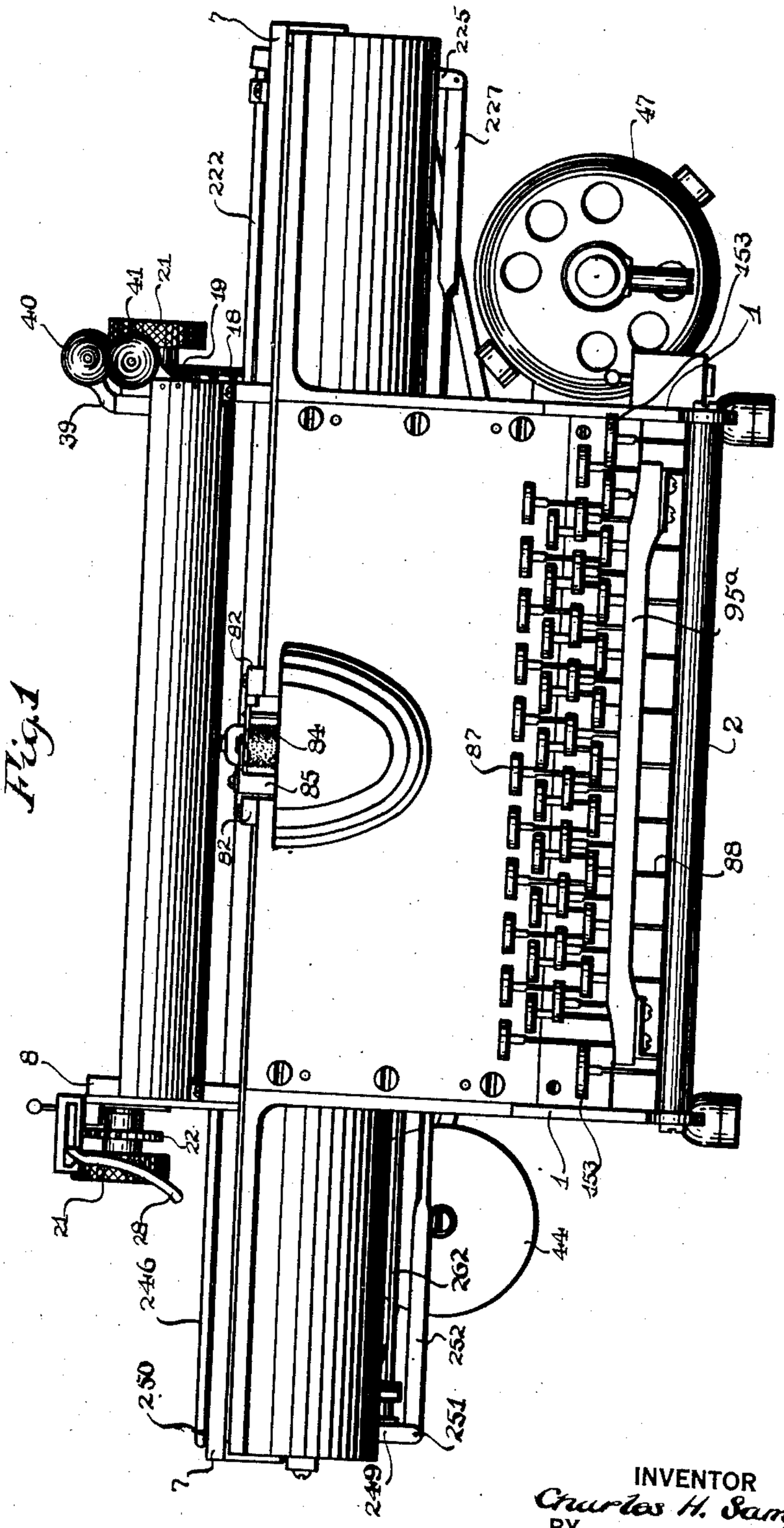

Fig. 1

INVENTOR
Charles H. Sampson
BY
H. W. Timmo
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

PRINTING MACHINE

Filed Jan. 18, 1929

1,961,644

21 Sheets-Sheet 2

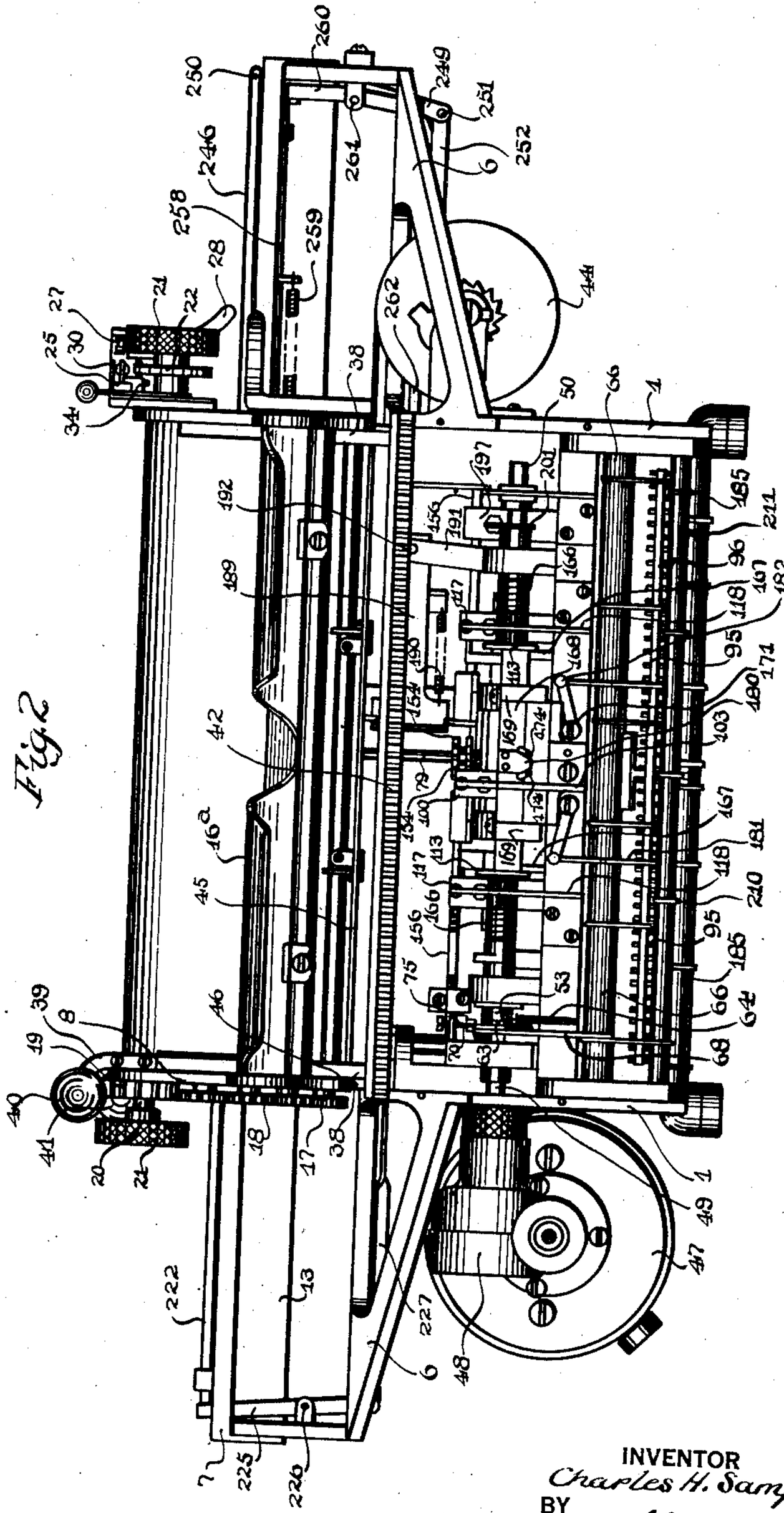

Fig. 2

INVENTOR
Charles H. Sampson
BY
H. H. Simms
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

PRINTING MACHINE

Filed Jan. 18, 1929

1,961,644

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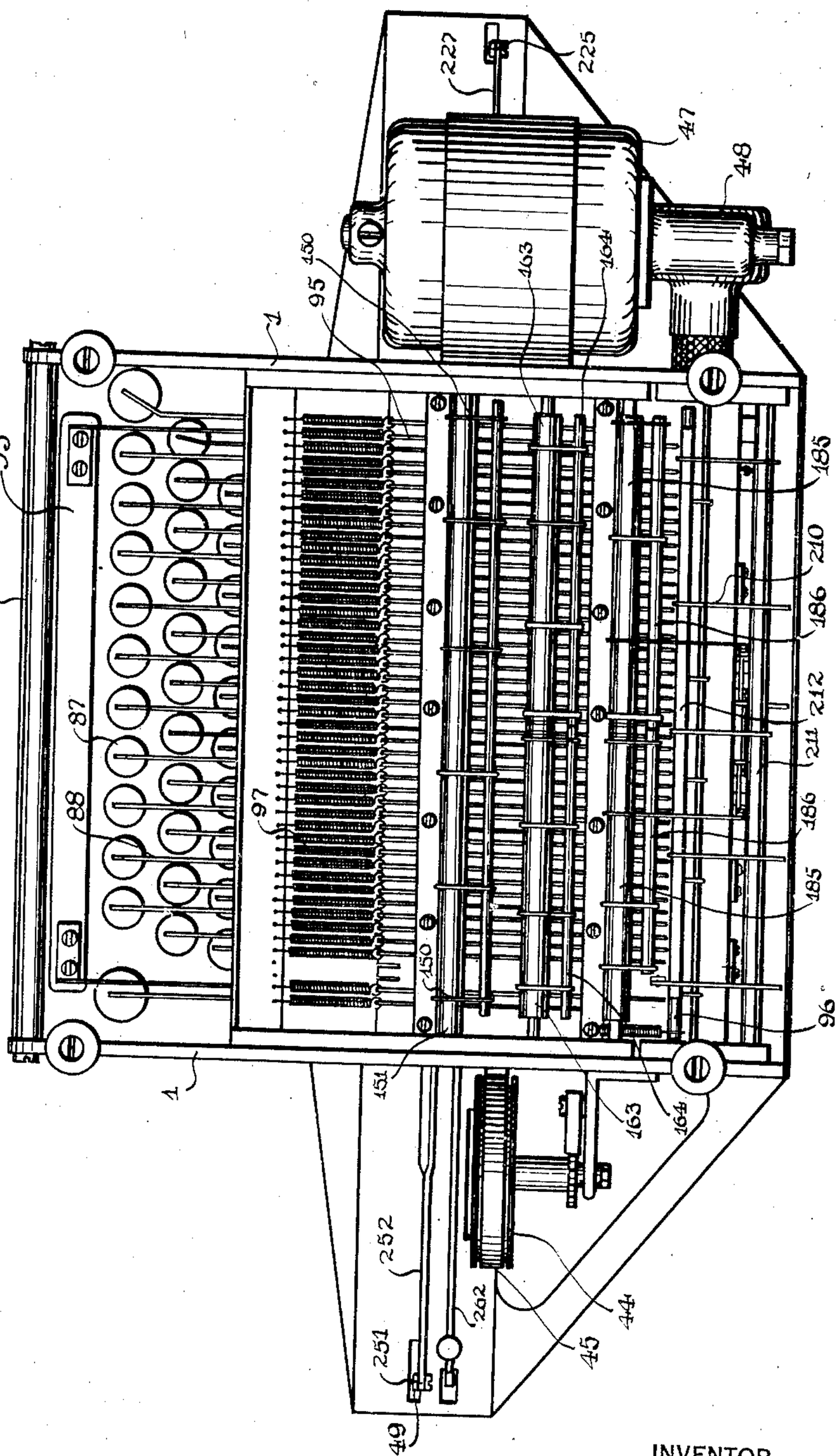
Fig. 3



INVENTOR
Charles H. Sampson
BY
J. A. Timmo
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

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1,961,644

21 Sheets-Sheet 4

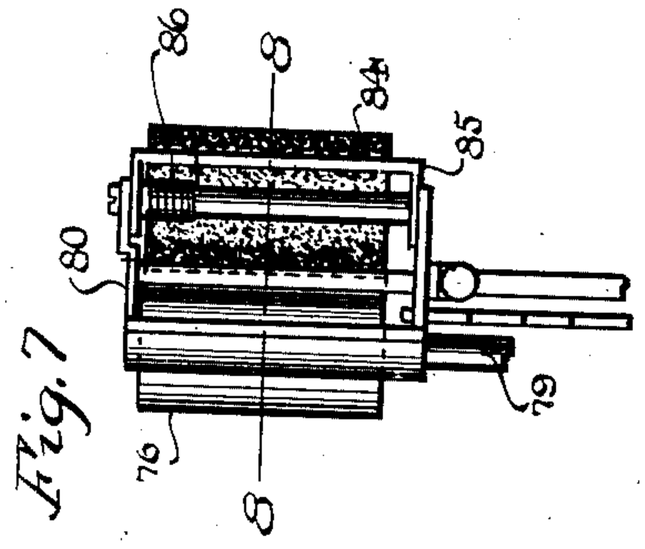

Fig. 7

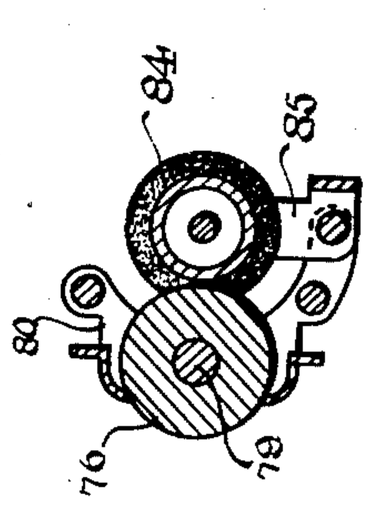

Fig. 8

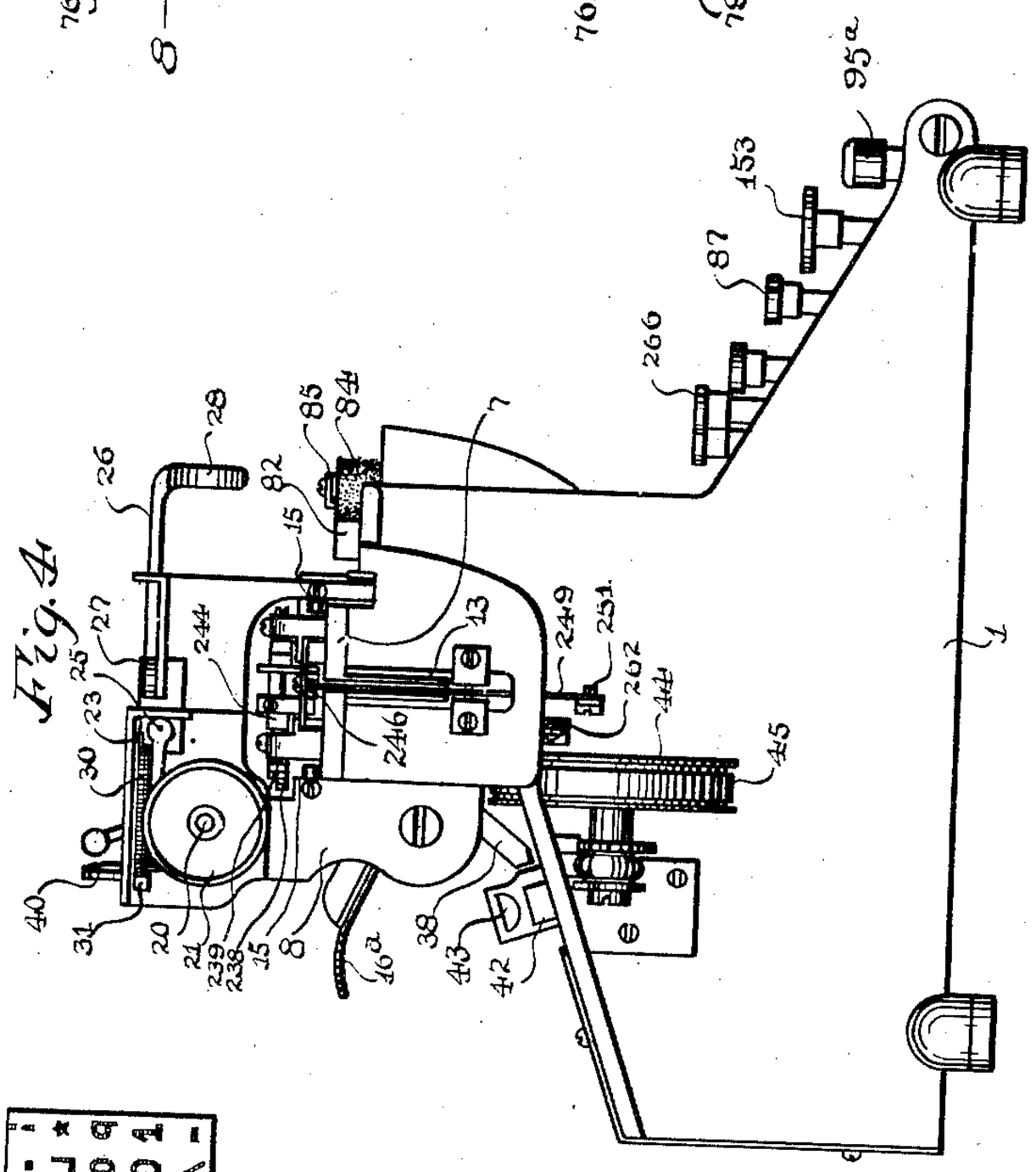

Fig. 4

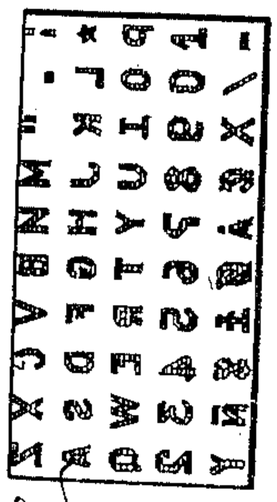

Fig. 5

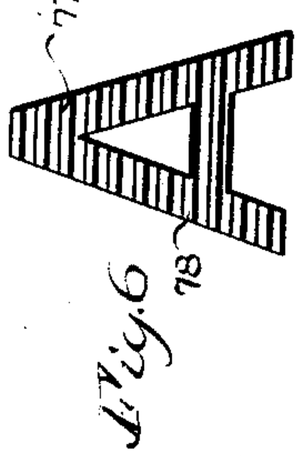

Fig. 6

INVENTOR

Charles H. Sampson

BY J. W. Timmo

his ATTORNEY

June 5, 1934.

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21 Sheets-Sheet 5

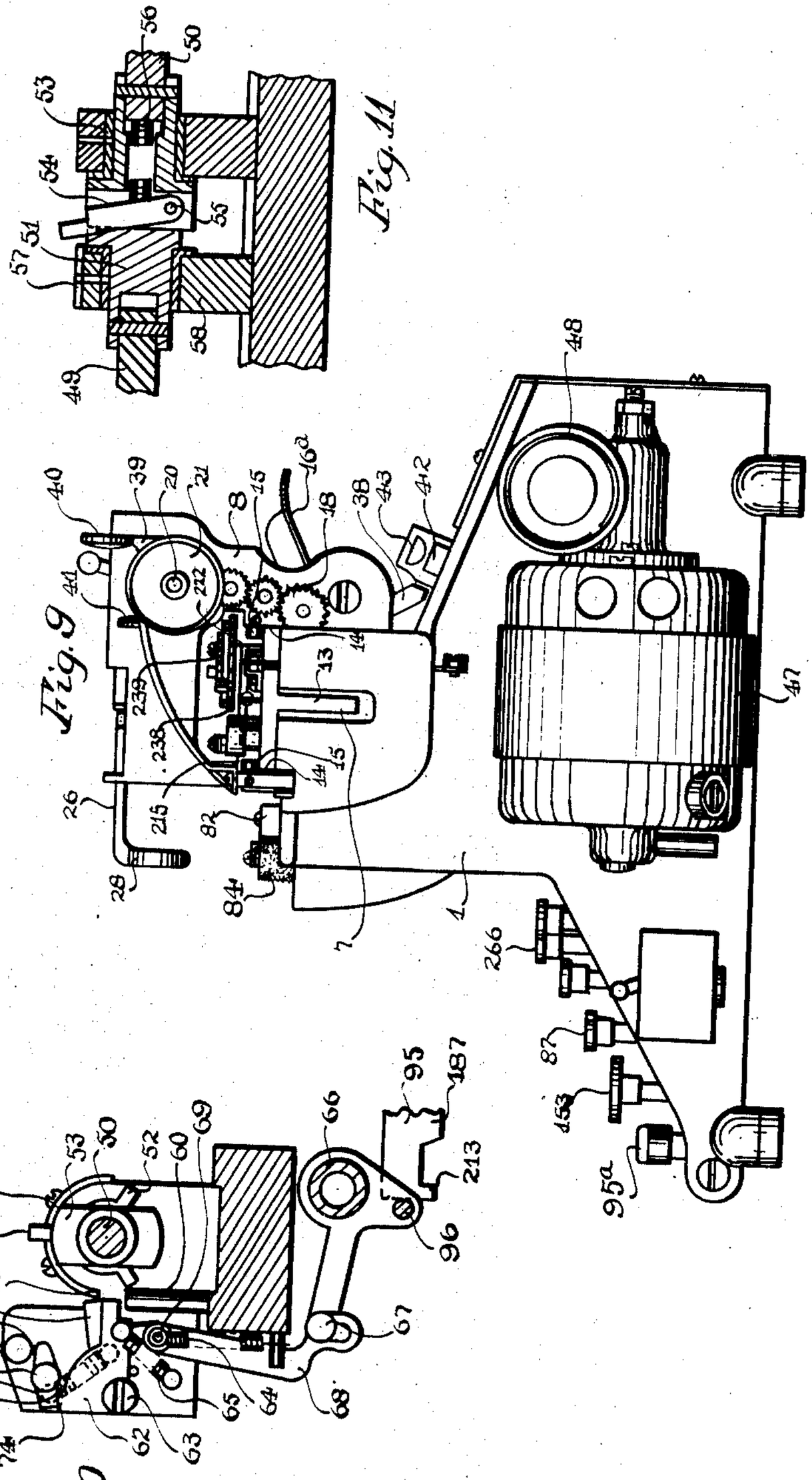

Fig. 9

Fig. 11

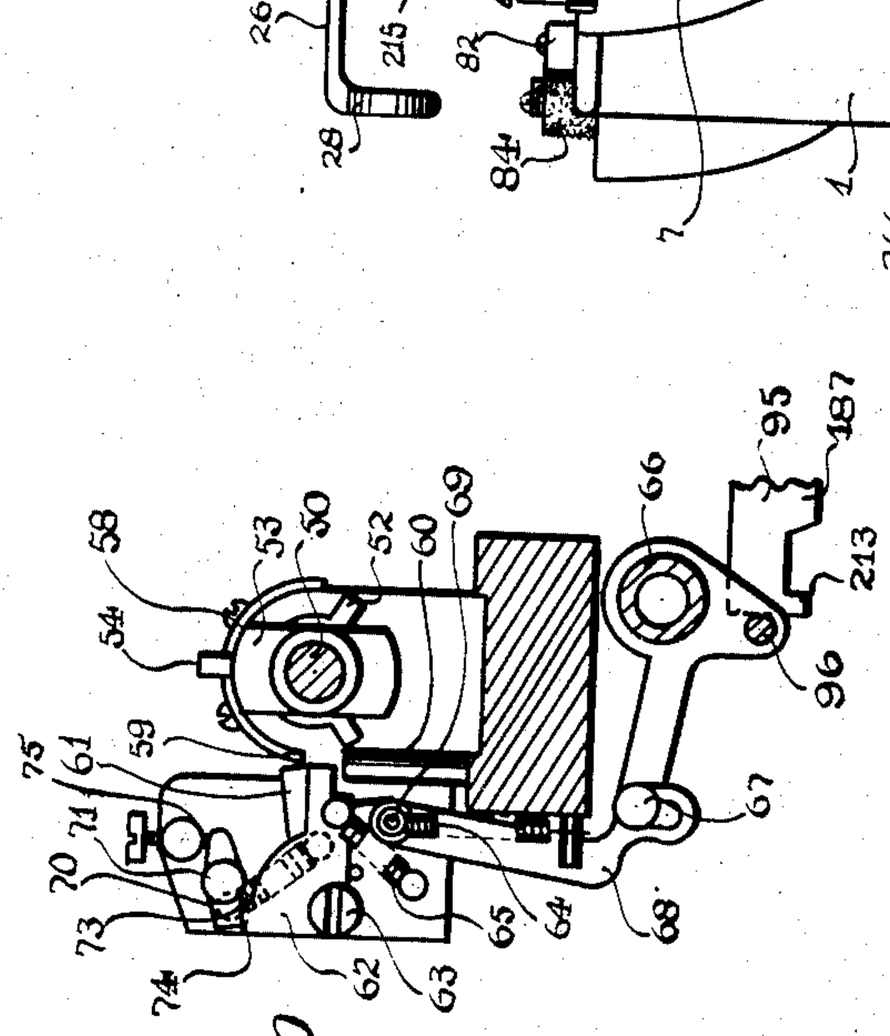

Fig. 10

INVENTOR

Charles H. Sampson

BY H. H. Timmo

his ATTORNEY

June 5, 1934.

C. H. SAMPSON

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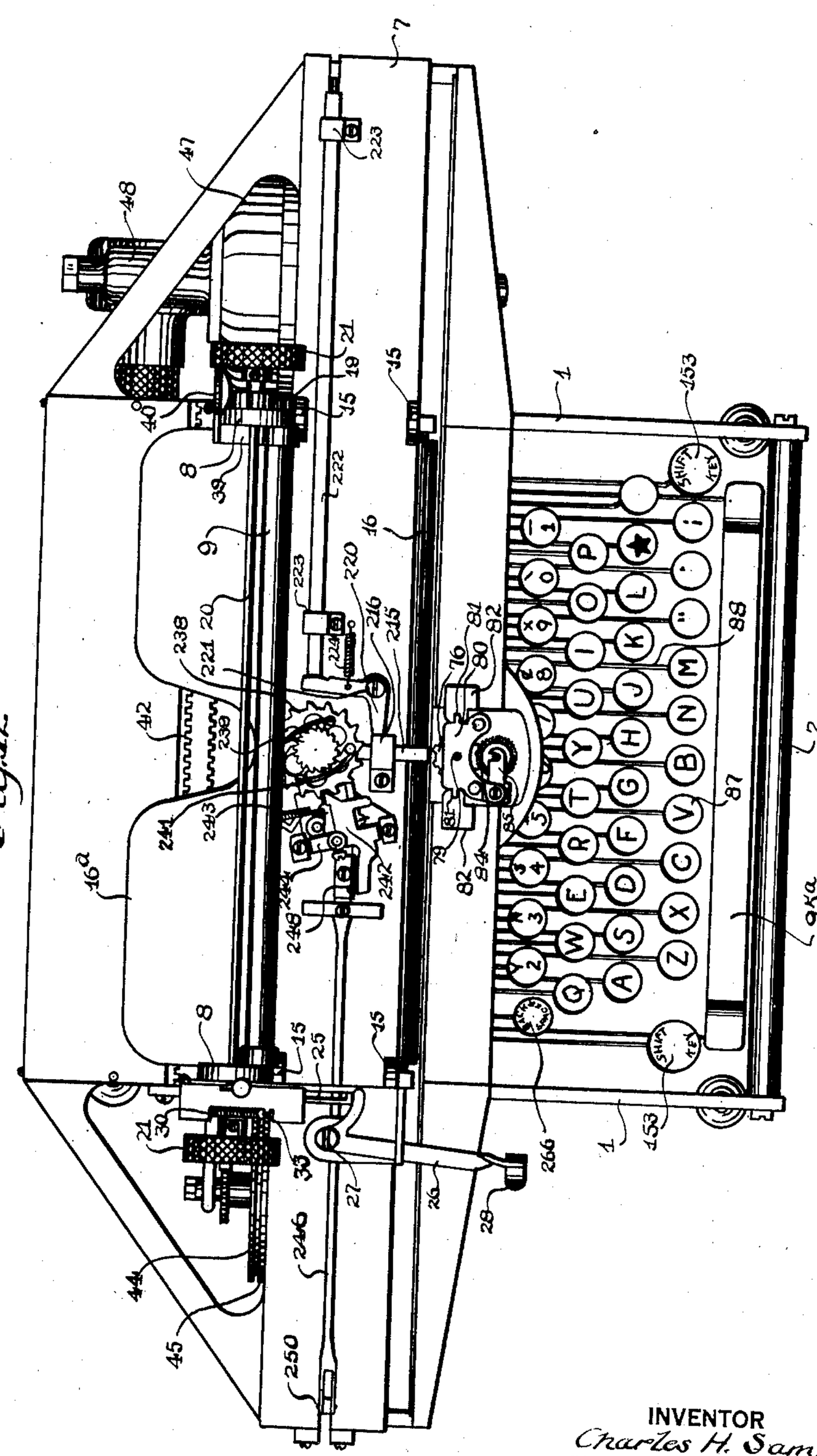
Fig. 12



INVENTOR

Charles H. Sampson

BY

H. N. Simmo

his ATTORNEY

June 5, 1934.

C. H. SAMPSON

PRINTING MACHINE

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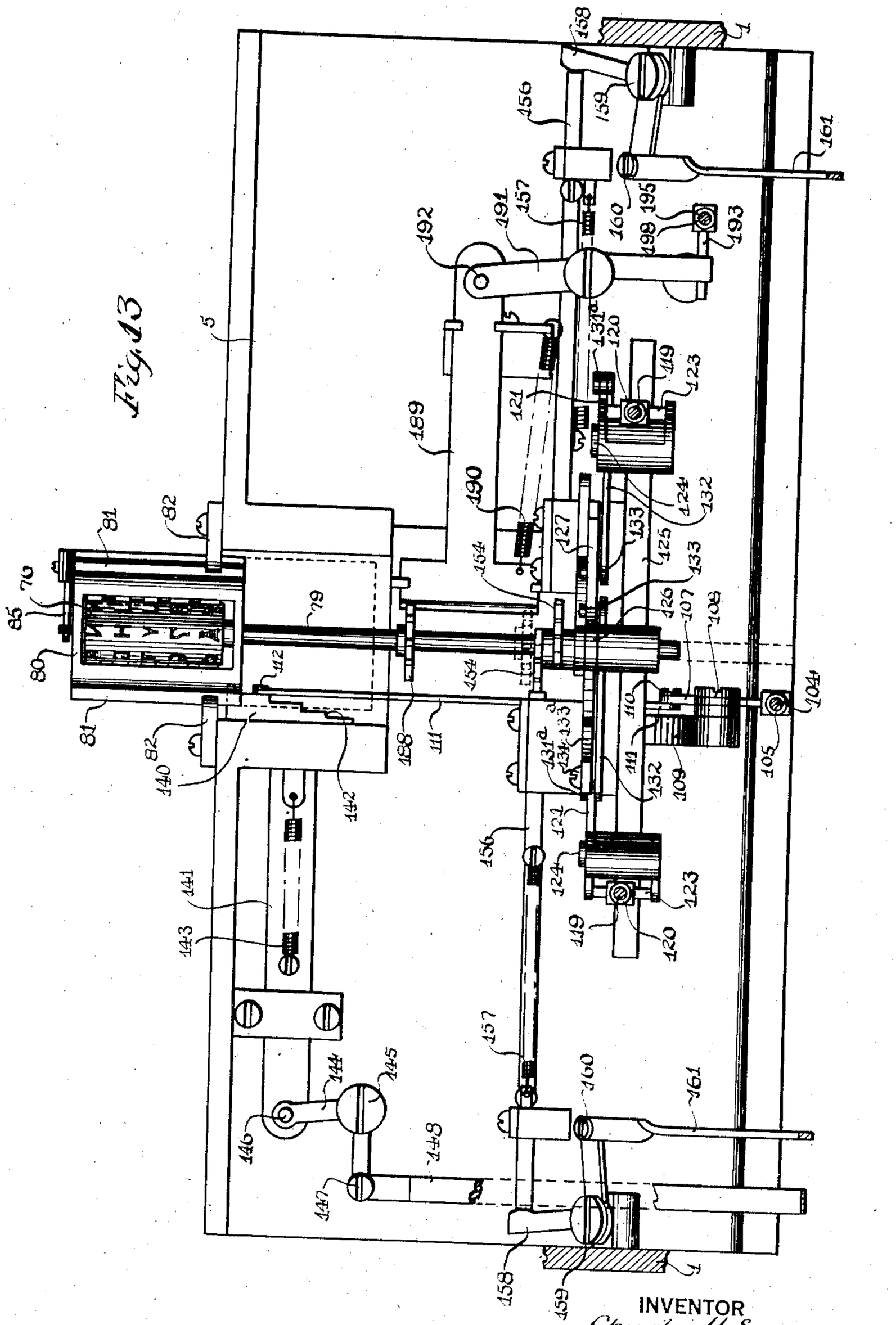
1,961,644

21 Sheets-Sheet 7

Fig. 13



INVENTOR

Charles H. Sampson

BY

his ATTORNEY

June 5, 1934.

C. H. SAMPSON

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Filed Jan. 18, 1929

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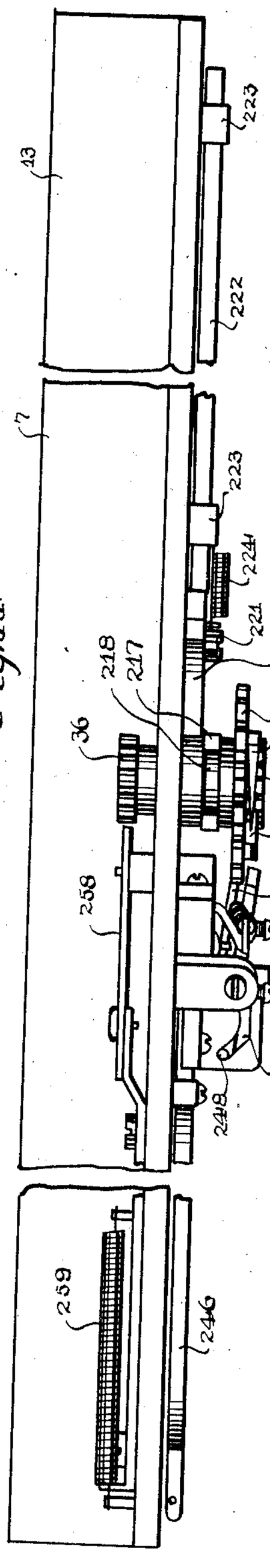

Fig. 14

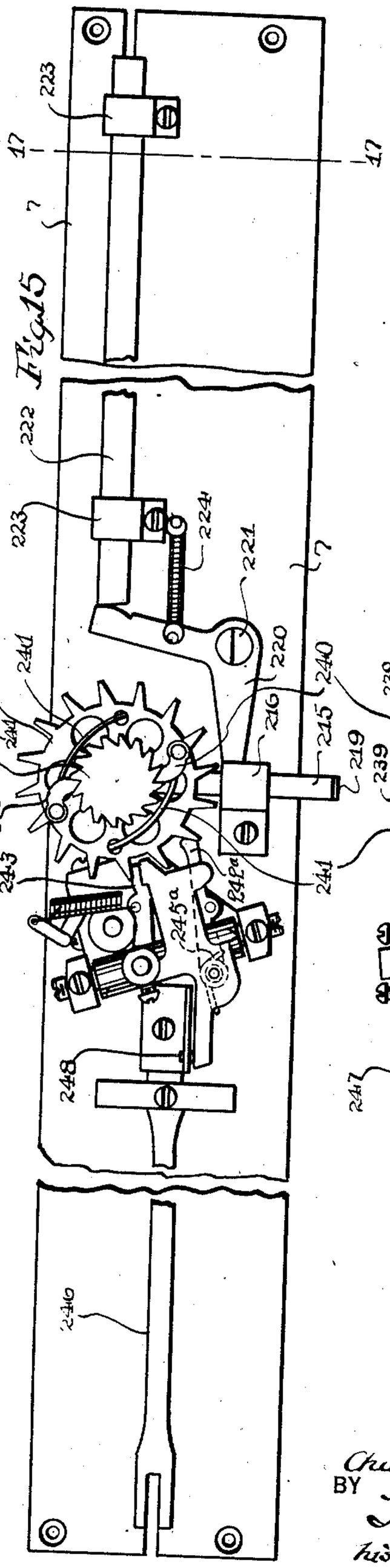

Fig. 15

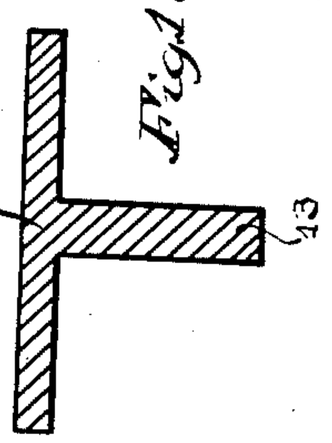

Fig. 17

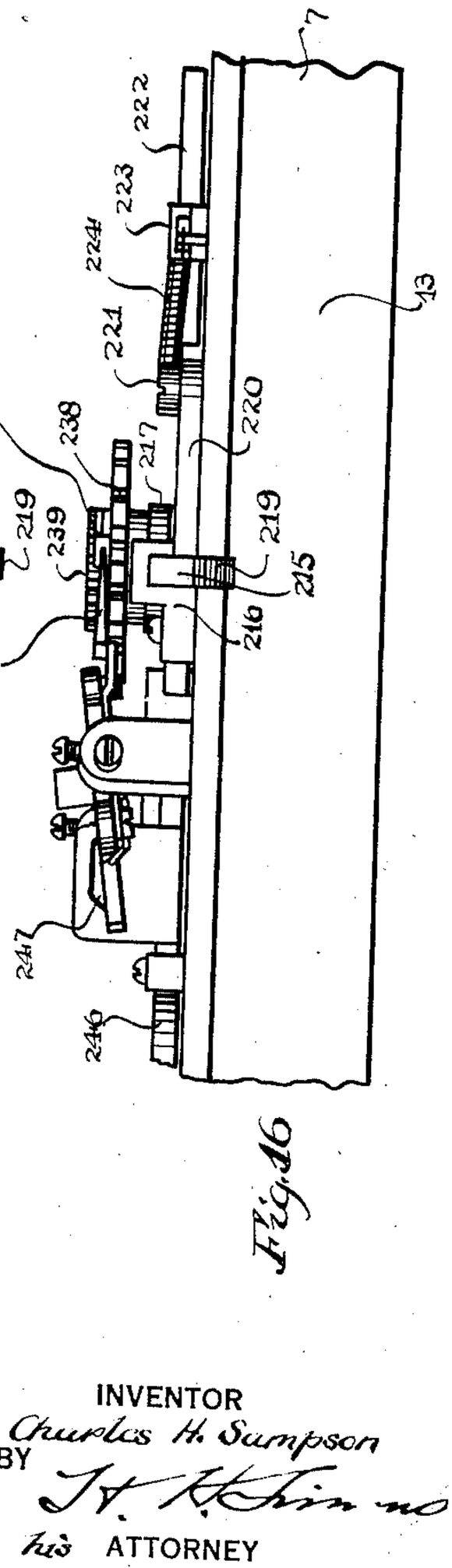

Fig. 16

INVENTOR
Charles H. Sampson
BY
J. A. Atkinson
his ATTORNEY

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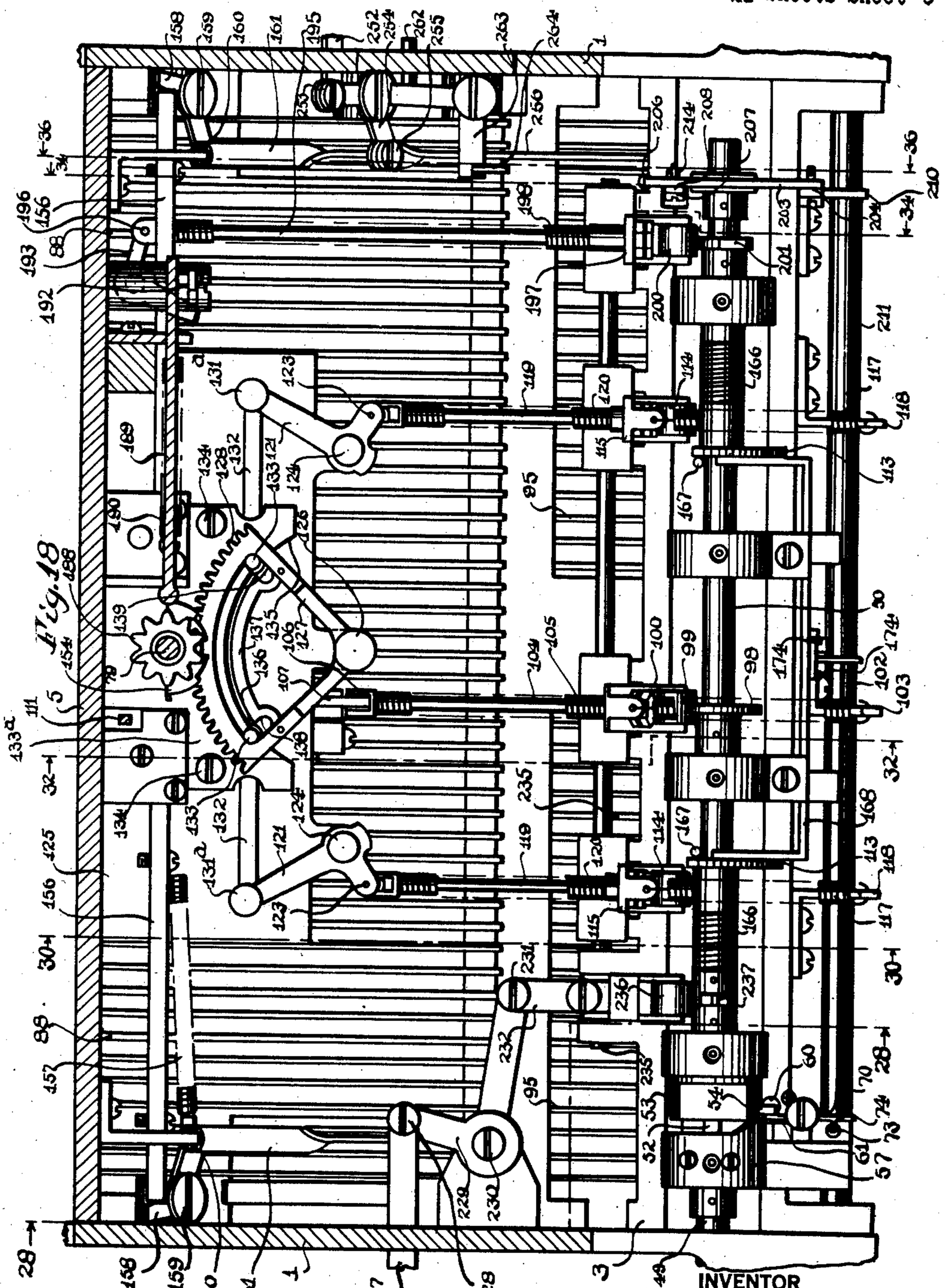

Fig. 18

INVENTOR
Charles H. Sampson
BY
H. B. Grimes
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

1,961,644

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Fig. 19

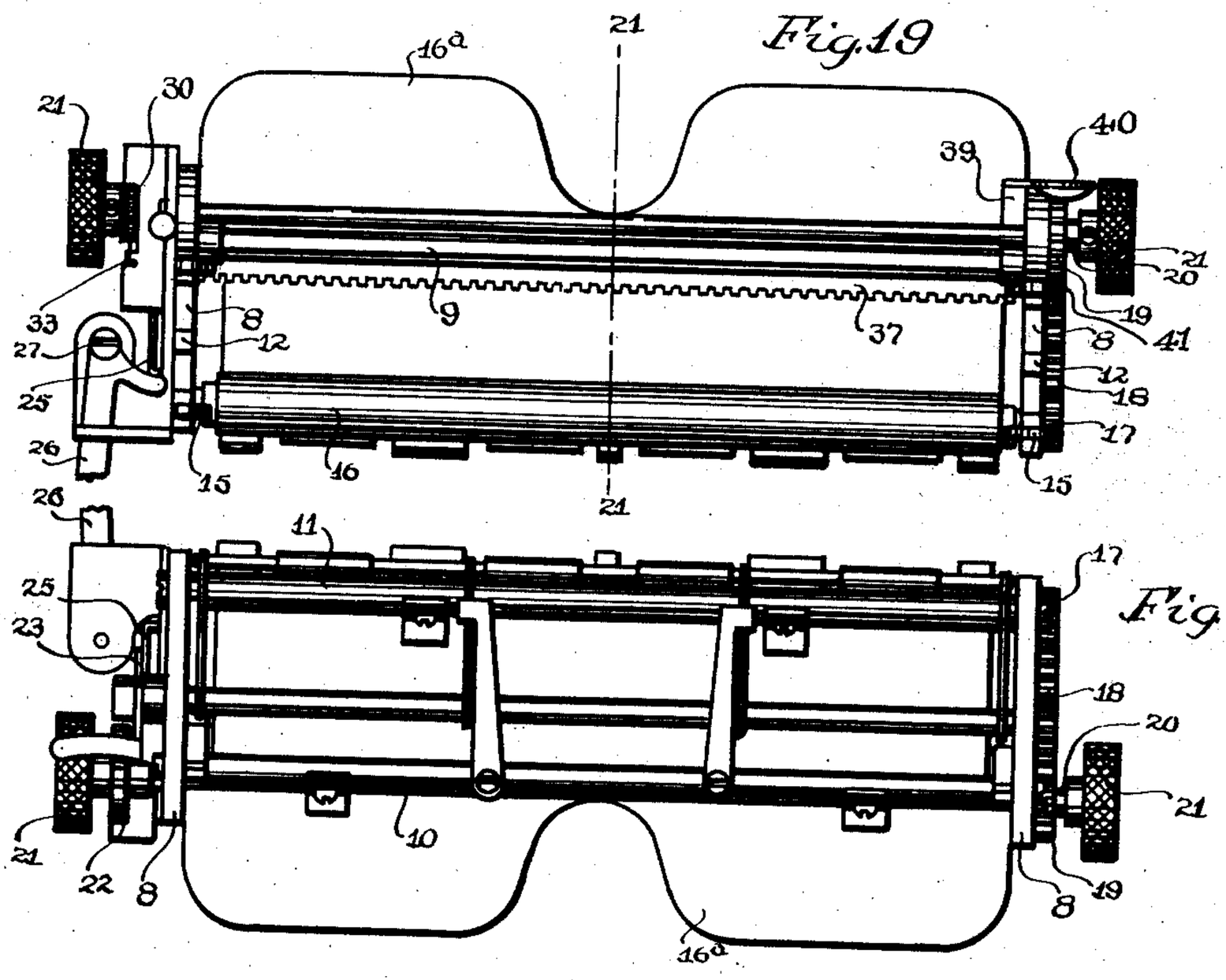

Fig. 20

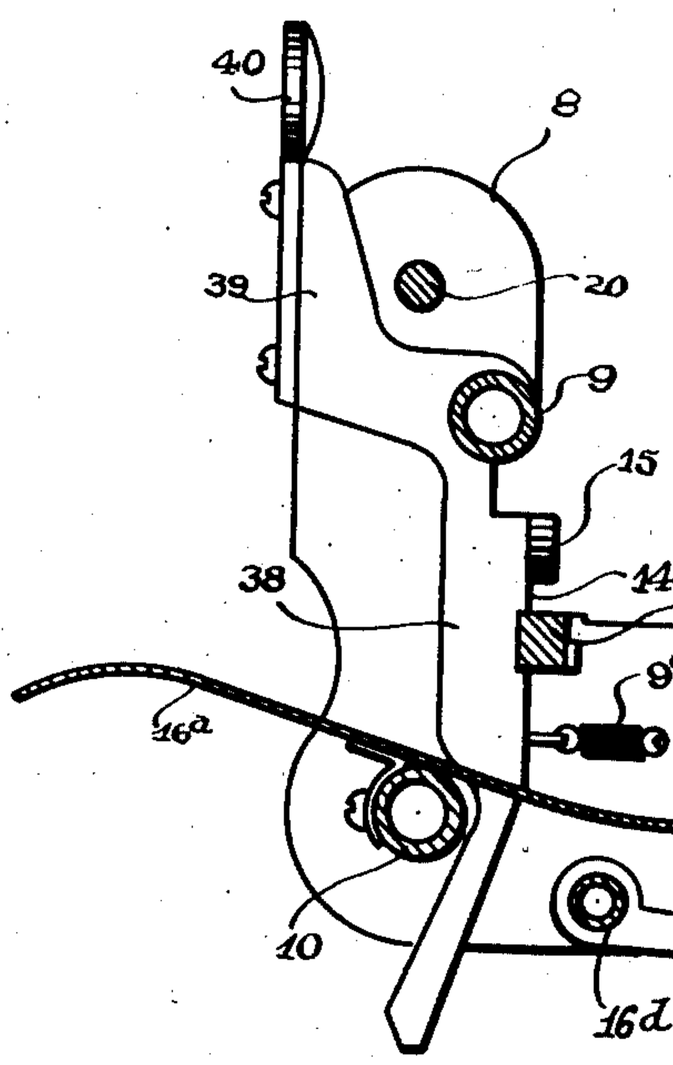

Fig. 21

INVENTOR
Charles H. Sampson
BY
his ATTORNEY

June 5, 1934.

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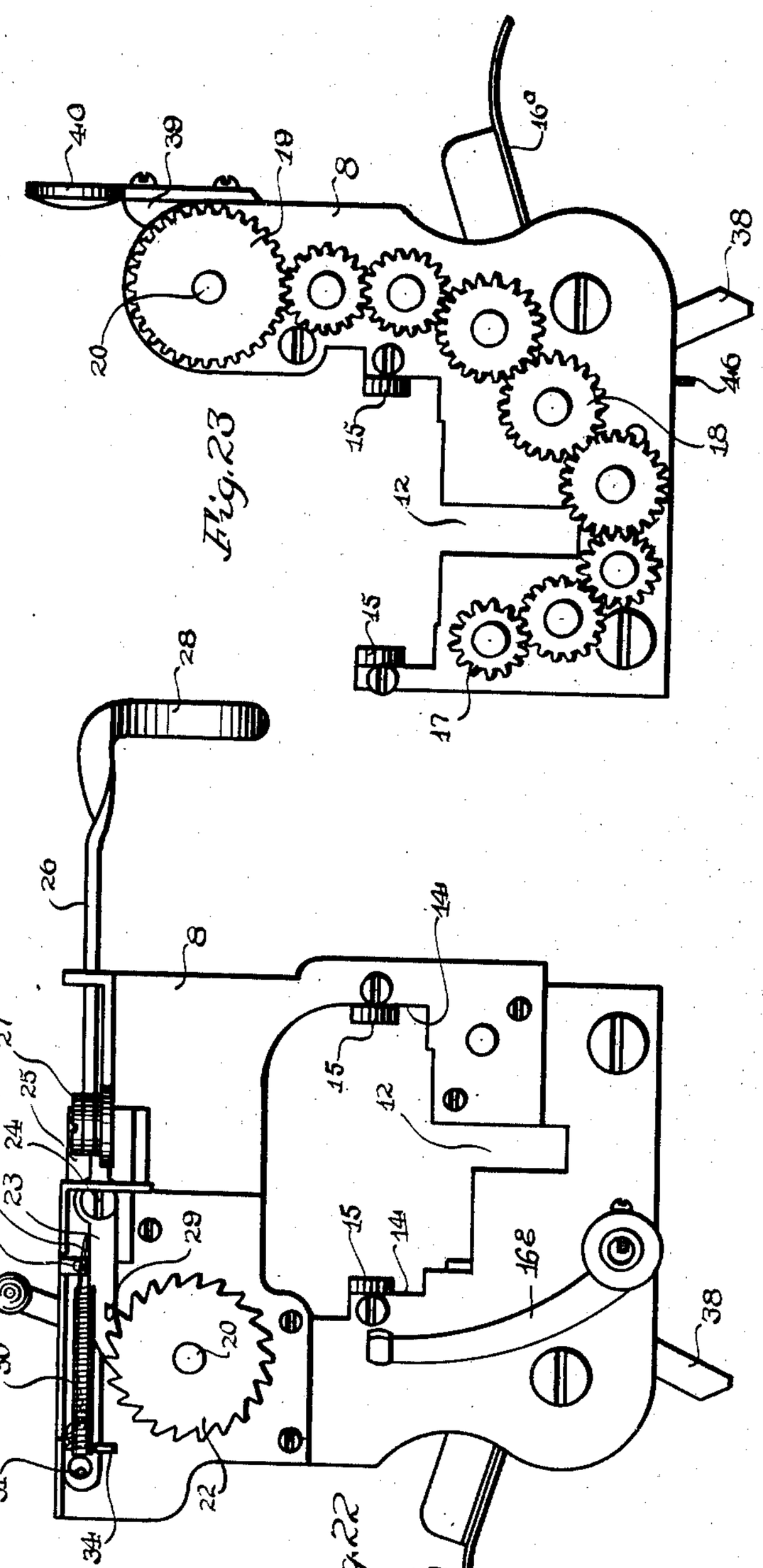

Fig. 23

Fig. 22

INVENTOR

Charles H. Sampson

BY M. V. Thimo

his ATTORNEY

June 5, 1934.

C. H. SAMPSON

PRINTING MACHINE

Filed Jan. 18, 1929

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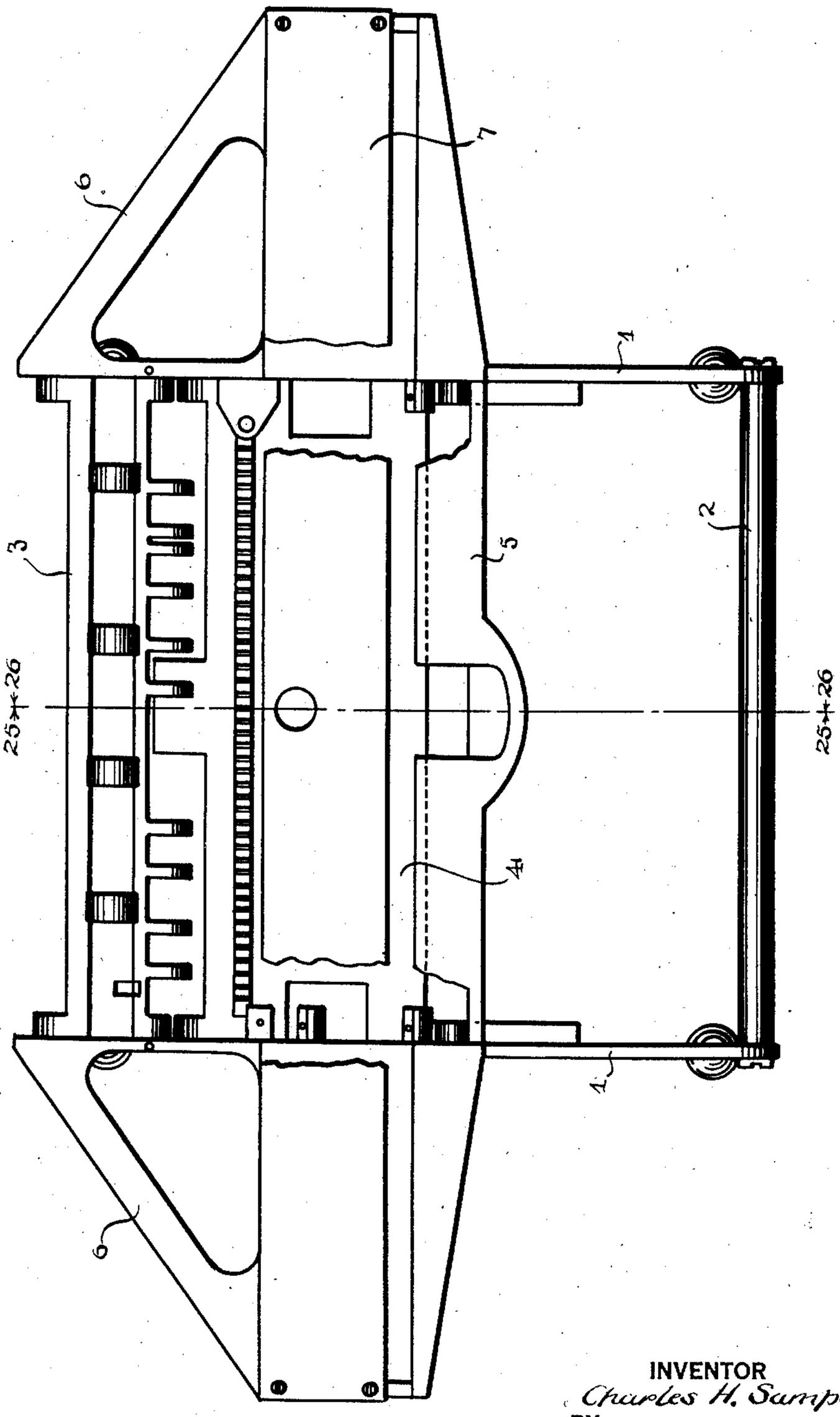

Fig. 24

INVENTOR
Charles H. Sampson
BY W. W. Simmo
his ATTORNEY

June 5, 1934. C. H. SAMPSON 1,961,644

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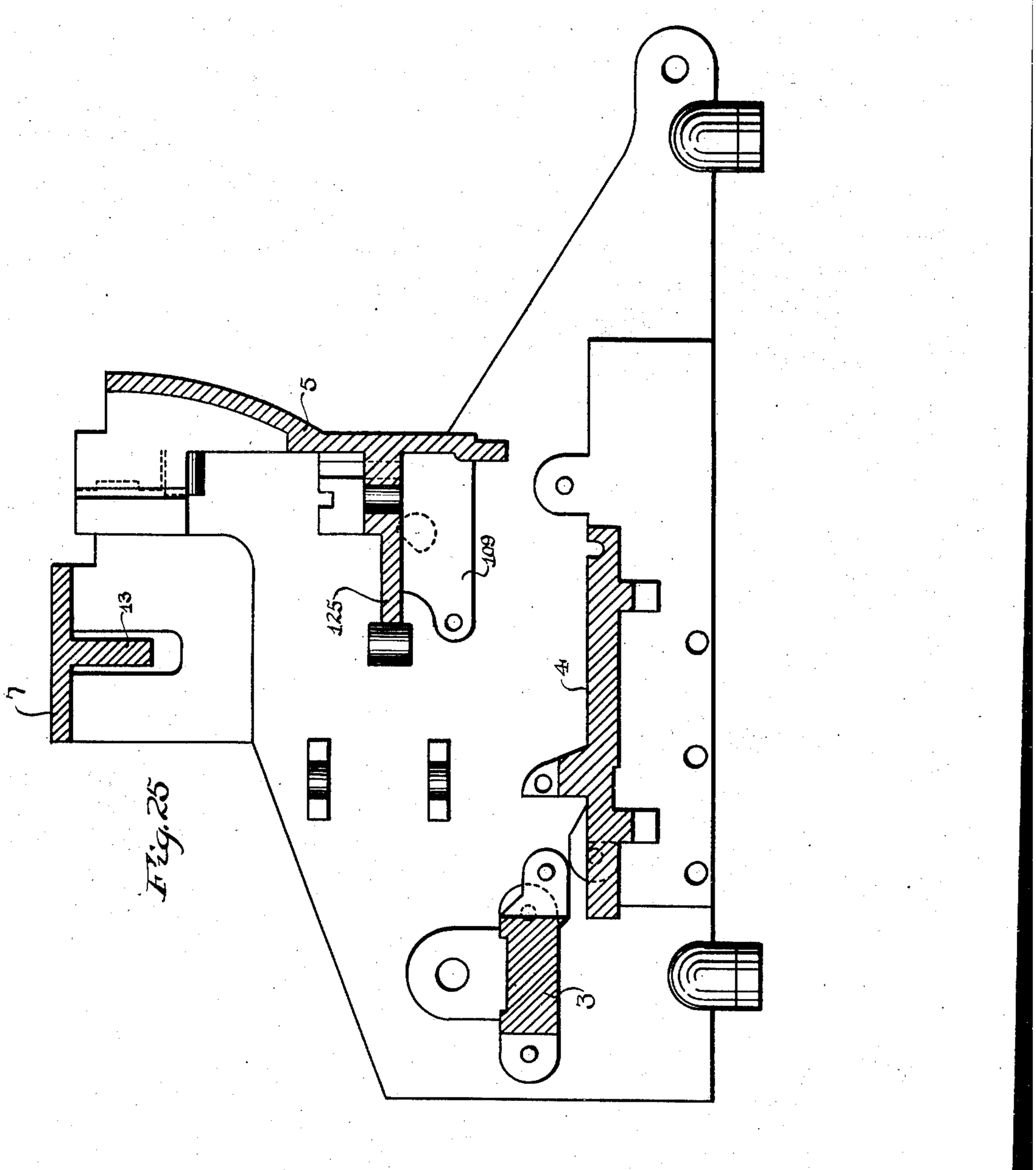

Fig. 25

INVENTOR
Charles H. Sampson
BY J. V. Simmons
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

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21 Sheets-Sheet 14

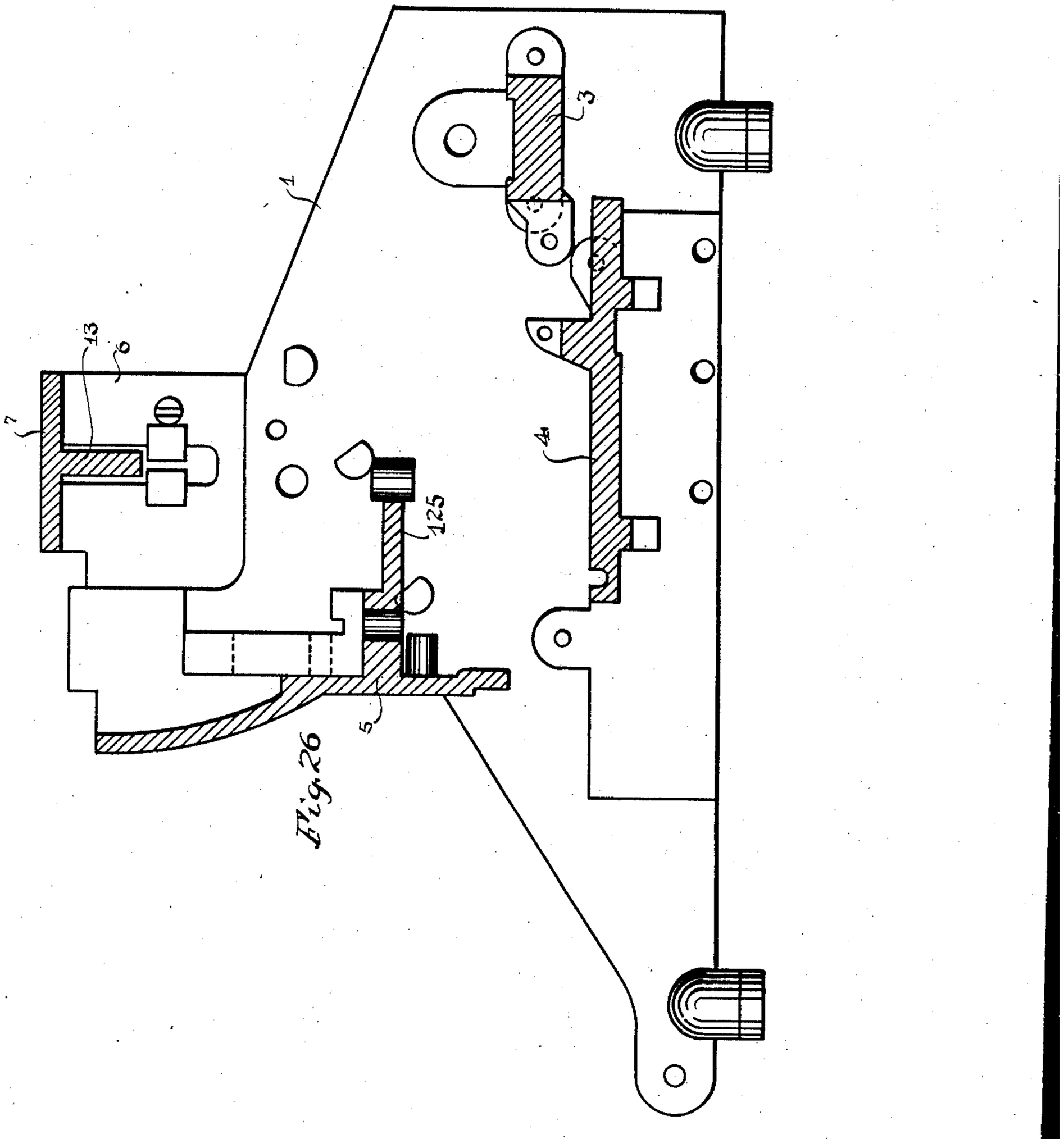

Fig. 26

INVENTOR
Charles H. Sampson
BY H. H. Simms
His ATTORNEY

June 5, 1934.

C. H. SAMPSON

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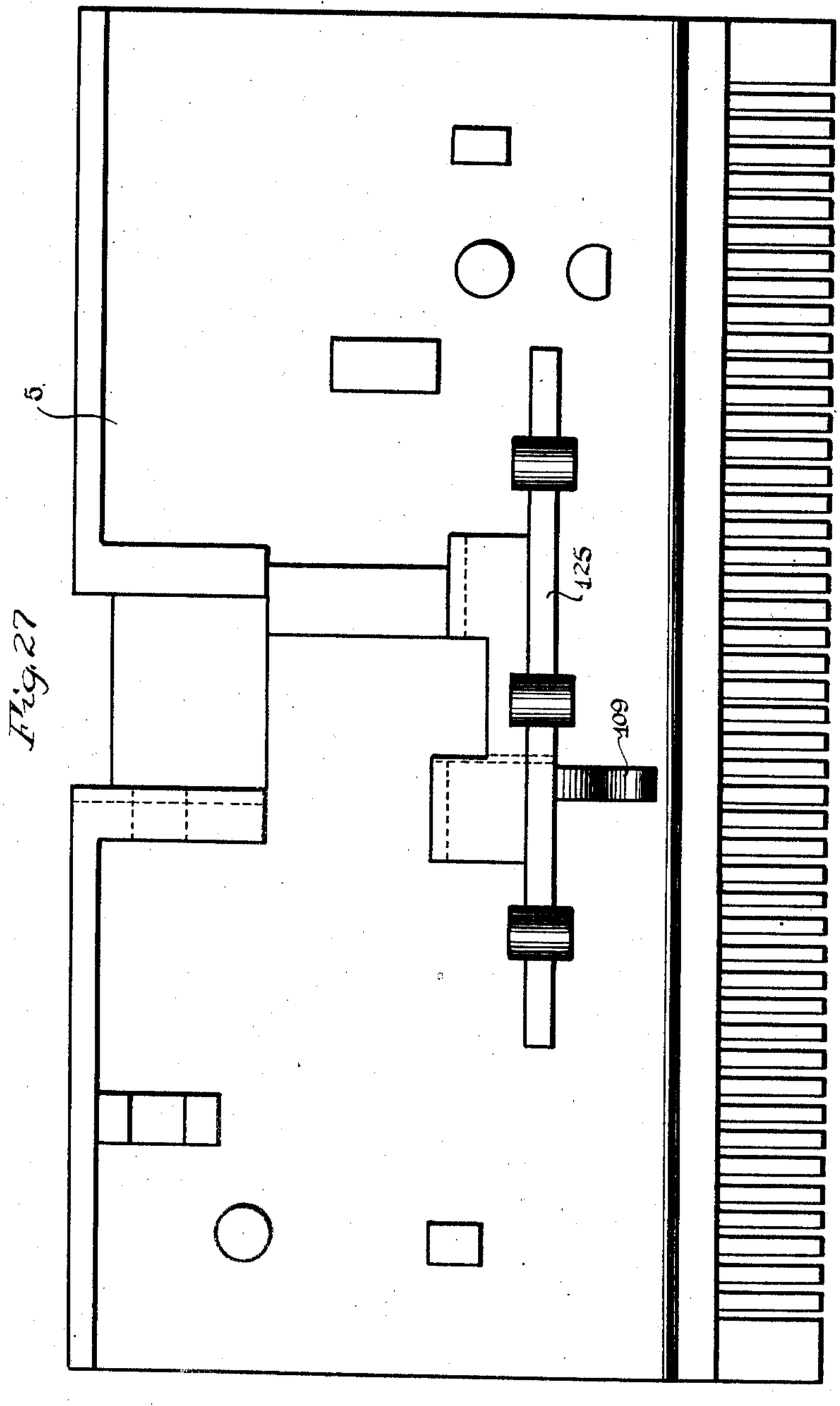

Fig. 27

INVENTOR
Charles H. Sampson
BY H. H. Simms
his ATTORNEY

June 5, 1934. C. H. SAMPSON 1,961,644

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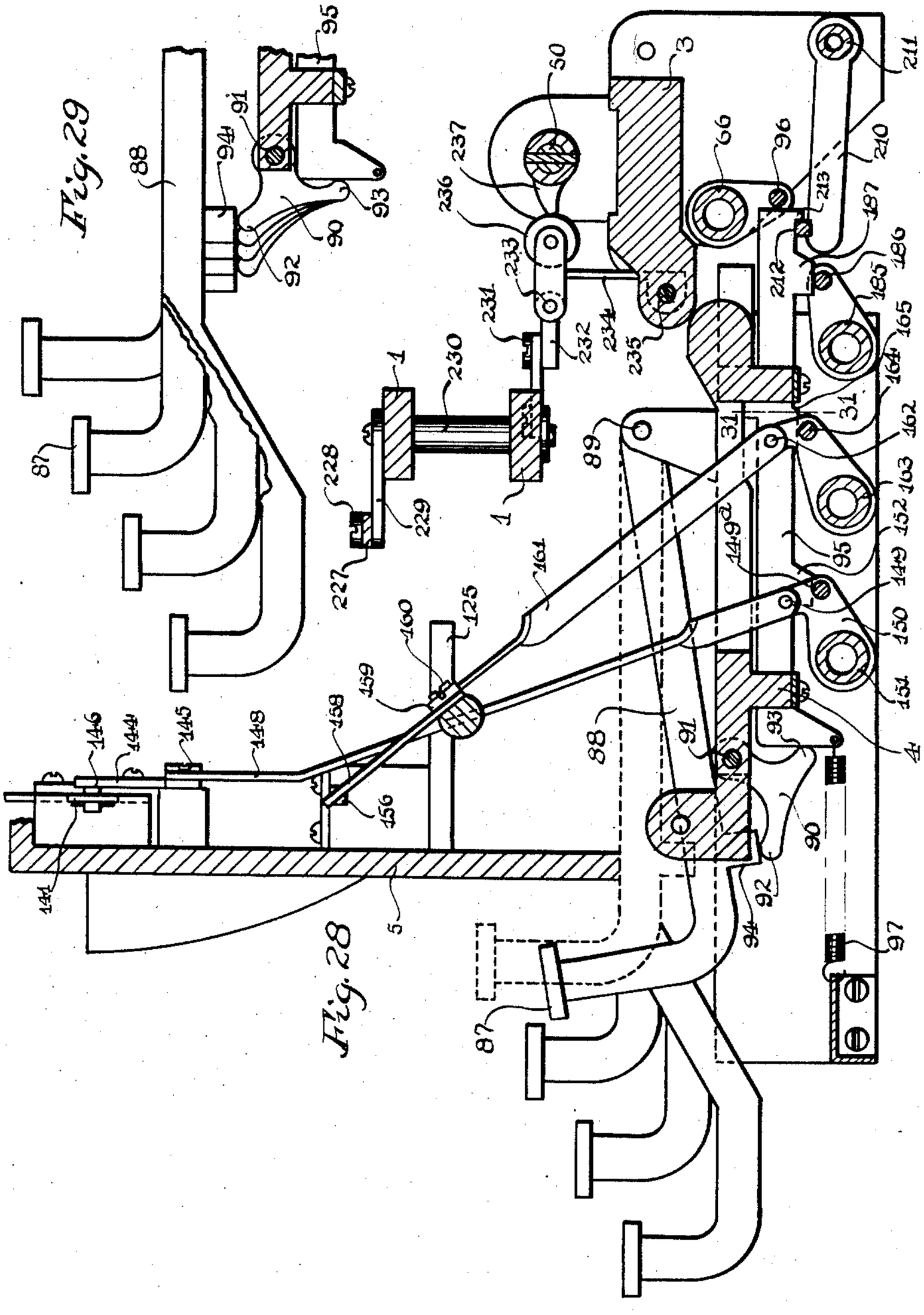

Fig. 28

Fig. 29

INVENTOR
Charles H. Sampson
BY H. W. Timms
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

1,961,644

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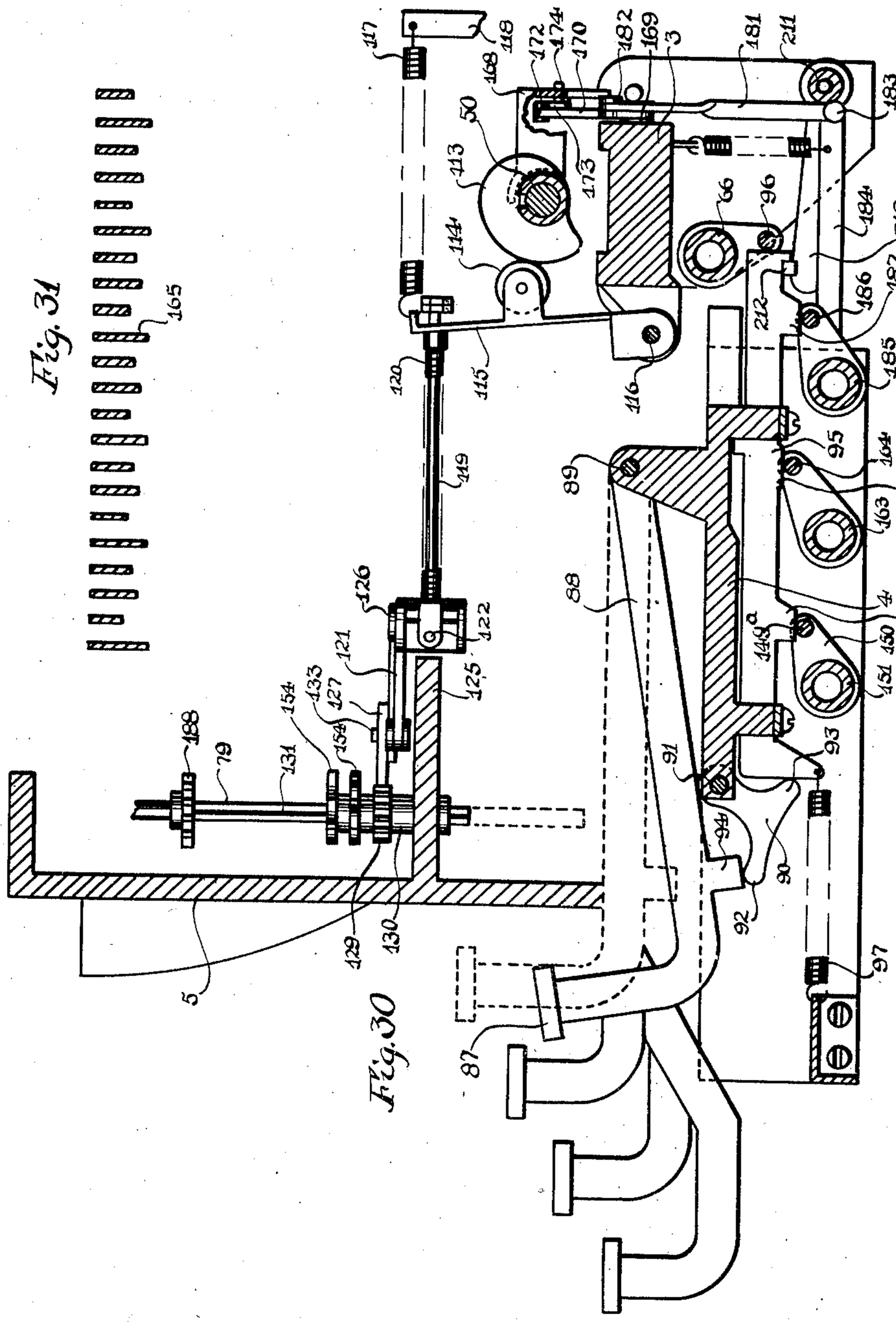

Fig. 31

Fig. 30

INVENTOR
Charles H. Sampson
BY J. H. Timmo
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

PRINTING MACHINE

Filed Jan. 18, 1929

1,961,644

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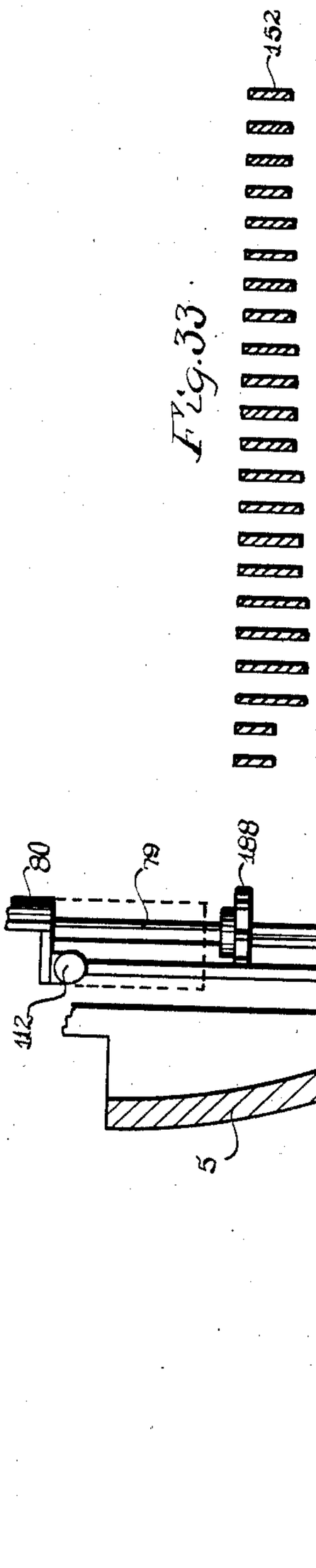

Fig. 33.

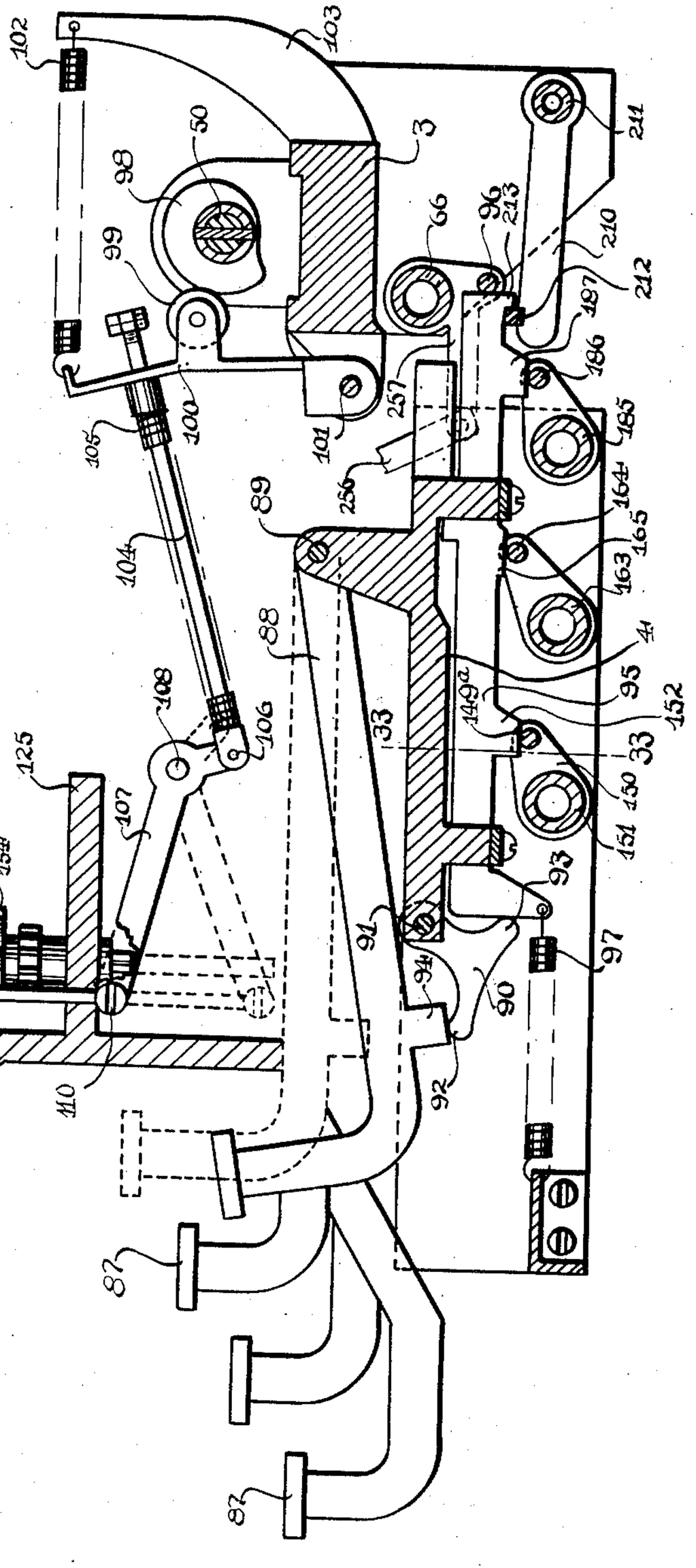

Fig. 32

INVENTOR
Charles H. Sampson
BY N. T. Timmo
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

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1,961,644

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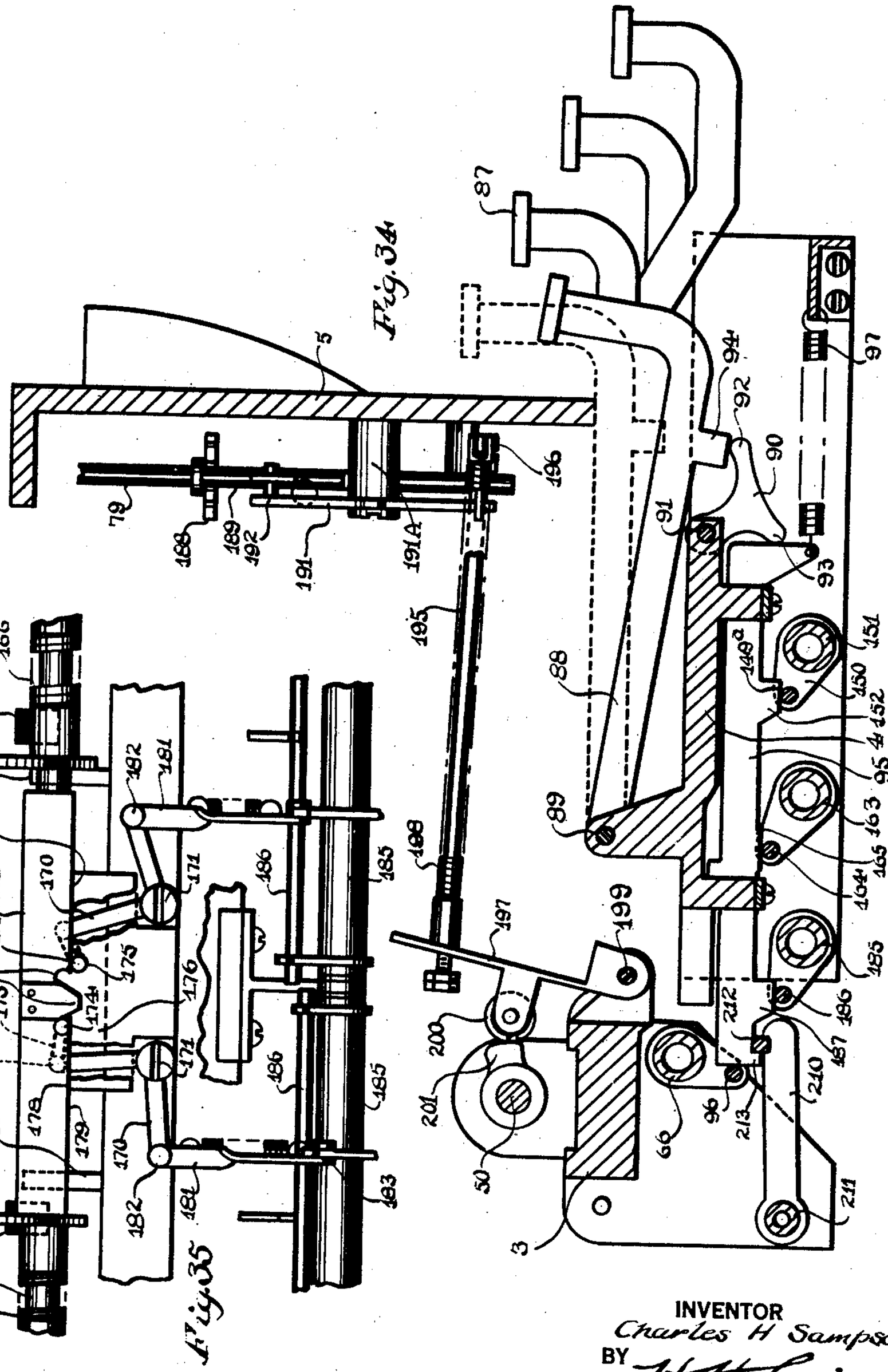

Fig. 34

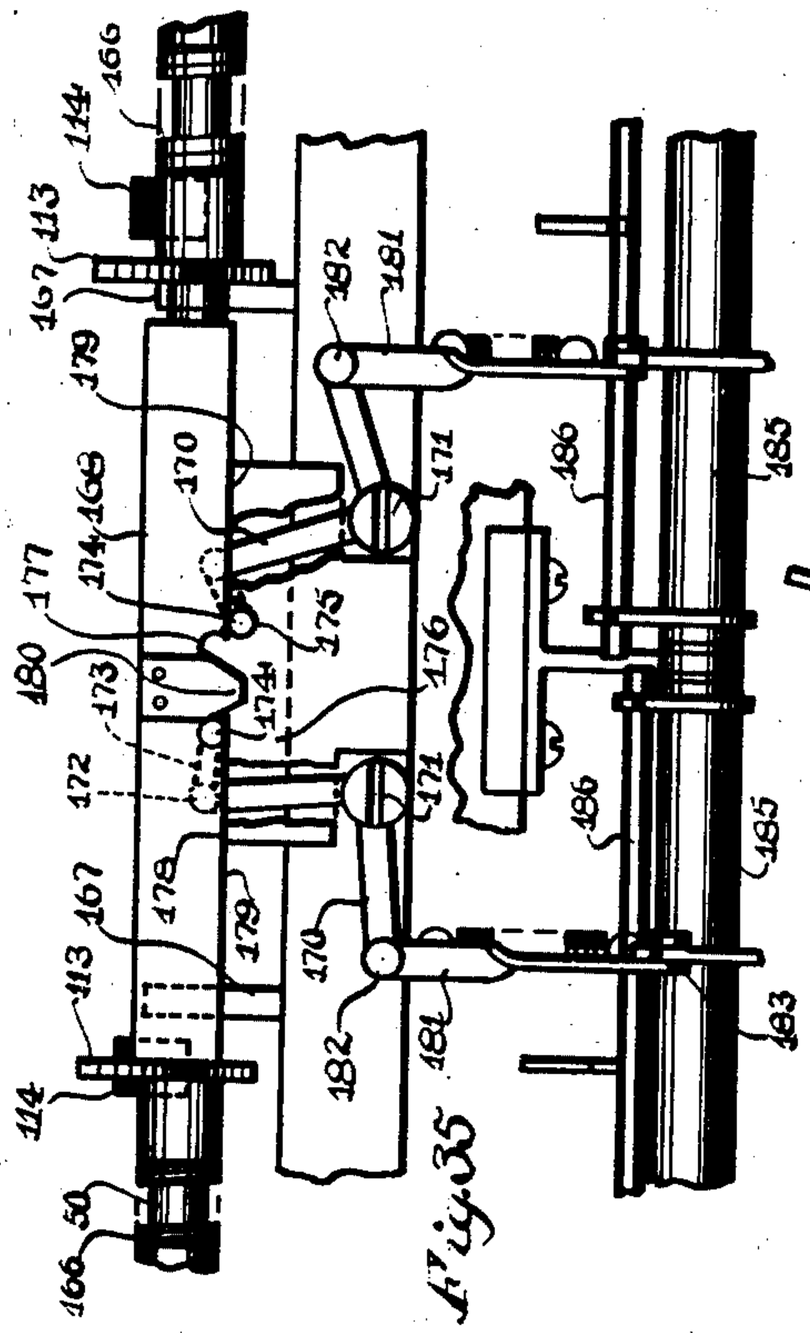

Fig. 35

INVENTOR
Charles H Sampson
BY H. H. Simmons
his ATTORNEY

June 5, 1934.

C. H. SAMPSON

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Fig. 36

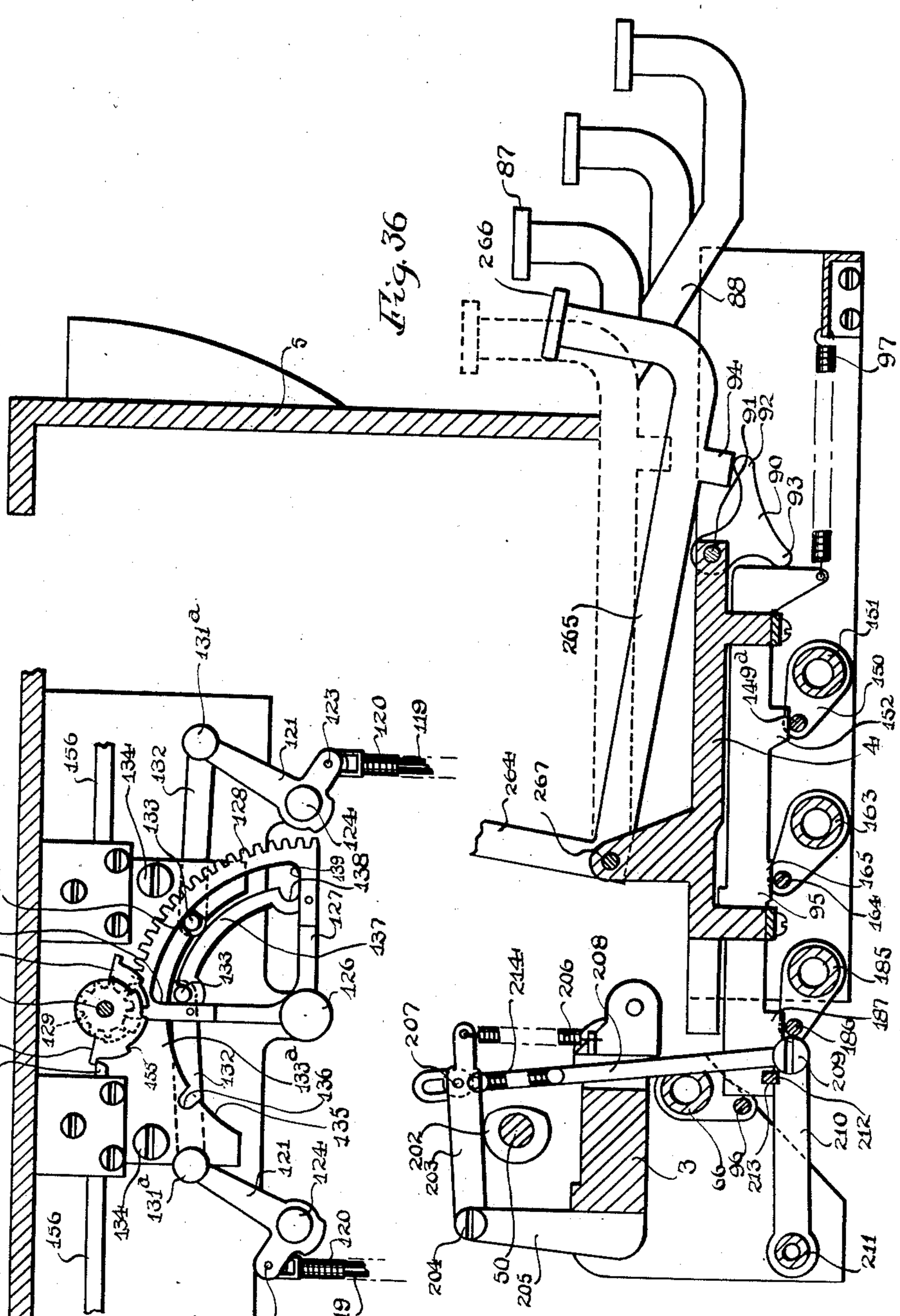
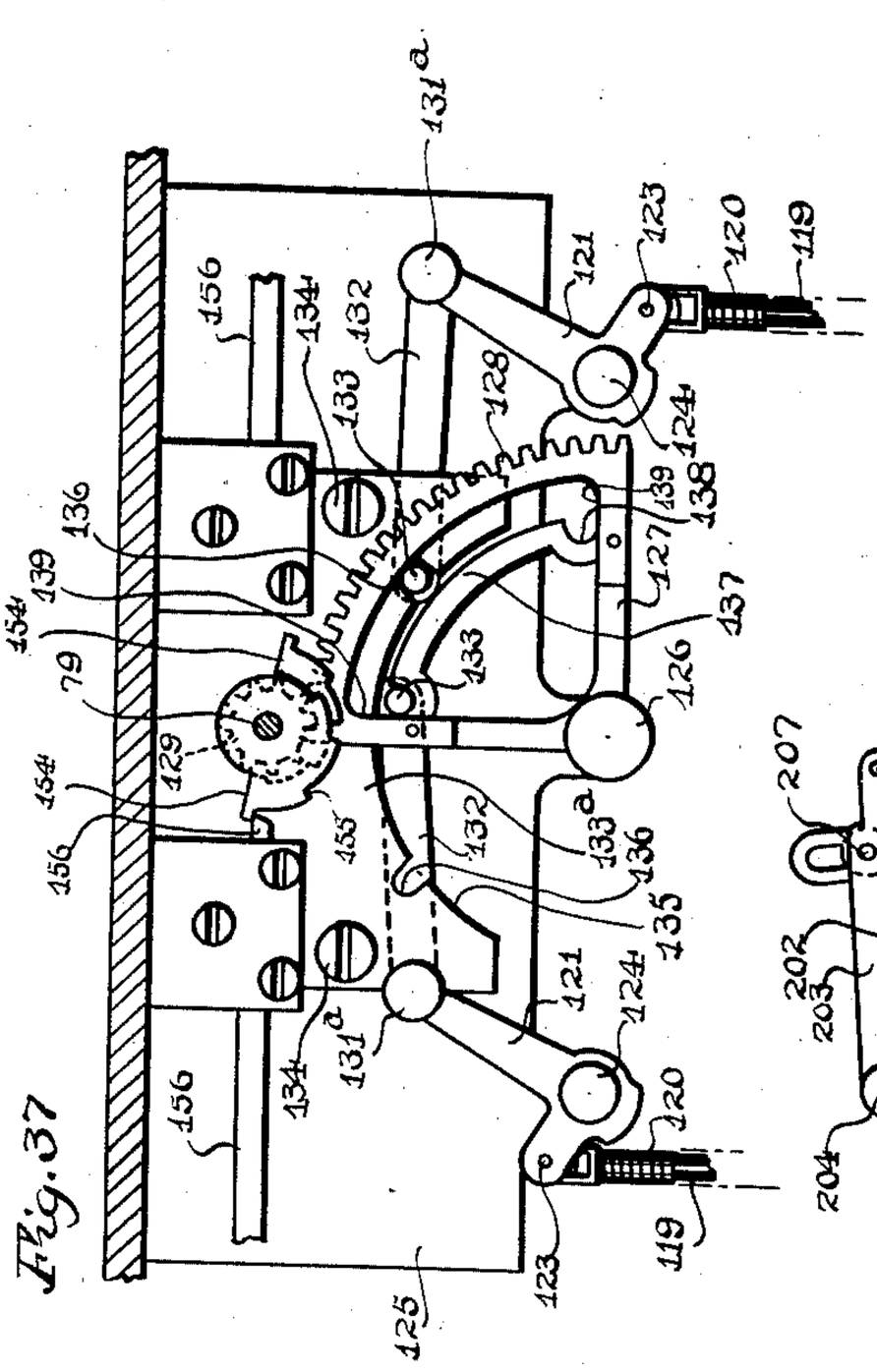


Fig. 37



INVENTOR

Charles H. Sampson

BY

his ATTORNEY

June 5, 1934.

C. H. SAMPSON

PRINTING MACHINE

Filed Jan. 18, 1929

1,961,644

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Fig. 39

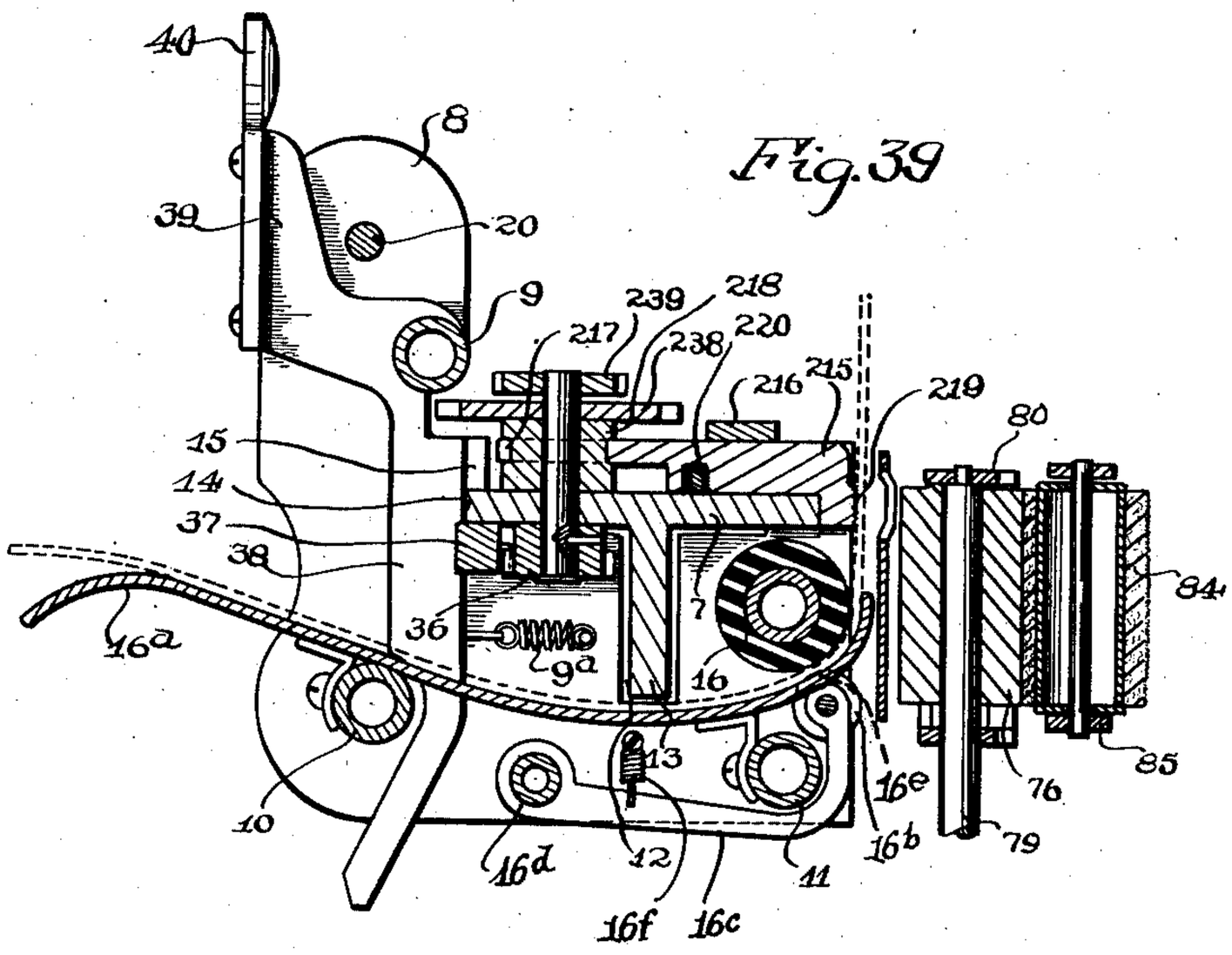
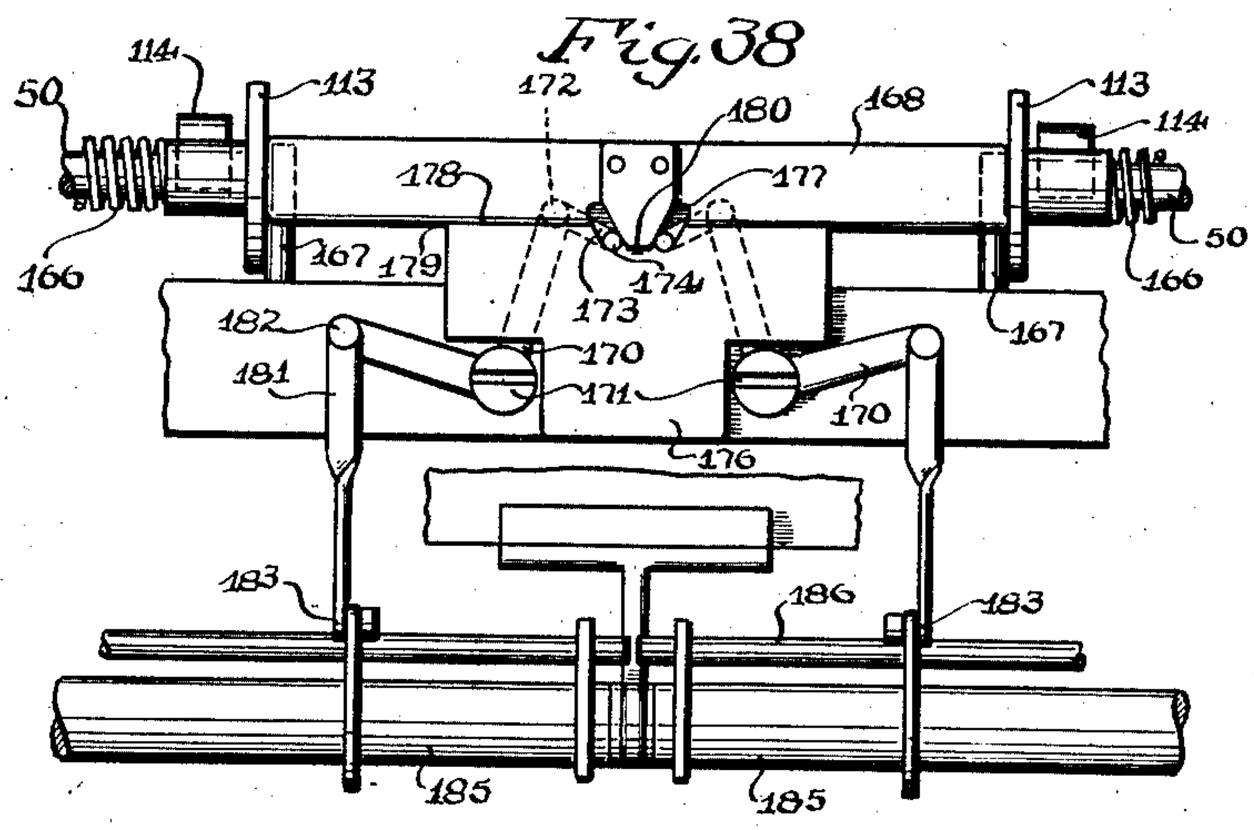


Fig. 38



INVENTOR
Charles H. Sampson
BY H. H. Simms
his ATTORNEY

Patented June 5, 1934 1,961,644

UNITED STATES PATENT OFFICE

1,961,644

PRINTING MACHINE

Charles H. Sampson, Rochester, N. Y., assignor to Sampson Pennagraph Company, Inc., Rochester, N. Y., a corporation of New York

Application January 18, 1929, Serial No. 333,300

38 Claims. (Cl. 197—6.5)

The present invention relates to printing machines and an object thereof is to provide a motor driven construction which will make it possible to rupture or shred the paper on which the machine prints without, at the same time, limiting the machine to any expression or words. Another object of the invention is to make it possible to rupture or shred the work with the printing and at the same time control the printing member through a key board mechanism. Still another object of the invention is to provide for driving a platen with impacting force against a printing member through a motor. A further object of the invention is to so support the platen that a sheet of material on which matter is to be printed may be readily fed from the rear of the machine beneath the platen and upwardly between the platen and the printing member. Still another object of the invention is to obtain visible writing in a printing machine of the type in which a platen and a printing member cooperate with opposite faces of the sheet on which the matter is to be printed while the sheet can feed between the platen and the printing member to effect letter spacing. A still further object of the invention is to provide a printing machine in which the printing member is normally stationary and is moved to a selected printing position through a motor. A still further object of the invention is to provide a normally stationary but motor moved printing member which has two movements controlled by two stopping means, one for each movement. Still another and further object of the invention is to provide a novel means of selecting or determining the printing position of a movable printing member. Still another object of the invention is to provide a novel means for effecting the movement of a printing member to a selected printing position. Another object of the invention is to provide a normally stationary printing member moved to printing position by a motor and having its printing position and its movement thereto controlled by a key board mechanism.

To these and other ends, the invention consists of certain parts and combinations of parts, all of which will be hereinafter described: the novel features being pointed out in the appended claims.

In the drawings:

Fig. 1 is a front view in elevation of a machine embodying this invention;

Fig. 2 is a rear view of the machine;

Fig. 3 is the bottom view of the machine;

Fig. 4 is a view in elevation of one end of the machine;

Fig. 5 is a development of the face of the printing member;

Fig. 6 is an enlarged view of one of the printing characters;

Fig. 7 is a side view of the printing member and a sliding carrier on which it is mounted;

Fig. 8 is a section on the line 8—8, Fig. 7;

Fig. 9 is a view in elevation of the other end of the machine;

Fig. 10 is a detail view of the clutch control;

Fig. 11 is an axial section through the clutch;

Fig. 12 is a plan view of the machine;

Fig. 13 is an enlarged view of the rear face of the front plate showing the printing member mounted thereon and shifted to a printing position;

Fig. 14 is an upside down edge view of the carriage supporting guide with the step-by-step feeding mechanism mounted thereon;

Fig. 15 is a top view of the same parts;

Fig. 16 is a fragmentary view of the opposite edge of the same parts;

Fig. 17 is a section on the line 17—17, Fig. 15;

Fig. 18 is a horizontal section through the machine showing connection between the operating shaft at the rear of the machine and the parts driven thereby;

Fig. 19 is a top view of the work holding carriage;

Fig. 20 is a bottom view of the same carriage;

Fig. 21 is a section on the line 21—21, Fig. 19;

Fig. 22 is an end view of the work feeding carriage:

Fig. 23 is a view of the other end of the work feeding carriage;

Fig. 24 is a plan view of the frame of the machine showing parts broken away;

Fig. 25 is a vertical section through the machine frame looking toward one end thereof on the line 25—25, Fig. 24.

Fig. 26 is a vertical section through the frame of the machine frame looking toward the other end thereof; on the line 26—26, Fig. 24.

Fig. 27 is a rear view of the front plate;

Fig. 28 is a vertical section of the key board mechanism illustrating its connection with the platen operating mechanism, the locking means for holding a key depressed and for preventing the operation of the other keys, and the connection with the two stopping means on the line 28—28, Fig. 18.

Fig. 29 is a detail view showing the manner

in which the operating slides of the keyboard mechanism connect with the key levers;

Fig. 30 is a vertical section through the keyboard mechanism on the line 30—30, Fig. 18; showing the manner in which the latter connects with the printing member when imparting rotation thereto;

Fig. 31 is a transverse section through the slides on the line 31—31, Fig. 28, showing the difference in lengths of the projections for effecting the rotary movement of the type wheel;

Fig. 32 is a vertical section through the keyboard mechanism on the line 32—32, Fig. 18, showing the manner in which the vertical movement of the printing member is effected;

Fig. 33 is a sectional view on the line 33—33, Fig. 32, showing the projections on the slides for effecting the vertical movement of the printing member;

Fig. 34 is a vertical section through the keyboard mechanism on the line 34—34, Fig. 18, showing the manner in which the centering device is moved to centering position with reference to the printing member;

Fig. 35 is a detail view of that mechanism for shifting the cams to determine in which direction the printing member is to be turned by the motor, the parts being illustrated to bring one of the cams in cooperation with the mechanism which it operates;

Fig. 36 is a vertical section through the keyboard mechanism on the line 36—36, Fig. 18, showing the means by which the locking mechanism is operated from the motor shaft and also the back spacer key.

Fig. 37 is a detail view of the operating mechanism for the stopping means which determines the rotary position of the printing member, the parts being shown in the positions they occupy while in stopping position;

Fig. 38 is a detail view showing the parts illustrated in Fig. 35 in normal positions; and

Fig. 39 is a sectional view through the mechanism for operating the platen and the parts closely associated therewith.

In the illustrated embodiment of the invention, there is employed a main frame comprising, in this instance, two sides 1 connected by a forward or front bar 2 and connecting frames 3, 4 and 5, the latter serving as a front plate. The sides 1 of the frame are provided with outward extensions 6 which support a guide member 7 for a movable work support or carriage.

The carriage or work support Figs. 19 to 23, in this instance, comprises two end pieces 8 connected by two cross bars 10 and 11. The side frames or end pieces 8 are of substantially L shaped form and project under the guide piece 7 on the main frame by extending upwardly at the rear of said guide piece 7. Those portions of the side pieces 8 which project under the guide piece 7 are formed with guide slots 12 to receive the stiffening rib 13 on the under side of the guide piece 7. The work support is held against horizontal play by cooperating with the surfaces 14 on the side frames 8 and above these surfaces 14 are supported wear blocks 15 for cooperating with the upper surface of the guide piece 7 and suspending the carriage from the guide.

Also supported by the work support is a line feeding mechanism which, in this instance, comprises a rubber roller 16 journalled at its ends in the side frames 8 and having at one end, on the outer face of one of the side frames, a gear 17 geared to a train of gears 18 meshing with a gear 19 on a shaft 20 which is journalled on the two side frames 8 and has knurled wheels 21 at opposite ends through which the roller may be turned from a point above the guide piece 7 on the main frame, the roller being positioned below said guide piece and at the forward edge thereof to project slightly in advance of the forward edge of the guide piece 7. A work feeding plate 16^a is supported between the sides 8 and serves to guide the work from a point in rear of the machine, beneath the guide bar 7 and upwardly in front of the feeding roller 16, its forward portion conforming to the feed roller and cooperating therewith to assist in feeding the paper on the carriage. Associated with the roller 16 is a roller 16^b which is journalled in arms 16^c extending from a rock shaft 16^d mounted on the carriage beneath the feeding plate 16^a, the latter having an opening 16^e for the passage of the roller 16^b. A spring 16^f serves to hold the roller 16^b toward the roller 16. An arm 16^g on the rock shaft permits the roller 16^b to be moved away from the roller 16 at will.

For effecting the line spacing, in this embodiment, a line spacing mechanism is connected with the feeding roller 16, to this end, a ratchet wheel 22 is arranged on the shaft 20 and is engaged by a pawl 23 which is pivoted at 24 to a slide 25 guided on one of the side frames 8. This slide in turn is moved by a bell crank lever 26 pivoted at 27 to the adjacent side frame 8 and having a finger piece 28 by which it may be moved to shift a slide 25 and cause the pawl 23 to engage through its tooth 29 the ratchet wheel 22. A spring 30, anchored at 33 to the side frame 8 and at 31 to the slide, normally returns the slide with the pawl 23 and the bell crank lever 26 to normal position. A stop 34 cooperates with the end of the pawl 23 to limit the rearward movement of the slide 25 to the rear while a spring 35 cooperates with the pawl 23 normally to hold the pawl toward the ratchet wheel 22.

Movement of the carriage is effected, in this embodiment, through a vertical stub shaft which carries a pinion 36 and is mounted to turn in the guide piece 7, the pinion being situated below the guide piece and cooperating with a rack bar 37 Figs. 19 and 21 which is movably supported on the carriage or work support. In this instance, this rack bar connects two arms 38 depending from the rock shaft 9 and a spring 9^a acts on one of the arms 38 to hold the rack 37 to the pinion. An arm 39 projects upwardly from the rock shaft and has a finger piece 40 which, when pressed by the finger after anchoring another finger against a fixed abutment 41, will shift the rack bar 37 out of engagement with the gear 36 and permit the carriage to be shifted by hand in either direction. Extending between the side frames 1 is a stop bar 42 Fig. 9 having adjustable stops 43 thereon for the purpose of stopping the carriage at different points in its track. With these stops are adapted to cooperate the lower ends of the two arms 38 supported by the rock shaft 9. The carriage has a normal tendency to move in one direction, this being effected, in this instance, through a spring motor 44 supported on one of the side frames 1 and having a flexible connection 45 with a side frame of the carriage at 46.

The printing is effected, in this embodiment, through a selectively positioned printing member and a platen, the latter preferably being movable toward the printing member to cooperate

with a selected type on the latter. Movement of the selective printing member as well as movement of the platen is, in this instance, effected through a power device, such as an electric motor 47.

This electric motor is supported, in this instance, on one of the side frames 1 and is geared through a speed reducing gearing 48 with a shaft 49 journalled on the frame of the machine which is axially alined with the operator or shaft 50 journalled on the connecting bar 3 of the frame. Between the drive shaft 49 and the operator or shaft 50 is provided a clutch which preferably, when thrown into operation effects the movement of the operator or shaft 50 one complete revolution and then breaks connection with the operator or shaft 50.

In the illustrated construction, the clutch (see Figs. 10 and 11) embodies a head 51 secured to the shaft 49 and carrying a number of radial abutments 52. On the operating shaft 50 is a head 53 in which a movable clutch element 54 is pivoted at 55 and is normally held in the path of the abutments 52 by a spring 56 arranged in the head 53. With the end in view of moving the clutch element 54 out of the path of the abutments 52, a shifting device is employed preferably in the form of a curved cam 57 secured in a fixed position as to the bracket 58 in which the head 51 turns. This cam is substantially concentric with the axis of turning of the clutch, and, when the clutch element 54 reaches the high point on this cam at the extreme end 59 of the cam, the clutch element 54 will lie out of the path of the abutments 52 and the shaft 49 will turn without turning the operating shaft 50. Slightly beyond and in spaced relation to the high point 59 of the shifting cam 57 is a fixed stop or abutment 60 against which the end of the clutch element 54 comes to rest and stops the rotation of the operating shaft 50. As the end of the shifter 57 is spaced from the stop or abutment 60, the spring 56 tends normally to move the clutch element 54 back to clutching relation with the drive shaft 49, and, in order to prevent this action until the desired time, a detaining means is provided which will cooperate with the clutch element 54 after the latter passes the shifter 57 and holds such clutch element 54 on the stop 60. This detaining means, in this instance, comprises two detents or dogs 61 and 62 having a common pivot 63 and having respectively springs 64 and 65 urging them normally to their positions beyond the end of the shifter 57. The detent 61 is operated, in a manner to be described, from a rock shaft 66 which has a lost motion connection 67 in the form of a pin and slot, with a link 68 pivoted at 69 to the detent 61, this spring 64 also acting on this link 68 to hold the latter in normal position. A breakable connection is provided between the detents 61 and 62. This connection, in this instance, embodies a pawl 70 pivoted at 71 to the detent 61 and normally urged by a spring 73 toward a shoulder 74 on the detent 62. When the two detents lie in their normal positions beyond the ends of the shifter 57, the pawl 70 engages the shoulder 74 on the detent 62 so that, when the pawl 61 is elevated, the pawl 62 will likewise be elevated. After a time, the pawl 70 will engage an adjustable abutment 75 and will be kicked out of engagement with the abutment 74 on the detent 62, thereby permitting the detent 62 to return to its normal position under the action of the spring 65 before the detent 61 is released. This quick release of the detent 62 has been found necessary due to the quick rotation or revolution of the clutch element 54 which would otherwise reach the end of the shifter and shift back into clutching relation before the detent 61 could be released.

The printing element (see Figs. 7 and 8) is, in this instance, in the form of a cylinder 76 which has on its periphery suitable characters 77, in this instance, comprising the letters of the alphabet, figures and such other characters as may be required. Each of these characters may have its face serrated or ribbed, as shown at 78, for engagement by a serrated or ribbed surface on the platen. In this embodiment, the printing element has two movements, being mounted for both axial and rotary movement. To this end, the roller 76 is secured to a shaft 79 journalled in a movable frame 80 (Figure 13) which has guides 81 on opposite sides cooperating with guide blocks 82 supported on the upper part of the front piece 5, the front piece having a pocket 83 on its inner face in which the movable frame for the printing member operates. An inking roller 84 may be supported on a swinging frame 85 by the frame 80 and be normally held in engagement with the periphery of the printing member 76 by a spring 86.

The selective positioning of the printing member is, effected through a selective mechanism, in this instance, in the form of a keyboard mechanism arranged between the side frames 1. The key levers of this keyboard also control the clutch to effect the shifting of the selected printing character to printing position as well as selecting or determining the printing position for such printing member.

The keyboard mechanism, in this instance, has each key 87 thereof mounted on the end of a key lever 88 which is pivoted at 89 to the connecting piece 4. At the forward end of this connecting piece an equalizing lever 90 is pivoted at 91 and has two arms 92 and 93, one cooperating with a depending projection 94 on the key lever 88 and the other cooperating with the forward end of an operating slide 95 which is guided on the under side of the cross piece 4. The rear end of each slide 95 cooperates with a bar 96 eccentrically arranged on the rock shaft 66, before mentioned. A spring 97 connects with the slide 95 and tends normally to move the slide forwardly and at the same time elevate the key lever 88. Through this arrangement, the depression of any key of the keyboard connecting with the printing member, establishes connection between the electric motor and the operating shaft 50 so that the operating shaft makes one complete rotation and then stops. Owing to the fact that the levers 88 are of different lengths, this would, under normal conditions, make different amounts of pressure and different strokes. To overcome this, the equalizing levers 90 are so formed that their forwardly projecting portions 92 vary in length, as shown in Fig. 29 of the drawings, so as to correspond to the different lengths of the key levers, thereby securing equal strokes and equal pressure in the key levers.

The axial movement of the printing member from the operating shaft 50 is effected, in this instance, (see Figs. 18 and 32) through a cam 98 on said shaft 50 cooperating with a roller 99 on a swinging member 100 which is pivoted at 101 to the cross piece 3 at the forward edge of the latter. This swinging member is normally held against the cam 98 by a spring 102 anchored to a bracket 103 on the cross piece 3 and to the upper end of the swinging member 100. A yield-

ing connection is provided between the swinging member 100 and the frame 80 carrying the printing member. In this instance, this yielding connection embodies a rod 104 which has a suitable engagement with the swinging member 100 and is surrounded by a spring 105 which abuts the swinging member at one end and at the other end abuts the rod 104. The other end of the rod 104 is pivoted at 106 to one arm of a double armed lever 107 which is pivoted at 108 to a bracket 109 on the front plate 5. The other end of this lever 107 is pivoted at 110 to a rod 111, the upper end of which is pivoted at 112 to the frame 80 carrying the printing member. It is apparent that the rotation of the shaft 50 swings the swinging member 100, thus pushing the rod 111 upwardly to carry the printing member to the desired position as determined by the selective mechanism. The spring 105 yields so that while the cam 98 is permitted to make its full movement as well as the member 100, the rest of the shifting mechanism for effecting the elevating or axial movement of the printing member moves only so far as determined by the selective mechanism.

Rotating movement of the printing member is effected, in this instance, in opposite directions (see Figs. 3, 18, 30, 35 and 37) by two cams 113 on the shaft 50 cooperating with rollers 114 on swinging members 115 which are pivoted at 116 to the cross piece 3. Springs 117 normally hold the rollers 114 toward the cams 113 and are anchored, each at one end, to a swinging member 115 and at its other end to a bracket 118 supported by the frame piece 3. Each of the swinging members 115 has a rod 119 loosely connected thereto and surrounded by a helical spring 120 which at one end abuts a swinging member 115 and at the other end abuts a rod. So that a resilient connection is provided between the rod and the swinging member, the rod is pivotally connected by a bell crank lever 121 by a universal connection having two pivots 122 and 123 at right angles to each other. Each bell crank lever is pivoted at 124 to a table 125 projecting from the rear face of the front plate 5. Also mounted on the table 125 to turn about an axis 126 is a swinging operating member 127. This swinging member has a gear segment 128 which meshes with a pinion 129 which is secured to a sleeve 130 through which the shaft 79 of the printing member is slidable, a key way connection 131 being provided between the shaft 79 and the sleeve so that the shaft 79 may move axially but will turn with the sleeve. Connection is made between each of the bell crank levers 121 and the swinging member 127 so that one of the bell crank levers may swing the swinging member 127 in one direction while the other bell crank lever 121 may swing said member 127 in the opposite direction, provision being made whereby when either of said bell crank levers has shifted the swinging member 127 away from its central or intermediate position the said other bell crank levers can not act on the same. In this instance, to each of the bell crank levers is pivoted at 131^a an operator 132 which is provided at its free end with a stud or pin 133. Arranged on the table 125 and spaced from the surface thereof above the operators 132 but below the swinging member 127 is a plate 133^a secured in position by screws 134. This plate has a curved surface 135 concentric with the axis of turning of the swinging member 127 and it also has notches 136 at opposite ends of this curved portion. The swinging member 127 also has a curved guide 137 concentric with its axis of turning and provided with notches 138 at opposite ends of such curved portions 137. When the swinging member 127 is in its central position, as shown in Fig. 18, the two studs or projections 133 will lie in the notches 136 and opposite the notches 138. If either of the bell crank levers 121 is shifted, the stud 133 on the operator 132 connected to such bell crank lever will shift into the adjacent notch 138 and will thereafter shift the swinging member 127 in the direction in which the operating bell crank lever 121 is moved. During the swinging movement of the swinging member 127, the projection 133 which is shifting said member will cooperate with the curved portion 135 so as to be held in the notch 138. The other projection 133 will be held against movement in its notch 136 by the curved portion 137 on the swinging member so that, while the swinging member is being moved by either bell crank lever, the other bell crank lever is held against movement. When the swinging member is in its central position, the two studs 133 will abut the surfaces 139 on the swinging member, while such studs 133 will lie in the notches 136 and in this way the swinging member will be held in a centered position against swinging in either direction until one of the studs 133 is moved to effect the movement of the swinging member. This arrangement makes it possible to swing the printing member about its axis in either of the two directions from a fixed position so that each type on the printing wheel is caused to pass over the printing roller and be inked before being presented at printing point. At the same time the construction gives a high speed movement in the printing movement.

For selecting or determining the vertical position or axial position of the printing member, there is provided, in this instance, an adjustable stop member 140 (see Fig. 13) which is mounted on the end of a slide bar 141 guided on the rear face of the front plate 5 and normally projected so that the lowermost of its stop shoulders 142, of which there are five, corresponding in number to the rows of type on the printing member, will lie in the path of a portion of the frame 80 in order to limit the upward movement of such frame. By moving the slide bar 141 against the action of the spring 143 any one of the stop shoulders 142 may be presented for engagement by the frame carrying the printing member. Movement of the slide 141, is in this instance, effected by a bell crank lever 144 (see Figs. 13 and 28) pivoted at 145 to the front plate 5 and having one end connected at 146 to the slide 141 and the other end pivotally connected at 147 to a link 148. The other end of this link is pivoted at 149 to an arm 150 on a rock shaft 151. This rock shaft is in turn controlled by cam projections 152 on the slides 95. These projections 152 vary in length, there being, in this instance, five lengths (see Fig. 33) one for each of the four different rows of keys which control four of the stops. The fifth stop is controlled by the shift keys 153 which operate on the rod 149^a in the same manner as the other keys with still longer projections, thereby shifting the printing member to its highest position, in order that when the upper row of type members are operated for the upper letters, they will lift the printing member to present the type on the lowest row on the printing member to printing position and otherwise effect the operation of the machine. It will be understood that the shift keys merely shift the printing member to highest position and do not otherwise

effect the operation of the machine through the motor, this being accomplished through the upper row of keys which are thereby able to print two sets of characters. With the release of the keys after setting the stop member 140, the latter returns under the action of the spring 143 to its normal position where the lowermost stop thereon is in stop position.

The selecting mechanism for determining the rotary movement of the swinging member comprises, in this instance, two stop members 154 (see Figs. 37 and 30) arranged one above the other on the sleeve 130 and turning with the printing member when the latter is operated by the swinging member 127. Normally these stop members lie in the position shown in Fig. 18 and each is provided with a plurality of stop shoulders 155 at different distances from the center of the shaft 79. For cooperating with these two stop members, two adjustable stops 156 are provided, one for each of the stop members 154 and lying on opposite sides of the sleeve 130, being, in this instance, slidably mounted to move toward and from the axis of turning of the stop members 154. The amount of such movement determines the stop 155 to be engaged by said stop members 156 upon the rotation of said stop members 154. Each sliding stop member 156 is normally held away from stop position by a spring 157, while its movement toward stop position may be effected by a bell crank lever 158 (see Figures 13 and 28) which is pivoted at 159 to the side frame 1, one end of said lever 158 engaging an end of the slide stop 157 while the other end has pivoted thereto at 160, a link 161. Each of these links is pivotally connected at 162 to one of two rock shafts 163 which are alined with each other beneath the slides 95. Each of these rock shafts has an eccentrically mounted bar 164 thereon which is adapted to be engaged by projections 165 on those slide bars 95 arranged directly above the rock shaft 163 (see Fig. 31). The adjacent ends of the two rock shafts 163 are substantially at the center of the machine so that those slide bars 95 arranged on the side of the center will actuate one rock shaft 163, whereas those slide bars 95 on the opposite side of the center will actuate the other rock shaft 163. In this way, one of the adjustable stops 156 is controlled by one-half of the key board while the other adjustable stop 156 is controlled by the other half of the key board.

With the end in view of determining in which direction the swinging member 127 shall be moved, the two cams 113 normally lie out of engagement with the rollers 114, being keyed to the shaft 50 in such a manner that they may be moved axially, springs 166 normally holding said cams toward each other against stops 167. For shifting the cams 113 into cooperation with the rollers 114 a shifter 168 is provided, (see Figs. 18, 35 and 38). This shifter, in this instance, is in the form of a slide guided at 169 on the cross piece 3 (see Figure 2) and having two arms cooperating with the opposed faces of the cams 113. When the shifter 168 is moved in one direction, it moves one of the cams 113 into cooperative relation with one of the rollers 114, whereas, when the shifter or slide 168 is moved in its opposite direction, it moves the other cam into engagement with the other roller 114, the springs 166, in each instance, normally returning the shifter 168 to its central or neutral position. Two means are provided for shifting the shifter 168, one moving it in one direction and the other moving the shifter in the other direction. In this instance, this means comprises a bell crank lever 170 pivoted at 171 to the frame piece 3 and having pivoted at 172 to one arm thereof a link 173 which carries a lateral pin or projection 174. These lateral pins or projections 174 on the two bell crank levers lie in two separate notches 175 formed in a fixed part 176 over which the slide 168 moves. The slide 168 is also provided with two notches or recesses 177 which, when the shifter or slide 178 is in position, lie in communication with the notches 177. When the bell crank lever 170 is shifted on its pivot 171, the pin 174 connected with such bell crank lever shifts out of its notch 175 into the adjacent notch 177 so that connection between the bell crank lever 170 and the shifter 168 is established, permitting the bell crank lever to complete its movement. During this time, the pin 174 travels over a surface 178 and is held in the pocket or recess 177 by said surface. The other pin 174 is lying in its pocket 175 and is held in such pocket by a surface 179 on the slide 168, there being two of such surfaces extending in opposite directions from the two notches 177. When the slide 168 is in its central position, the projection 180 on the slide lies between the two lugs or projections 174 and produces a binding action preventing the movement of the slide 168 in either direction. Each bell crank lever may shift on its pivot 171 by a link 181 which is pivoted at 182 to one arm of the bell crank lever and at 183 to a lever 184 (see Fig. 30). These two levers 184 are each projected to one of two rock shafts 185 mounted to turn about a common center or arranged end to end beneath the slides 95. Each of these rock shafts carries an eccentric rod 186 which lies beneath projections 187 of equal length on the slides 95, one-half of the slides 95 operating one rock shaft 185 and the other half of the slides 95 on the other side of the center of the machine operating the other rock shaft 185. In other words, one-half of the key board on one side of the center of the machine shifts the shifter 168 in one direction, to turn the printing member in one direction, while the other half of the key board on the other side of the center of the machines shifts the shifter 168 in the other direction to effect the turning of the type wheel in the other direction.

The centering of the printing member may be effected preferably through a centering wheel 188 (see Figs. 18 and 34) mounted on the shaft 79 and adapted to be engaged by a centering plunger 189 which is guided on the front plate 5 and normally held away from centering position by a spring 190. This centering member 189 is in turn moved by a lever 191 pivoted at 192 to the centering guide 189 and mounted to rock on the post 191A. The lower end of the lever 191 is engaged by a bell crank lever 193, pivoted to the under side of the post 194 which is carried by the front plate, one arm of the lever 193 engaging the lever 191 while the other arm has a plunger 195 pivoted thereto at 196. This rod 195 is slidably connected to a swinging member 197, a spring 198 surrounding the rod 195 and having an abutment against the lever 197 and also against the rod so as to provide a resilient connection. The lever 197 is pivoted at its lower end at 199 to the cross piece 3 and carries a roller 200 cooperating with a cam 201 on the operating shaft 50 so that after the shaft 79 of the printing wheel or member has been turned to the desired or selected position, the centering device will be actuated by the motor to hold the printing wheel in the po-

sition to which it has been rotated so that it cannot shift during the printing action.

With the purpose in view of locking the key or bar in its depressed position, so that it cannot be released until the printing operation is completed, a locking mechanism is provided (see Fig. 36) controlled by the motor mechanism. This locking mechanism, in this instance, comprises a cam 202 on the operating shaft 50 cooperating with a lever 203 which is pivoted at 204 to a bracket 205 on a cross piece 3 and which is held toward the cam 202 by a spring 206. Through a pin and slot conection 207, a link 208 is pivotally connected to the lever 203 and has its lower end pivoted at 209 to a swinging frame 210 pivoted at 211. This swinging frame carries a locking bar 212 which is adapted to be engaged with shoulders or abutments 213 on the slides 95, in order to hold said slides in their rearmost positions after they have been moved to such positions. This bar at the same time engages the rear ends of the other slides 95 to prevent their being moved while a key of the key board is depressed and the motor is operating the machine. The link 208 has resilient connection 214 with the lever 203 in the event that any one of the slide bars 95 is moved to its extreme rear position and the motor is operating so as to prevent breaking of any of the parts. It is apparent that after one of the slides 95 has been moved to its rearmost position and the locking bar 212 has interlocked therewith, the slide 95 cannot return to its initial position and thereby effect the return of the printing member to its initial position until the motor shaft has made its complete turn and thereby release the bar 95.

The platen or impression member 215 (see Figs. 14, 15, and 16) moves toward and from the printing member and, in this instance, is in the form of a slide guided in a bearing bracket 216 and having its rear end bifurcated at 217 and straddling a tubular stud 218 mounted on the carriage guide 7. This platen has a serrated portion 219 for cooperation with the serration on the characters of the printing member. Normally the platen lies out of the path of the printing member so that the latter may turn and it is moved into such path to engage a character of the printing member after the printing member has reached its selected printing position. Movement of the platen toward printing position is effected, in this instance, by a bell crank lever 220 which is pivoted at 221 to the guide 7 and has one arm engaging the platen. The other arm of this bell crank lever is engaged by a slide 222 guided in brackets 223 on the top of the carriage guide 7. A spring 224 normally holds the bell crank lever toward the slide 222 and the platen 215 away from the printing wheel. Movement of the slide 222 may be effected by a double armed lever 225 (Figs. 2, 18 and 28) pivoted at 226 to the frame of the machine and having one end engaging the slide 222 and the opposite end pivotally connected to a link 227 which at its inner end is pivoted at 228 to a bell crank lever 229, the latter being pivoted at 230 on the inner side of one of the side pieces 1. To the other arm of the bell crank lever there is pivoted at 231 a link 232 which in turn is pivoted at 233 to a swinging member 234, this swinging member is pivoted at 235 to the cross piece 3 and carries the roller 236 which cooperates with a cam 237 on the operating shaft 50. After the printing wheel has been moved to a selected printing position, the platen, driven by the motor through the cam 237, impinges the printing wheel and crushes or macerates the material between the serrations of the platen and the serrations of the printing member, thus effectively preventing erasures of the printed matter.

The carriage has a step-by-step feed (see Figs. 14, 15 and 16) and this is effected, in this instance, through the control of the gear 36. To this end, the shaft of this gear which is journalled in the hollow stub shaft 218 carries above the guide 7 a toothed wheel 238 which has a pawl and ratchet connection with the shaft of the gear 36, the ratchet wheel 239 being rigidly secured to the shaft of gear 36 so as to turn with the wheel 36. Two pivoted pawls 240 are pivoted to the toothed wheel 238 so as to move with the latter, springs 241 normally hold the pawls 240 in engagement with the ratchet wheel 239 so that when the shaft 218 is turned counterclockwise or in the direction of line spacing, the toothed wheel 238 will turn with the wheel 236 but when the carriage is shifted to the beginning of the line, the ratchet wheel 239 will be turned clockwise and no movement will be imparted to the ratchet wheel 239. Control of the toothed wheel 238 is effected as is common in the art, by three detents 242, 242[a] and 243, all of which are mounted on a rocking frame 244, the detent 242 being rigid with the frame and the detents 242[a] and 243 being movable on the frame under the action of springs 245 and 245[a]. The detents 242[a] and 243 lie to one side of the detent 242 so that, when the frame 244 is still they will both engage the wheel 238. With the depression of the frame 244, the movable detents 243 and 242[a] move out of engagement with the toothed wheel 238 while the detent 242 moves into the path of the toothed wheel and holds the latter against turning. As the movable detents 242[a], and 243 move out of engagement with the toothed wheel, the detent 242 moves into engagement with the toothed wheel and upon the raising of the detents, the detent 242 will be thrown out of engagement with the toothed wheel while the movable detents 243 will be engaged by the teeth on the toothed wheel 238, the detent 243 shifting with said toothed wheel one step. The rocking of the swinging member 244 may be effected in any suitable manner but, in this instance, a slide 246 is provided having a cam slot 247 in which operates a pin 248 on a rocking member 244. The slide 246 may be operated in any manner. In this instance, a double armed lever 249, Fig. 2 is pivoted between its ends to the frame and has its upper end pivotally connected at 250 to the slide 246 and its lower end pivotally connected at 251 to a link 252 pivoted at its inner end at 253, Fig. 18 to a bell crank lever 254 which is pivoted at 255 to a link 256. The link 256 connects with an arm 257 on the shaft 66 (see Figs. 4 and 32) so that, as the slides 95 move rearwardly, the shaft 66 will shift the slide 246 and effect the movement of the carriage one step. The movement of the spacing bar 95[a] is transmitted through slides 95 to operate the spacing mechanism but the slides used for this purpose have no projections on the bottom and their movement by the spacing bar therefore does not operate the clutch nor move the printing element.

Back spacing of the machine may be effected through a slide 258 which is guided on the under side of the guide bar 7 to cooperate with the gear wheel 36 when moved forwardly in order to shift the gear wheel backwardly a distance of one space. A spring 259 engaging with the slide 258

and with the fixed part tends normally to hold the back spacer away from the gear wheel 36. Movement of the slide 258 may be effected by a lever 260 pivoted at 261 and having a link 262 Figs. 2 and 18 connected thereto and to a bell crank lever 263 Fig. 18. This bell crank lever 263 may be operated by an arm 264 extending upwardly from the lever 265 which carries the back spacing key 266 Fig. 36 which is pivoted at 267 to the cross piece 4 in line with the other keys.

What I claim as my invention and desire to secure by Letters Patent is:

1. The combination with a supporting bar, and means at opposite ends of the bar for supporting said bar, of a platen movably mounted on said bar, work feeding means supported by the bar and moving the work from a point in the rear of the bar, beneath the bar and upwardly in front of the platen supported on the bar, and printing means for cooperating with the platen to effect the printing.

2. The combination with a guide, and supporting means at opposite ends of the guide providing a rearwardly opening space beneath the guide, of a platen supported by the guide, a work feeding carriage movable on the guide in the space beneath the same to provide letter spacing and having means thereon for moving the work from a point in rear of the guide, beneath the guide and upwardly in front of the platen, and printing means for cooperation with the platen to effect the printing.

3. The combination with a guide, and supporting means at opposite ends of the guide providing a space beneath the guide, of a work feeding carriage movable on the guide in the space beneath the said guide and having means for feeding the work from a point in rear of the guide, beneath the guide and upwardly in front of the guide.

4. The combination with a normally stationary printing member having selective printing characters thereon and mounted to turn about a suitable axis and also to move longitudinally of said axis, adjustable stop means for determining the axial and the rotary movement of the printing member, a motor, and resilient means for connecting the motor with the printing member for effecting the axial and the rotary movement of said member as determined by the stop means, said resilient means having a breakable connection therein normally breaking the connection between the motor and the printing member and controlled with the stop means.

5. The combination with a normally stationary printing member having selective printing characters thereon and mounted to turn about a suitable axis, of adjustable stop means for determining the rotary movement of said printing member, a motor having resilient connection with the printing member to effect such rotary movement to said stop means, said connection having a clutch therein, and controlling means for the stop means having connection with the clutch to make the connection between the motor and the printing member in order to move the printing member by the motor to the position determined by the stop means.

6. The combination with a movable printing member having selective printing characters thereon and normally stationary, of a motor having resilient connection with the printing member for moving the printing character to carry the selected character to printing position, said connection including a clutch normally preventing the movement of the printing member by the motor, adjustable stop means for determining the character on the printing member to be moved to printing position by the motor, and means for controlling said stop means having connection with the clutch for establishing connection between the motor and the printing member so that the latter may be moved to the position determined by the stop means.

7. The combination with a normally stationary printing member having a plurality of lines of type thereon, and having two movements one for presenting a line of type to the printing line and another for presenting a type in the selected line at printing point, adjustable stop means for determining the line of type to be moved to printing line, adjustable stop means for determining the character to be moved to the printing point in any selected line, a common operating shaft, two mechanisms resiliently connecting said shaft with the printing member, one for moving the printing member to the selected line and the other for moving the printing member to carry a selected type in a selected line to the printing point, a motor having clutch connection with said shaft, common means for operating both of the stop means having connection with the clutch to connect the motor to the shaft so that the printing member may be moved by the motor to present the selected type at the printing point.

8. The combination with a normally stationary printing member having a plurality of lines of types thereon, and having two movements one for presenting a line of type to the printing line and another for presenting a type in the selected line at printing point, means for selecting the line of type to be moved to printing line, means for selecting the character to be moved to the printing point in any selected line, a common operating shaft, two mechanisms connecting said shaft with the printing member, one for moving the printing member to the selected line and the other for moving the printing member to carry a selected type in a selected line to the printing point, a motor having clutch connection with said shaft, common means for operating both of the selecting means having connection with the clutch to connect the motor to the shaft so that the printing member may be moved by the motor to present the selected type at the printing point, and a locking means controlled by said shaft, for holding the printing member against movement away from a position where a selected line is arranged at the printing point.

9. The combination with a normally stationary printing member having selective printing characters thereon and mounted to turn about a suitable axis, an adjustable stop for limiting the rotary movement of the printing member, a motor having a resilient connection with the printing member to effect such rotary movement to the stop, and locking means for holding the printing member against rotation, said locking means being controlled by the motor.

10. The combination with a movable printing member, and a stop for determining the position of said movable printing member, a plurality of slides, a rock shaft having connection with the stop to shift the latter, said rock shaft having an eccentrically arranged portion, and a plurality of projections each arranged on one of the slides to cooperate with the eccentrically arranged portion on the rock shaft, said projections being of different lengths so that when any one of the slides

moves, the projection thereon will shift the rock shaft and move the stop.

11. The combination with a printing member to be adjusted to different positions, a rock shaft to move it to different positions, said rock shaft having an eccentric portion thereon, and a plurality of slides each provided with a projection cooperating with said eccentric portion of the rock shaft to effect the movement of such rock shaft, said projections being of different lengths so that a different amount of movement is imparted to the rock shaft with the movement of each slide.

12. The combination with a printing member having two movements, of two adjustable stops each to determine one of said movements, a motor having connection with the printing mechanism for moving the latter to the stops and a key board having a plurality of key levers each having controlling connection with both of said stops and also with the motor.

13. The combination with a printing member having two movements, and two stops each controlling one of said movements, two rock shafts each connected to one of said stops to move the latter, and a plurality of slides having two sets of projections of different lengths for effecting the movement of the two rock shafts.

14. The combination with a printing member having a straight and rotary movement and a motor for having two resilient connections therewith for effecting both movements, of two adjustable stops each determining one of said movements.

15. The combination with a printing member having a straight and rotary movement and a motor for having two resilient connections therewith for effecting both movements, of two adjustable stops each determining one of said movements, and a key board mechanism having a plurality of keys each of which controls both of said stops.

16. The combination with a rotatable printing member mounted to turn about its axis in either of two directions, of means for determining the position to which said printing member is to be moved about its axis of turning, of a motor for moving the printing member to a determined position having two yieldable connections with the printing member, one for moving the printing member in one direction and the other for moving the printing member in the other direction.

17. The combination with a rotatable printing member mounted to turn about its axis in either of two directions, of means for determining the position to which said printing member is to be moved about its axis of turning, of a motor for moving the printing member to a determined position having two yieldable connections with the printing member, one for moving the printing member in one direction and the other for moving the printing member in the other direction, a key board mechanism, and means controlled by said key board mechanism for determining which of said yieldable connections is to operate.

18. The combination with a rotatable and axially movable printing member, of means for determining the position to which the printing member is moved, of a motor for moving the printing member to the determined position having three yieldable connections with the printing member, two of which effect the movement of the printing member in opposite directions about its axis and the third of which effects the axial movement of the printing member.

19. The combination with a printing member, means for determining the position to which the printing member is to be moved, a work holding and feeding carriage, and escapement mechanism for effecting a step-by-step feeding movement of the carriage, of a motor for moving the printing member to a determined printing position, and means for controlling the movement of the printing member by the motor having connection with the escapement mechanism to control the movement of the carriage.

20. The combination with a printing member, means for determining the position to which the printing member is to be moved, a work holding and feeding carriage, escapement mechanism for effecting a step-by-step feeding movement of the carriage, of a motor for moving the printing member to a determined printing position, and means for controlling the movement of the printing member by the motor having connection with the escapement mechanism to control the movement of the carriage, said controlling means having a lost motion connection with the motor permitting the operation of the escapement mechanism for character spacing.

21. The combination with a printing member, means for determining the position to which the printing member is to be moved, a work holding and feeding carriage, and escapement mechanism for effecting a step-by-step feeding mechanism of the carriage, of a motor, means connecting the motor and the printing member for moving the printing member to a determined position, a key board mechanism embodying a character spacing key, means operated by the keys of the key board mechanism having a lost motion connection with the clutch to effect connection between the motor and the printing mechanism, said means also having connection with the escapement mechanism to control the movement of the carriage.

22. The combination with a movable printing member, of adjustable stop means for determining the position to which the printing member is to be moved, a platen for cooperating with the printing member to effect the printing after the printing member has been moved to a determined printing position, a motor having resilient connections with the printing member to move the latter to a determined printing position and also having connection with the platen for moving the latter to printing position, a clutch interposed between the motor and the two connections, means for shifting said adjustable stop means having connection with the clutch for controlling the latter to make connection between the motor and the two connections.

23. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen supported by the guide between the ends thereof, a work feeding carriage movable on the guide between the supported ends thereof, and a printing mechanism for cooperating with the platen.

24. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen supported by the guide between the ends thereof, a work feeding car-

riage movable on the guide between the supported ends thereof, said work feeding carriage having a work feeding roller mounted to turn on the carriage below the guide.

25. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen supported by the guide between the ends thereof, a work feeding carriage movable on the guide between the supported ends thereof, said work feeding carriage having a work feeding roller mounted to turn on the carriage below the guide, an operator for turning the roller mounted above the guide on the carriage, and a gearing extending from the operator under the guide and connected to the roller.

26. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes of a platen supported by the guide between the ends thereof, a work feeding carriage movable on the guide between the supported ends thereof, said work feeding carriage having a work feeding roller mounted to turn on the carriage below the guide, and an operator for turning the roller supported upon the carriage to move with the latter.

27. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen movably mounted on the guide, a work feeding carriage movable on the guide between the supported ends thereof, a printing mechanism for cooperating with the platen, and mechanism for operating the platen supported below the guide and having connection with the platen extending thereto from one of its supported ends so as to leave a space between the ends of the guide through which the paper on the work feeding carriage may operate.

28. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen supported on the guide, a printing mechanism for cooperating with the platen, a work feeding carriage movable on the guide, and a character spacing mechanism for controlling the carriage having a portion thereof supported on the guide and connected to the carriage.

29. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen supported on the guide, a printing mechanism for cooperating with the platen, a work feeding carriage movable on the guide, and a character spacing mechanism controlling the carriage and embodying an escapement mechanism supported on the guide.

30. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen supported on the guide, a printing mechanism for cooperating with the platen, a work feeding carriage movable on the guide, and a letter spacing mechanism for controlling the carriage having a portion thereof supported on the guide and connected to the carriage, said character spacing mechanism extending to the guide from one end thereof leaving the space between the ends of the guide free from the movement of paper on the work feeding carriage.

31. A printing machine comprising a horizontally arranged guide extending in the direction of the printing line of the machine, and means for supporting said guide from its opposite ends leaving the space between the ends free for guiding purposes, of a platen supported by the guide, a printing mechanism for cooperating with the platen, a work feeding carriage movable on the guide, and a back spacing mechanism for the carriage having a portion thereof supported by the guide and extending from one end of the guide to leave a space between the ends of the guide for the movement of work on the work feeding carriage.

32. The combination with a normally stationary but movable printing member, and a motor for moving said member, of an adjustable stop for determining the position to which the printing member is to be moved by the motor, and a resilient connection between the motor and the printing member through which the latter is moved by the motor.

33. The combination with a normally stationary but rotatable printing wheel having rigid selective printing characters thereon and mounted to move longitudinally of its axis of rotation, two adjustable stops one for limiting the axial movement of the printing member and the other for limiting the rotary movement of the printing member, a common control for both stops, a motor, and resilient means connecting the motor with the printing wheel for effecting the axial and the rotary movement of said wheel as determined by the stops, said means having a breakable connection controlled by the controlling means for the two stops.

34. The combination with a normally stationary but rotatable printing wheel having selective printing characters thereon and mounted to move longitudinally of the axis of rotation, of adjustable stops for limiting the axial and the rotary movement to the printing member, and a motor having resilient connection with the printing member to effect both the axial and rotary movement of said printing member as determined by the stops.

35. The combination with a movable printing member and adjustable stop means determining the printing position of the printing member, of a motor for moving the printing member to the printing position so determined by said adjustable stop having a resilient connection with the printing member to compensate for the different amounts of movement determined by the adjustable stop means.

36. The combination with a printing member movable in opposite directions and means for determining the position to which the printing member is moved in either direction, of a motor, two mechanisms each operated by said motor and each resiliently connected to the printing member to move the latter in one direction, and means for selecting the mechanism which is to move the printing member.

37. The combination with a printing member

having a rotary and an axial movement, a motor, and two driving connections between the motor and the printing member operating together to turn the printing member while it is moving axially.

38. The combination with a printing member having a rotary and an axial movement, of a motor, a driving connection between the motor and the printing member for moving the latter axially, and two other driving connections between the motor and the printing member for moving the latter about its axis, one in one direction and the other in the other direction during the axial movement.

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