No. 785,584. PATENTED MAR. 21, 1905.

M. A. WHEATON.

MACHINE FOR MANUFACTURING SHEET METAL CAN BODIES.

APPLICATION FILED JAN. 2, 1903.

14 SHEETS—SHEET 1.

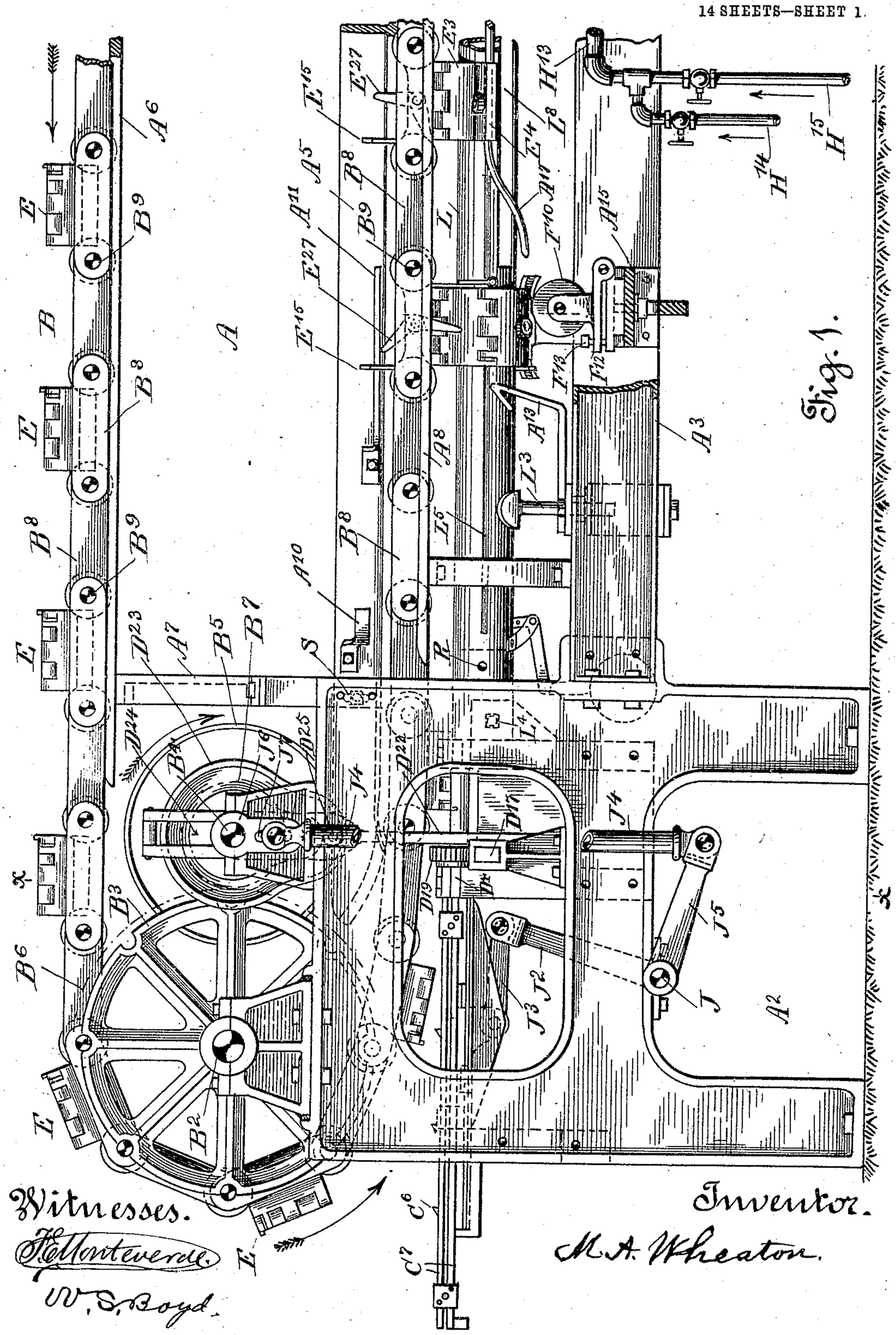

Fig. 1.

Witnesses.

F. Montevercle.

W. S. Boyd.

Inventor.

M. A. Wheaton.

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14 SHEETS—SHEET 2.

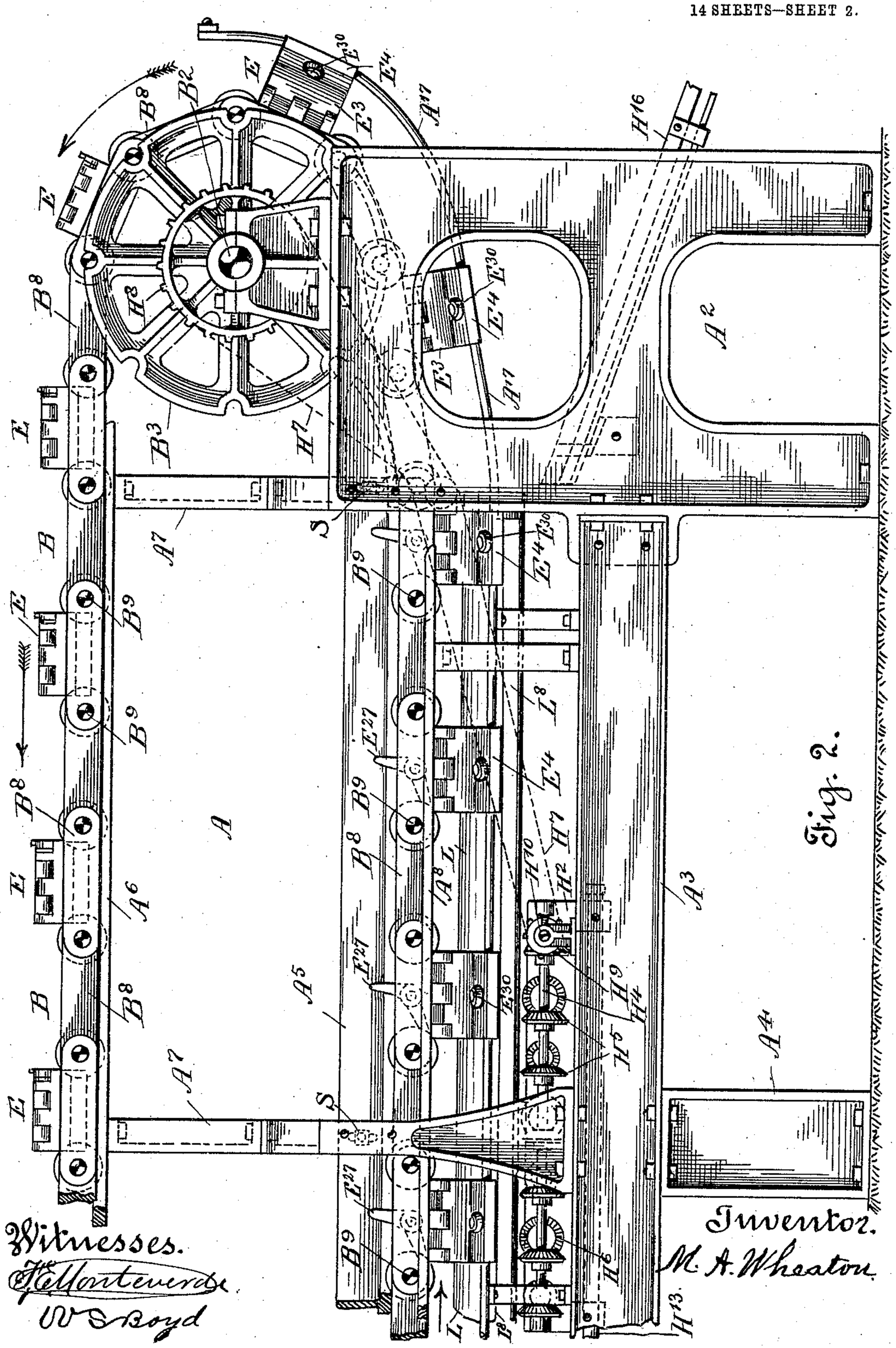

Fig. 2.

Witnesses.
J. Montenverde.
W. S. Boyd

Inventor.
M. A. Wheaton.

No. 785,584. PATENTED MAR. 21, 1905.

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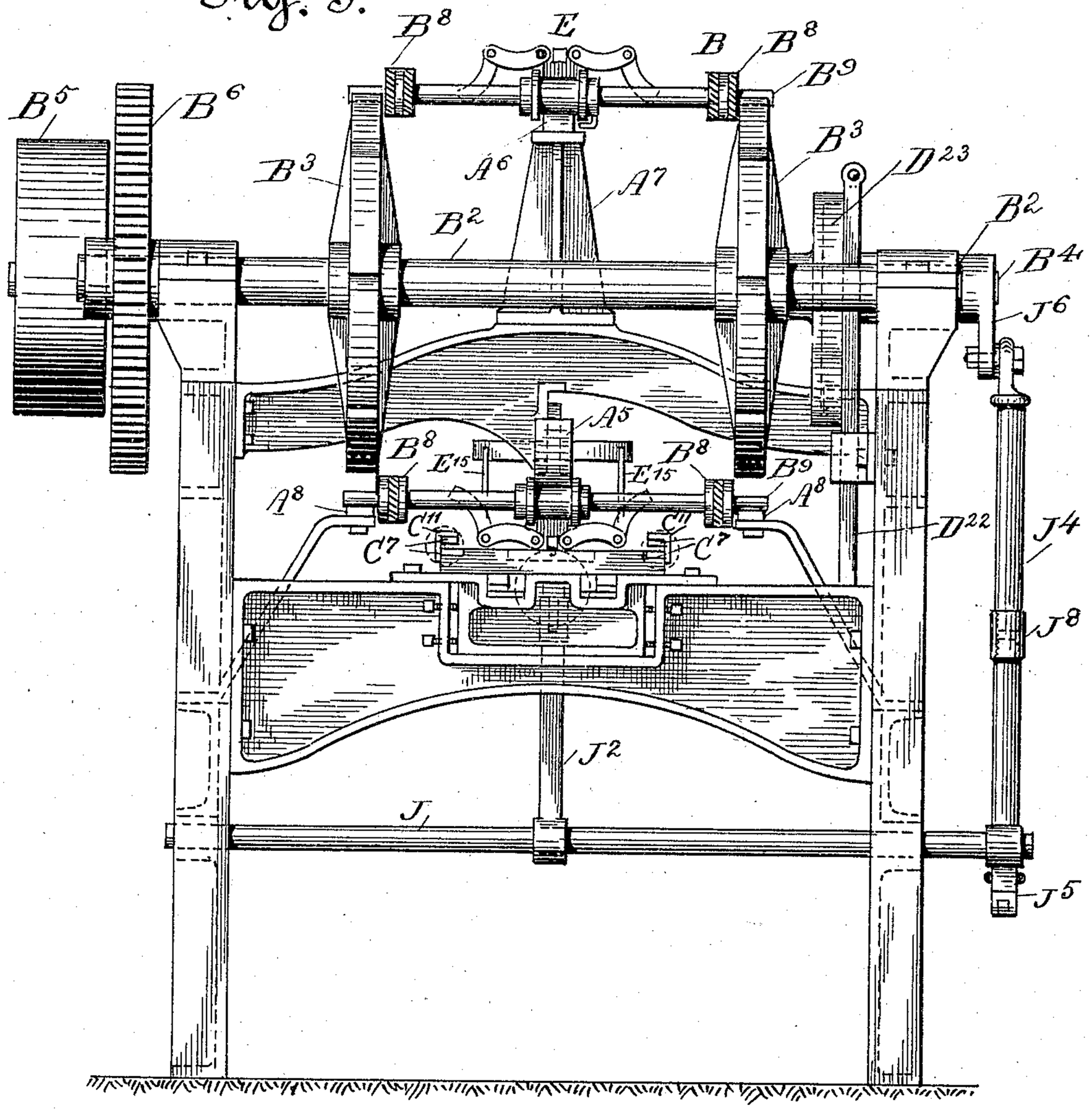
14 SHEETS—SHEET 3.

Fig. 3.



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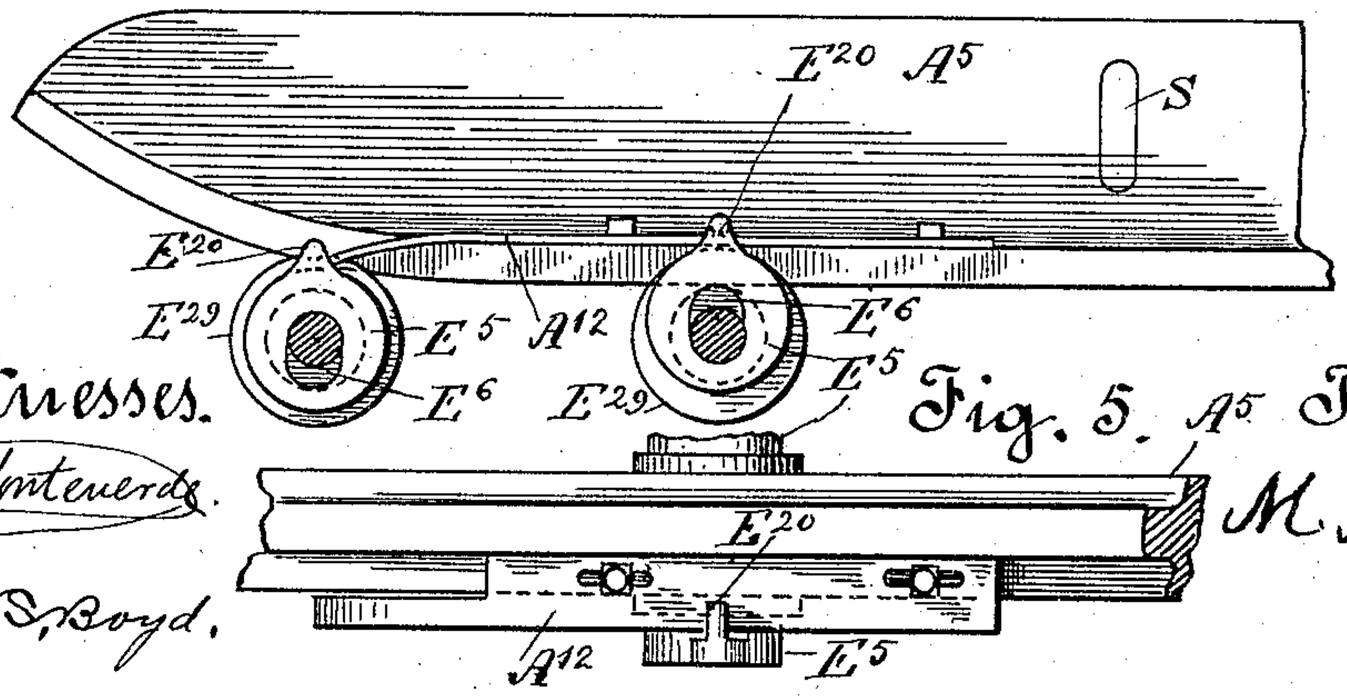

Witnesses.

F. Hellmuth.

W. S. Boyd.

Fig. 5.

Inventor.

M. A. Wheaton

No. 785,584. PATENTED MAR. 21, 1905.

M. A. WHEATON.

MACHINE FOR MANUFACTURING SHEET METAL CAN BODIES.

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14 SHEETS—SHEET 4.

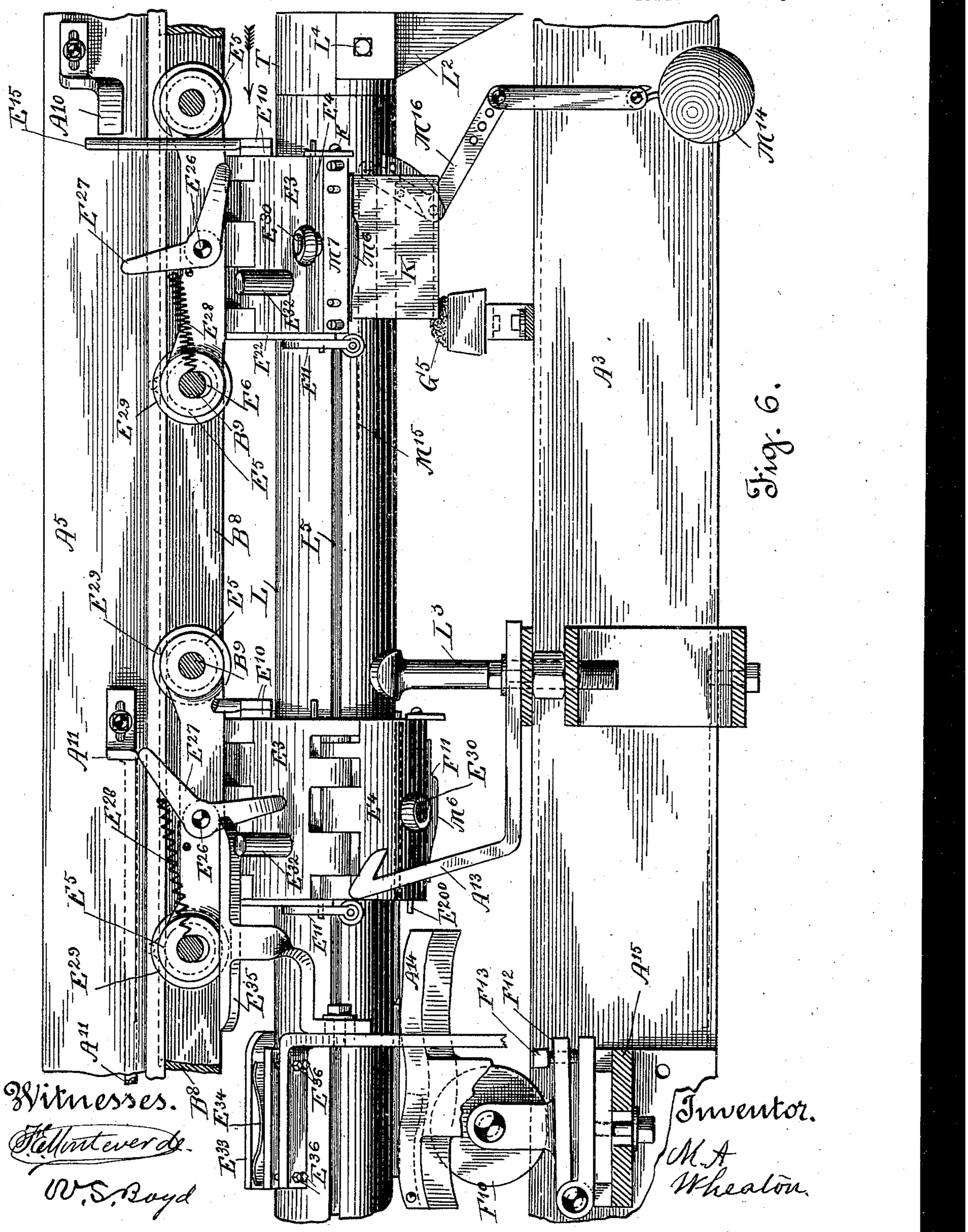

Fig. 6.

No. 785,584. PATENTED MAR. 21, 1905.

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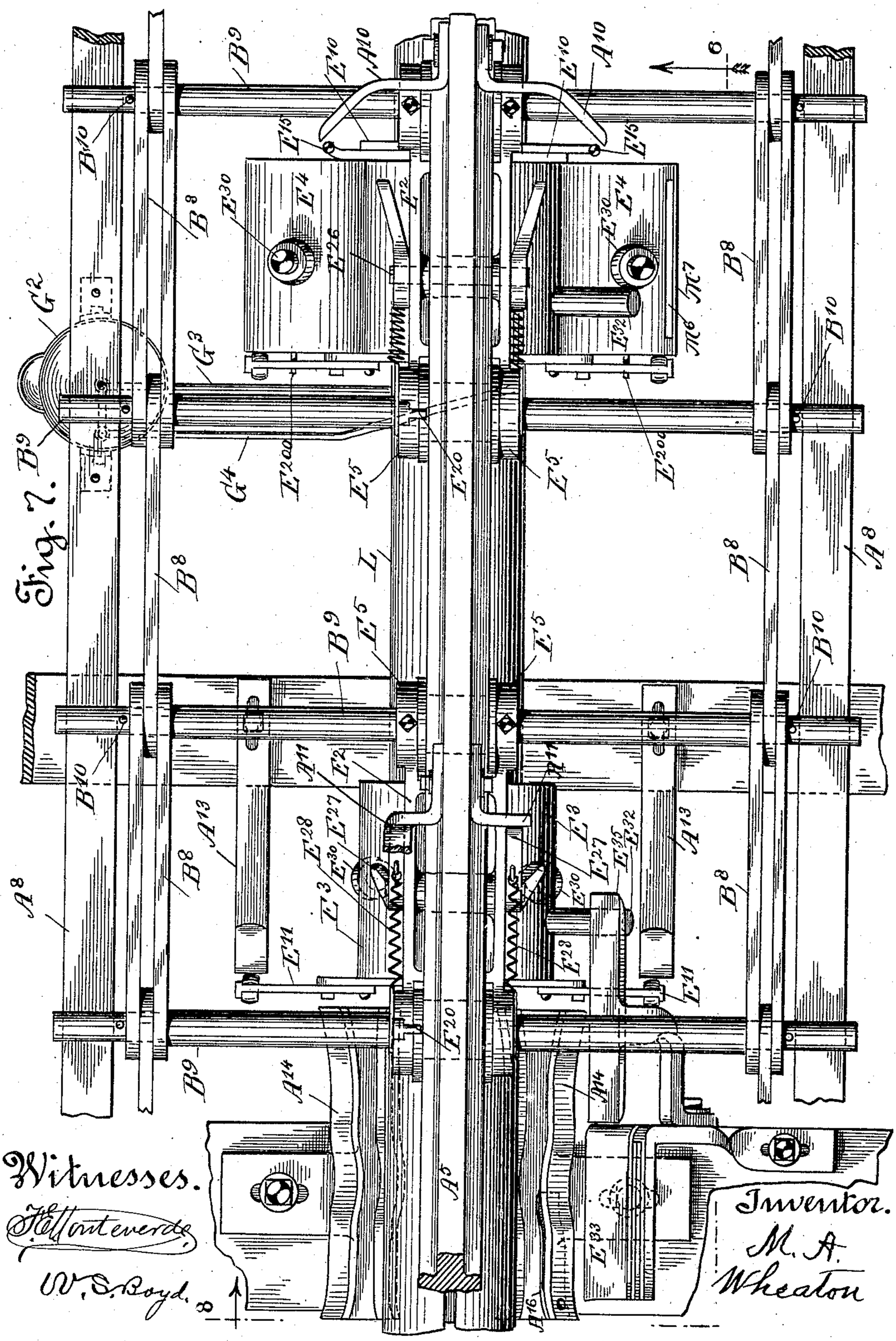
APPLICATION FILED JAN. 2, 1903.

14 SHEETS—SHEET 5.

Fig. 7.



Witnesses.

F. Hellmuth Everds.

W. S. Boyd.

Inventor.

M. A. Wheaton

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M. A. WHEATON.

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APPLICATION FILED JAN. 2. 1903.

14 SHEETS—SHEET 6.

Fig. 8.

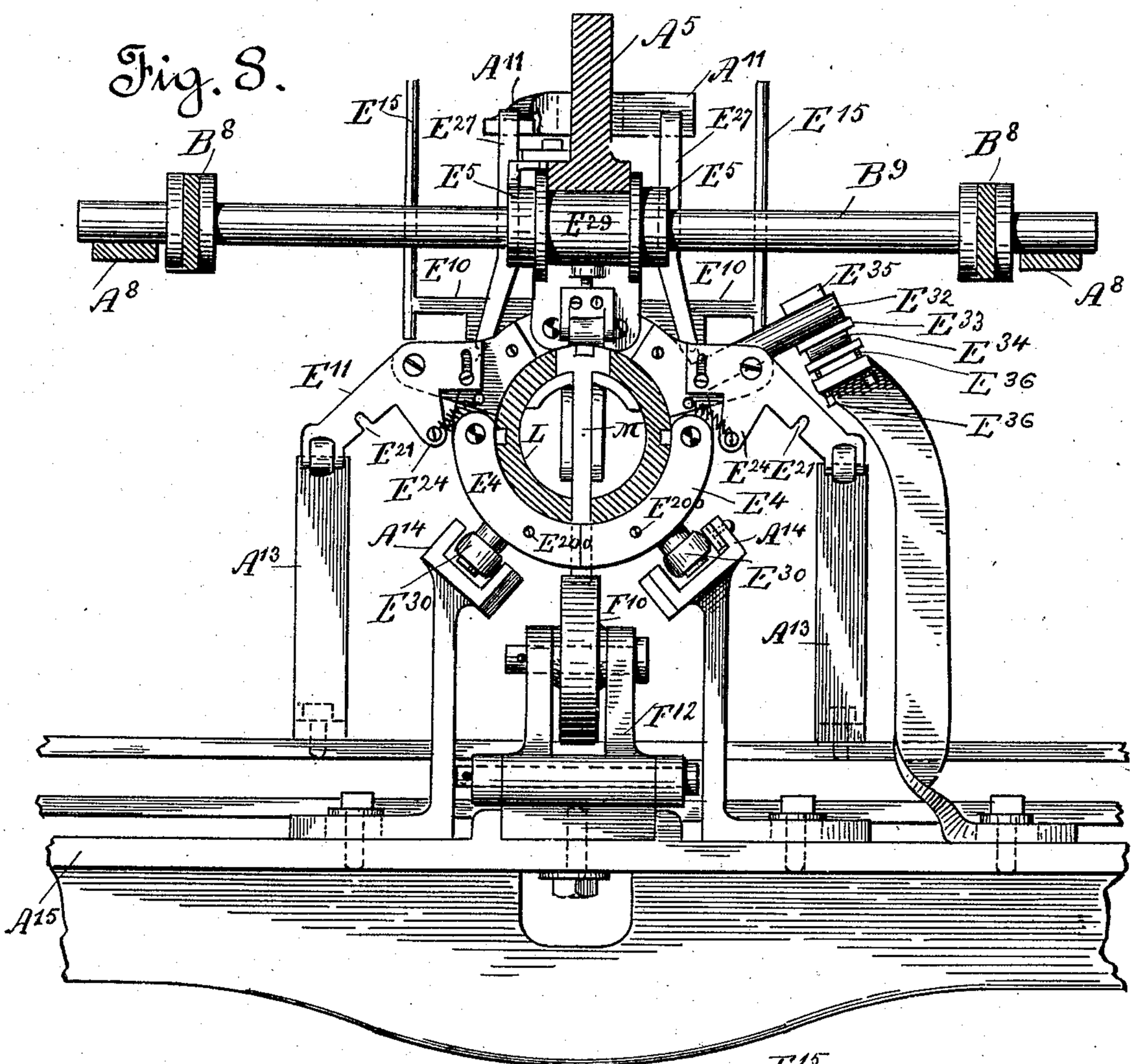
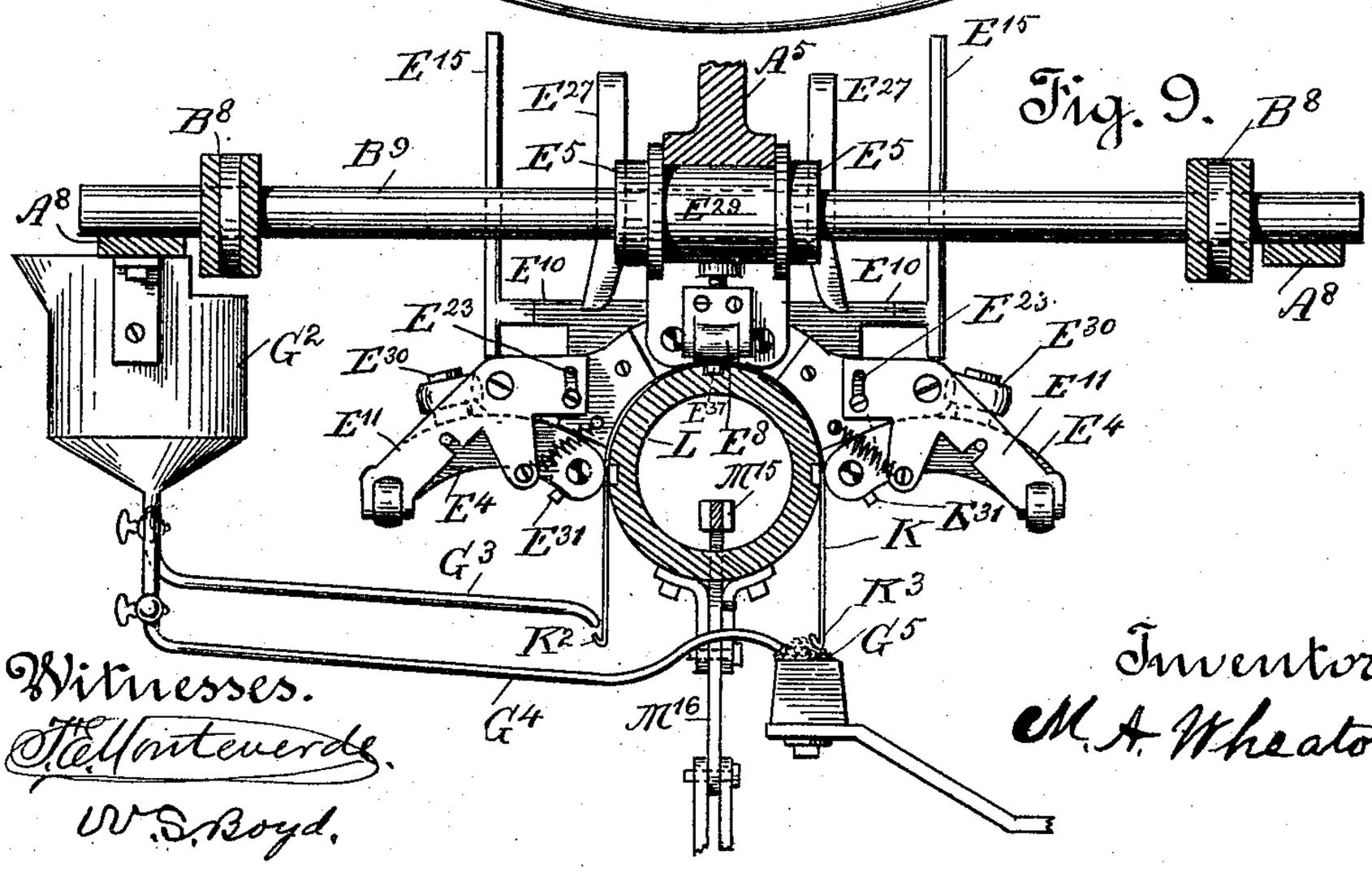


Fig. 9.



Witnesses.
T. E. Winterbotham.
W. S. Boyd.

Inventor.
M. A. Wheaton.

No. 785,584. PATENTED MAR. 21, 1905.

M. A. WHEATON.

MACHINE FOR MANUFACTURING SHEET METAL CAN BODIES.

APPLICATION FILED JAN. 2, 1903.

14 SHEETS—SHEET 7.

Fig. 10.

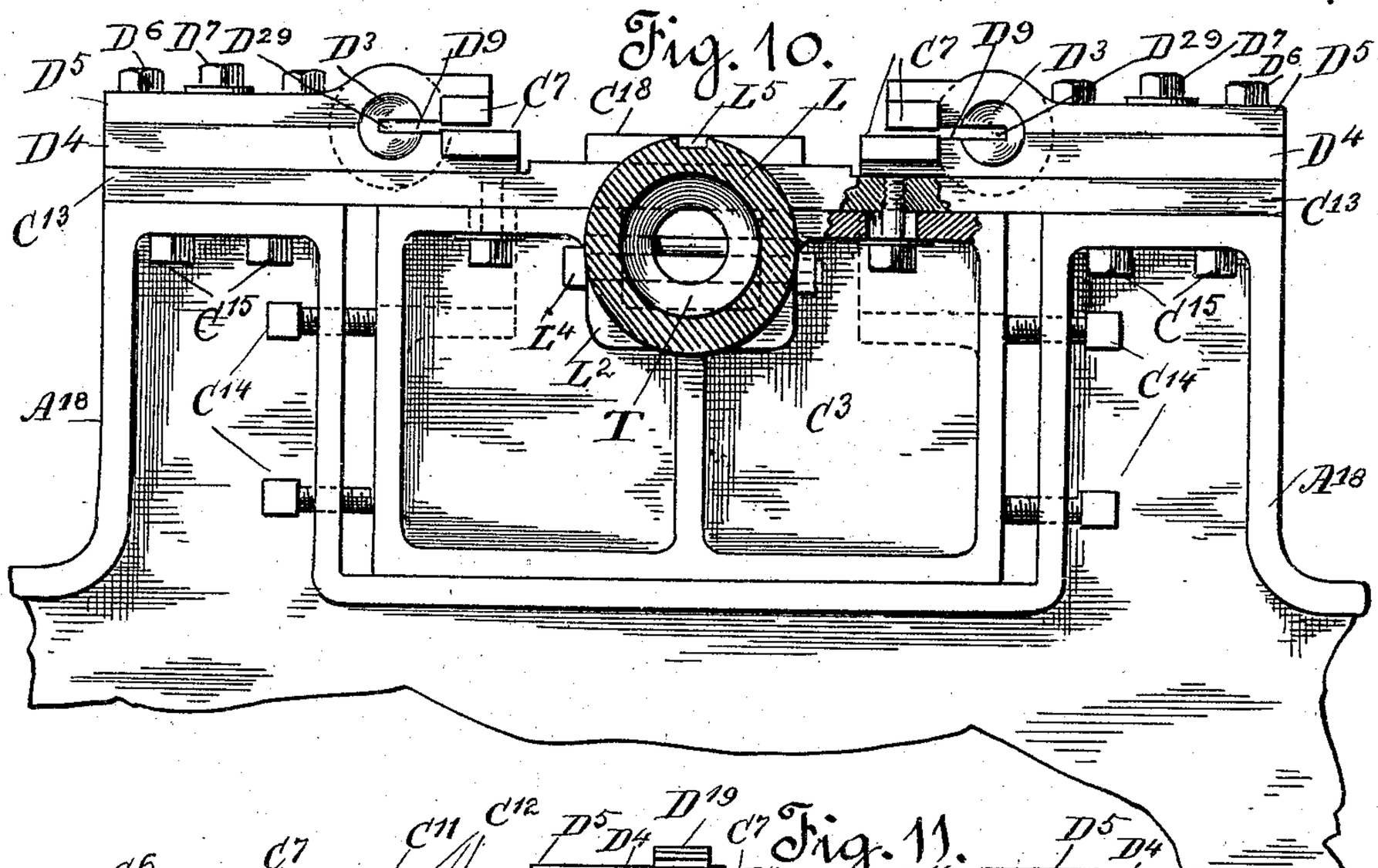
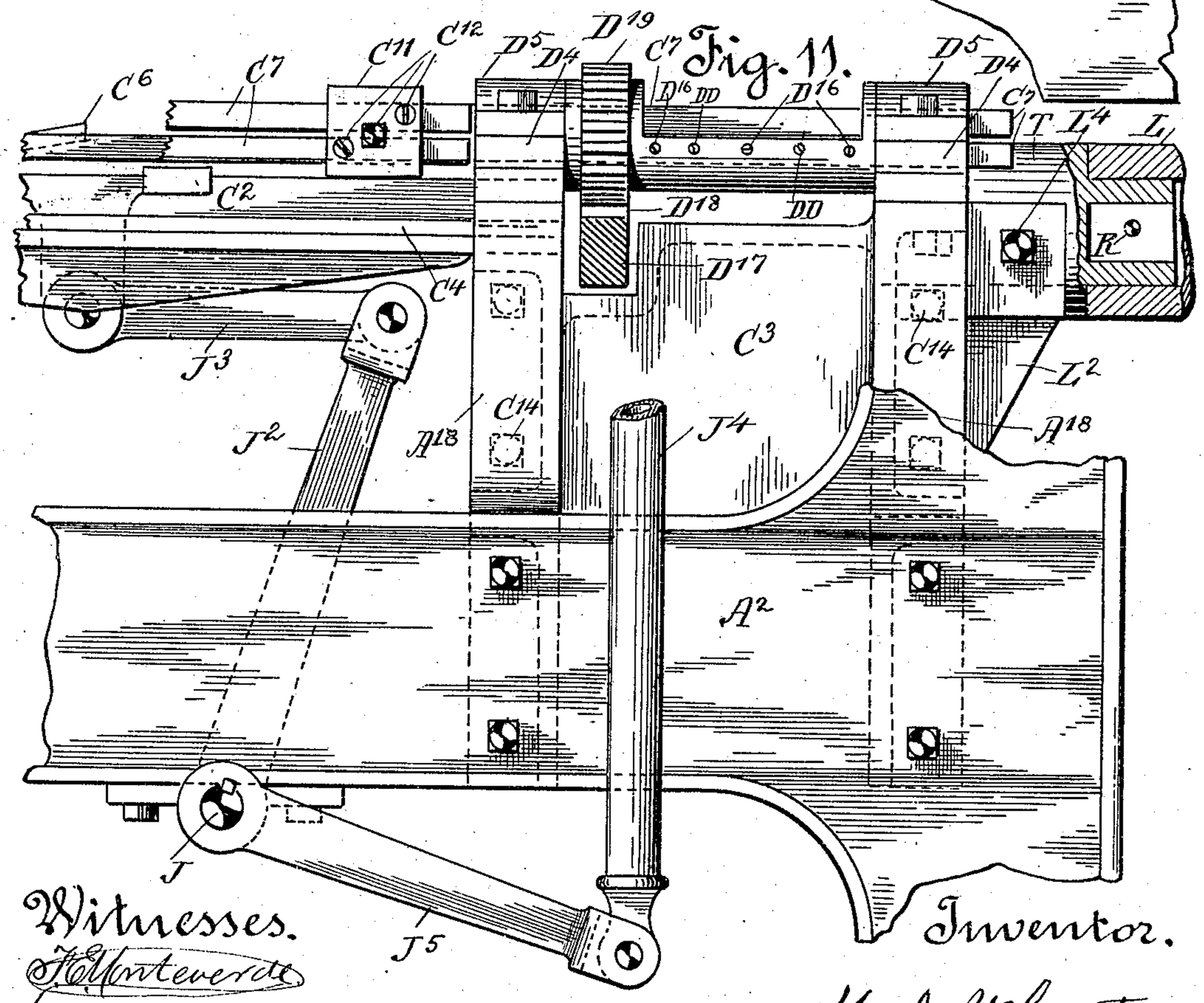


Fig. 11.



Witnesses.

F. E. Mortevedt

W. S. Boyd.

Inventor.

M. A. Wheaton

No. 785,584. PATENTED MAR. 21, 1905.

M. A. WHEATON.

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14 SHEETS—SHEET 8.

Fig. 14.

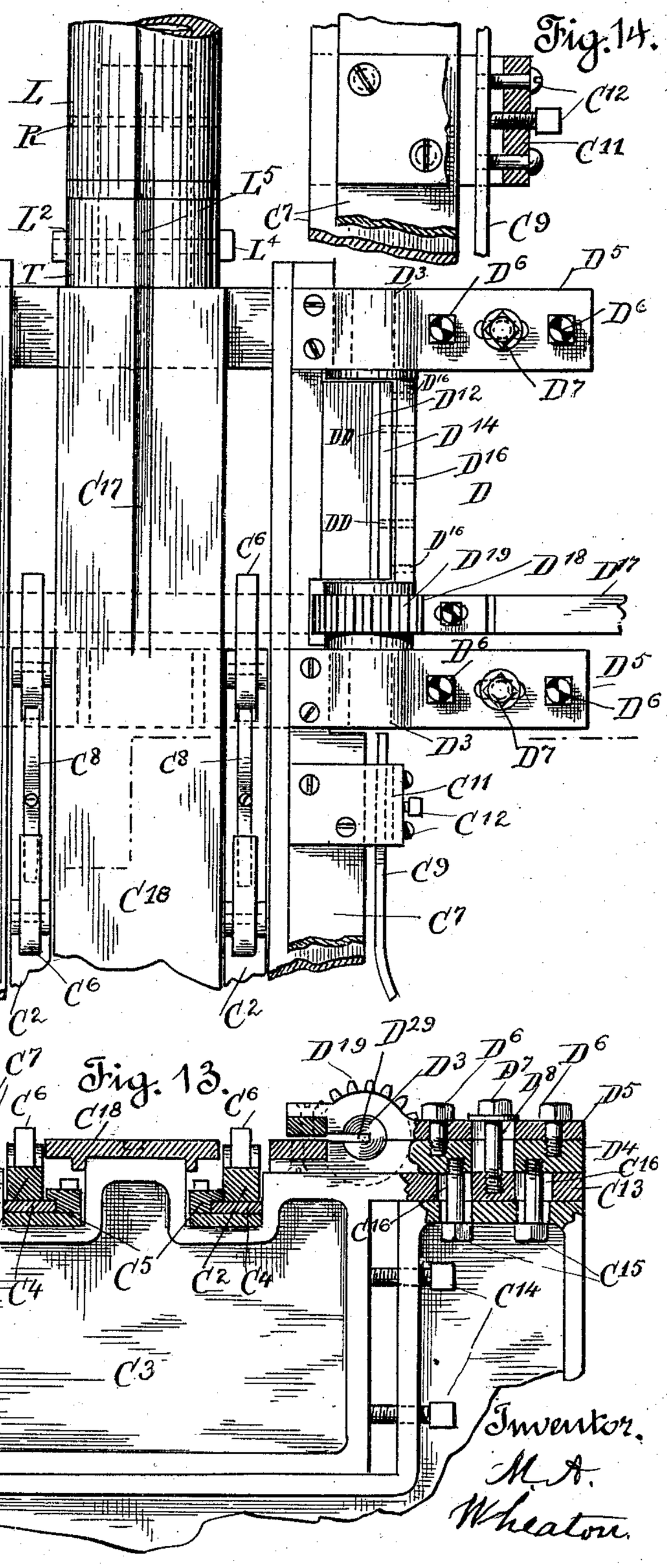

Fig. 13.

Witnesses.
Kellontever de.
W. S. Boyd.

Inventor.
M. A.
Wheaton.

No. 785,584. PATENTED MAR. 21, 1905.

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14 SHEETS—SHEET 9.

Fig. 16.

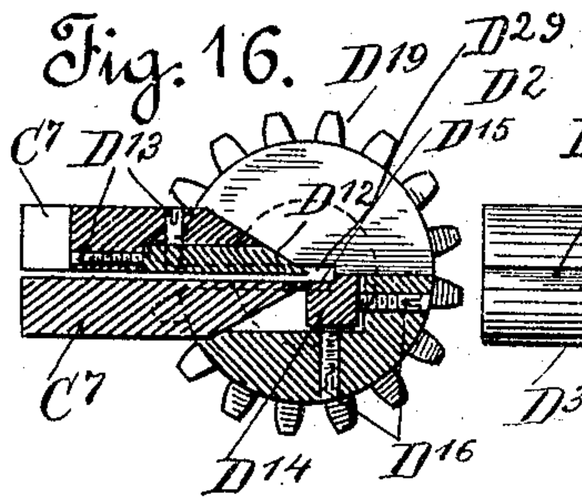


Fig. 15.

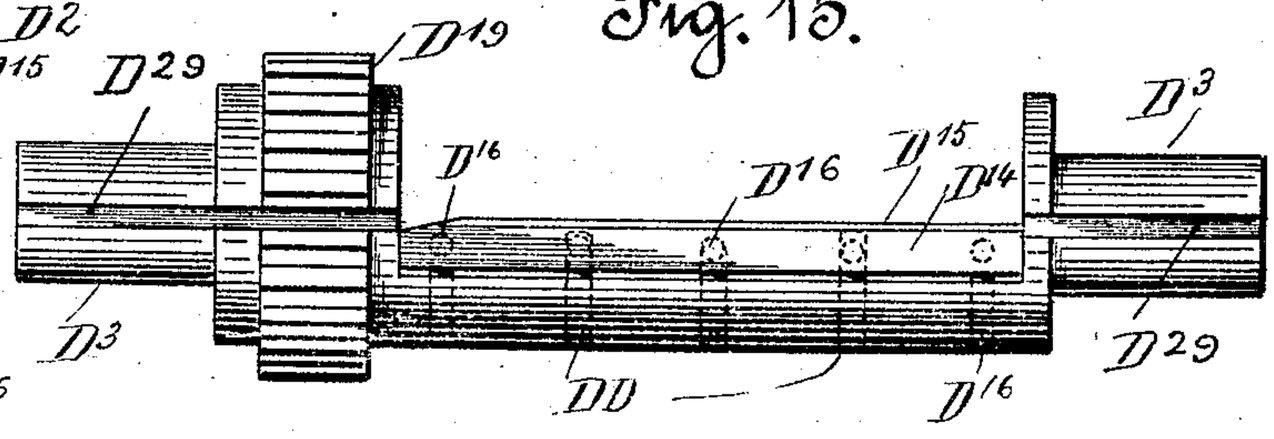


Fig. 17.

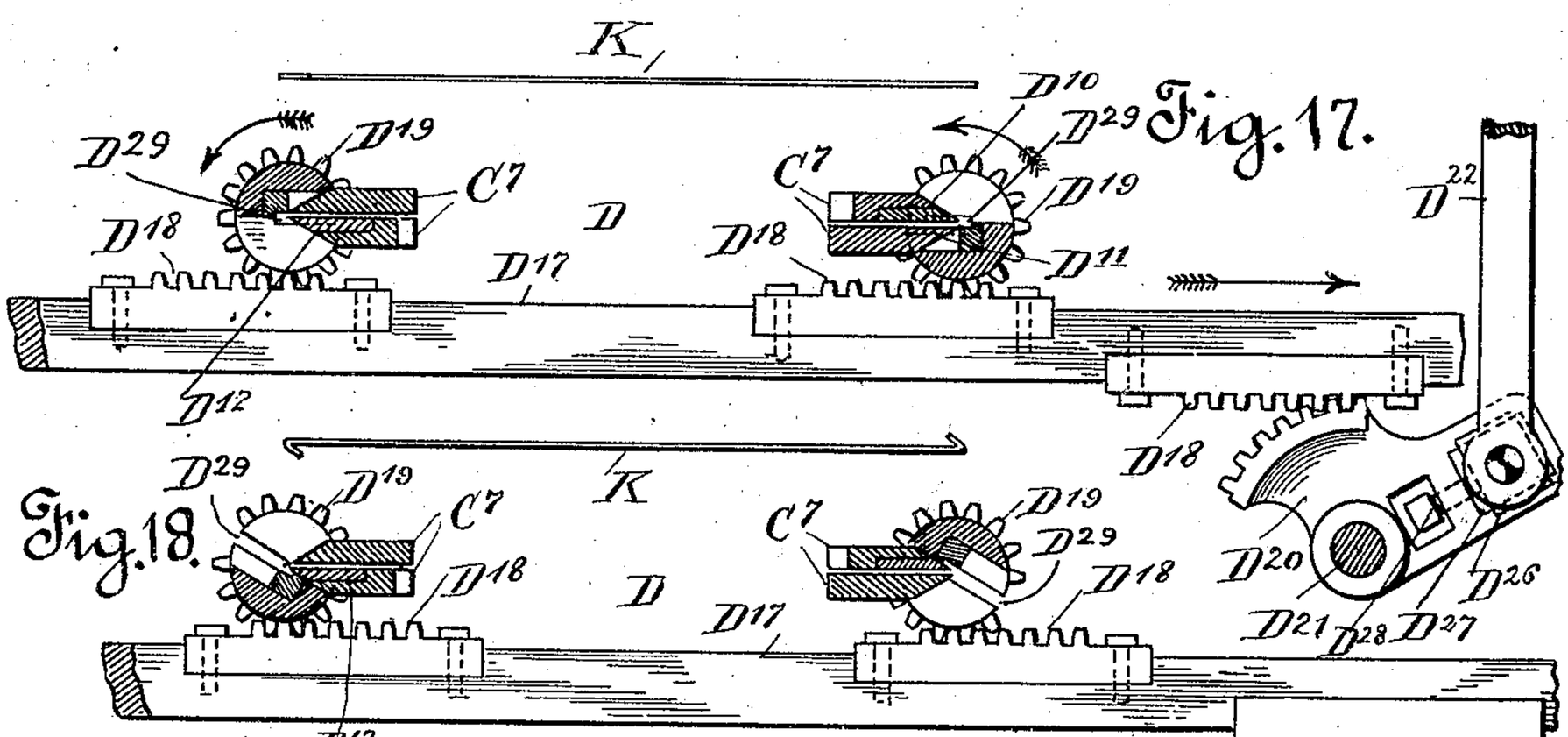
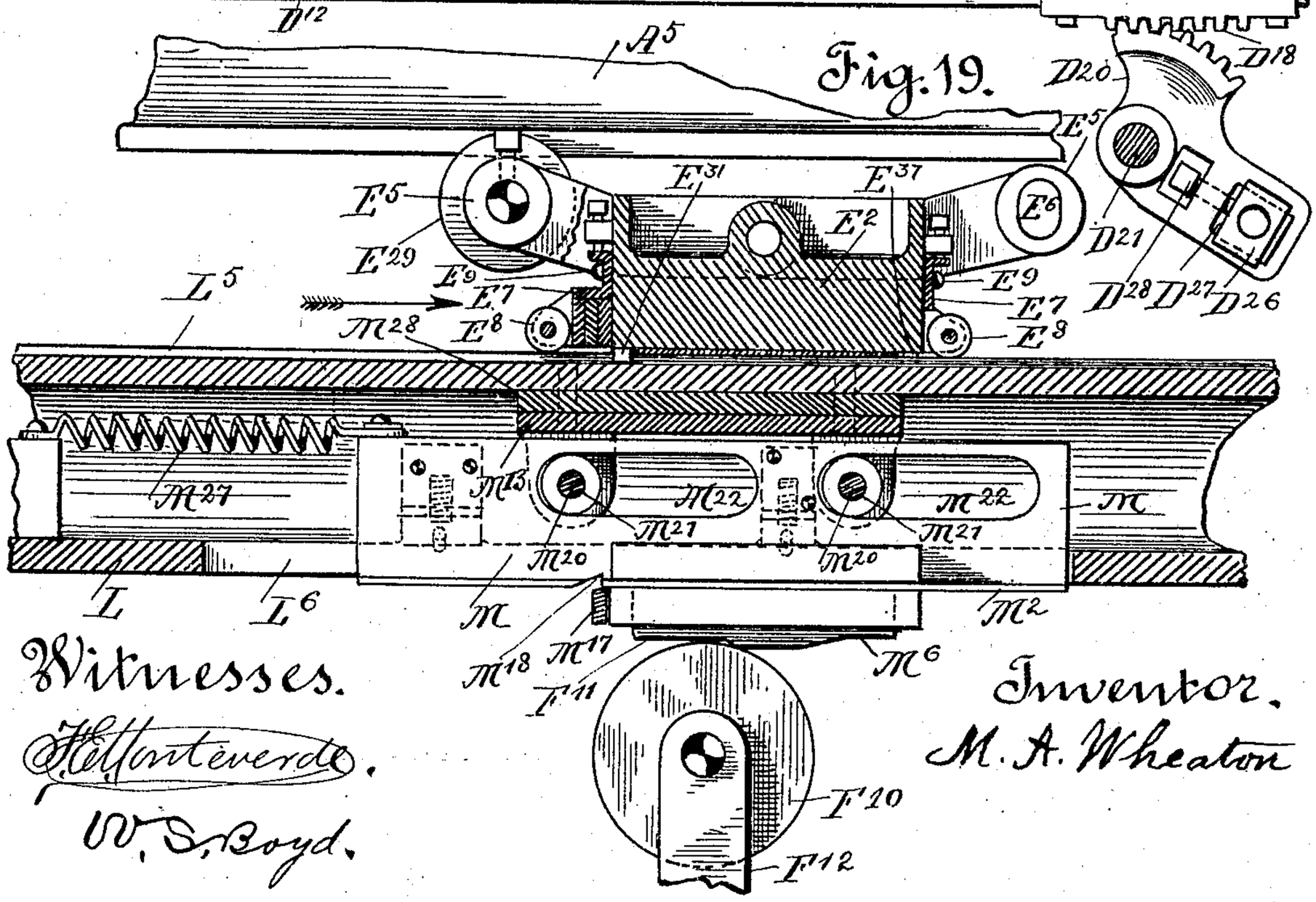


Fig. 18.

Fig. 19.



Witnesses.

H. Hollonteverde.

W. S. Boyd.

Inventor.

M. A. Wheaton

No. 785,584. PATENTED MAR. 21, 1905.

M. A. WHEATON.

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APPLICATION FILED JAN. 2, 1903.

14 SHEETS—SHEET 10.

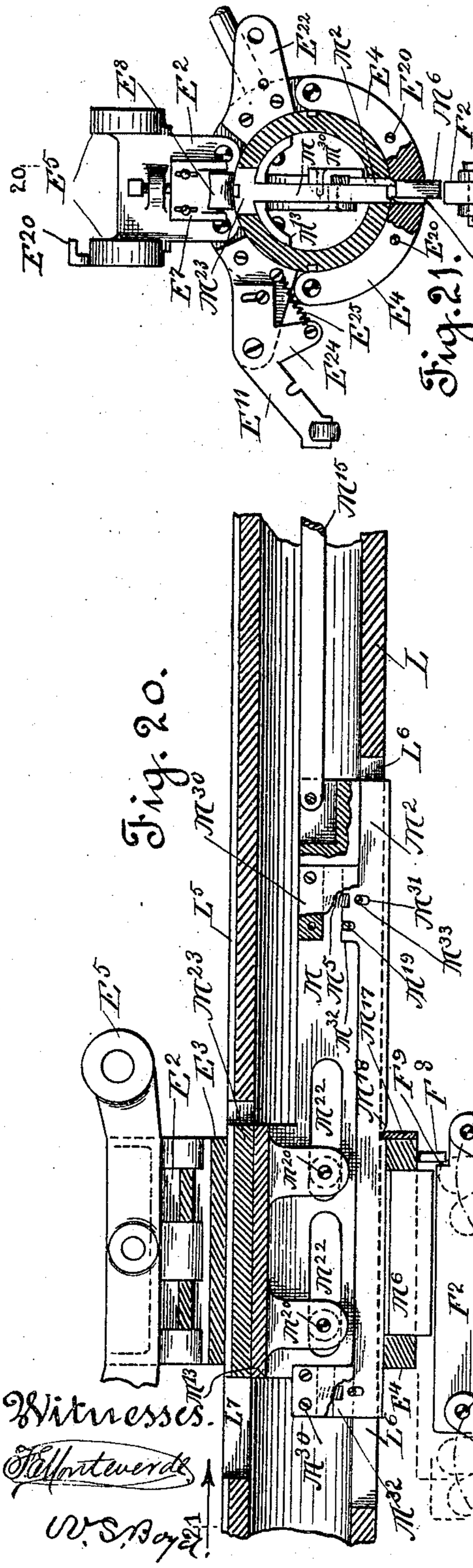

Fig. 20.

Fig. 21.

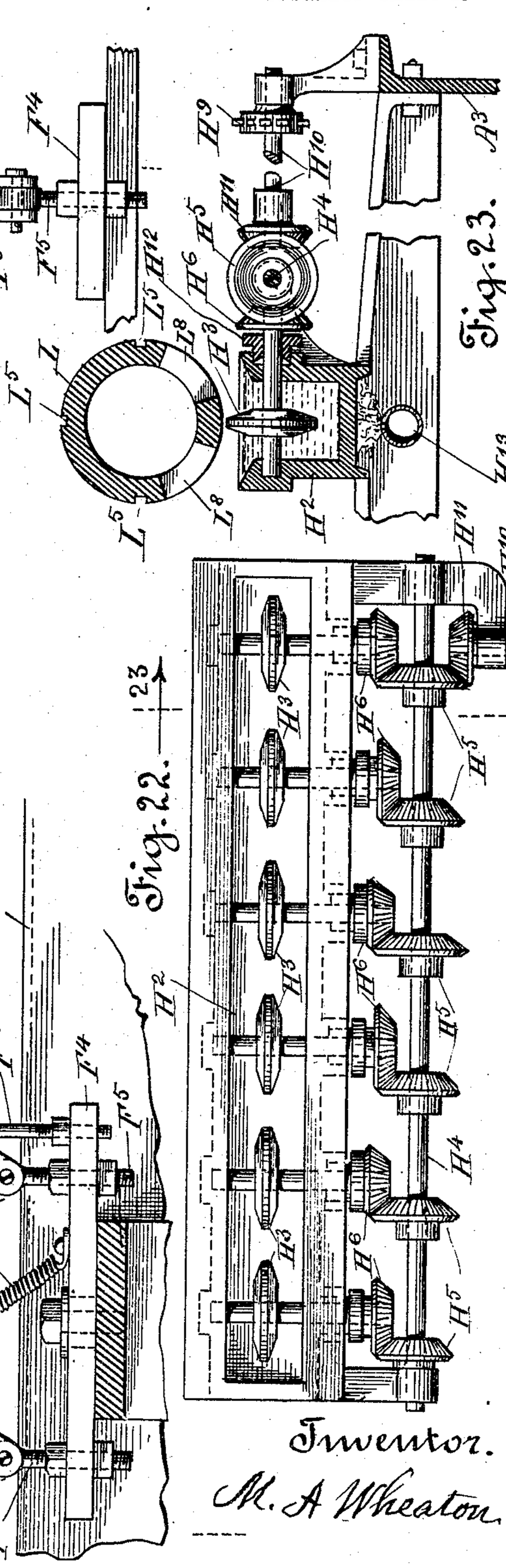

Fig. 23.

Fig. 22.

Witnesses.

Fallonteverde

W. S. Boyd

Inventor.

M. A. Wheaton

PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 785,584. PATENTED MAR. 21, 1905.

M. A. WHEATON.

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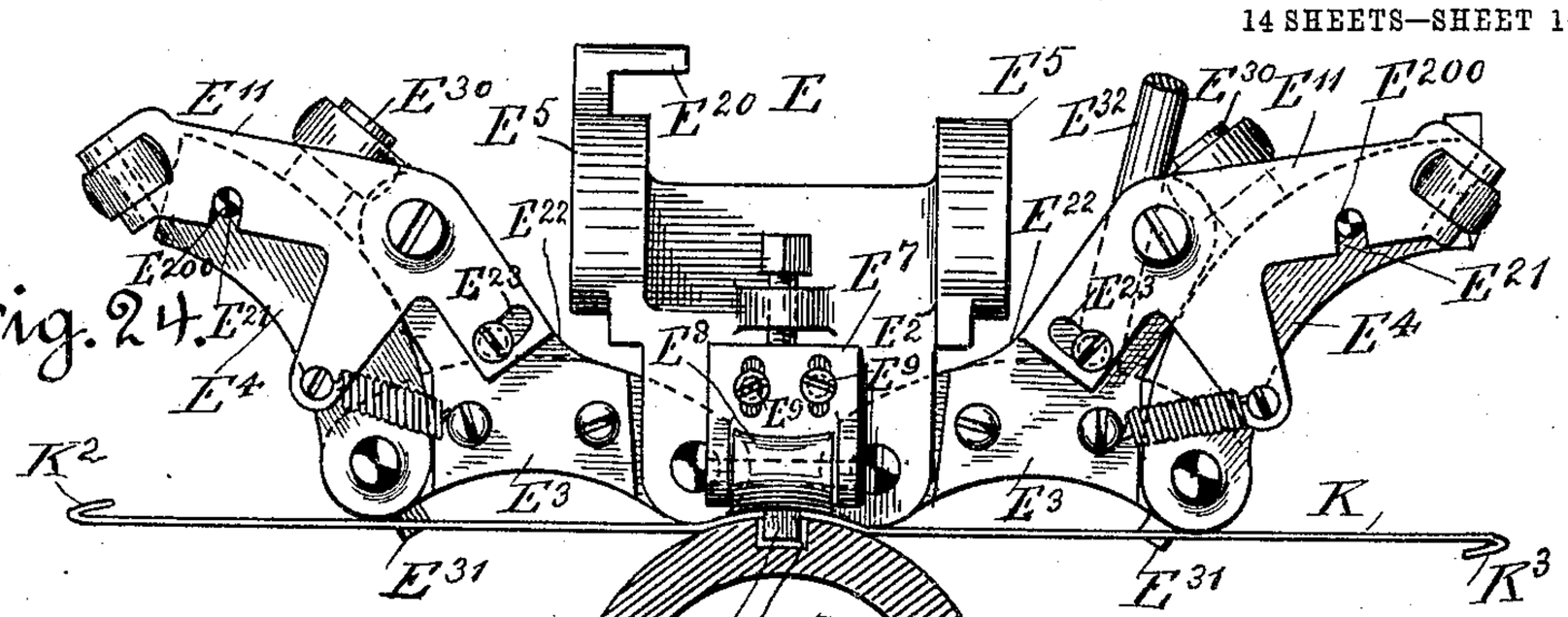
APPLICATION FILED JAN. 2, 1903.

14 SHEETS—SHEET 11.

Fig. 24.



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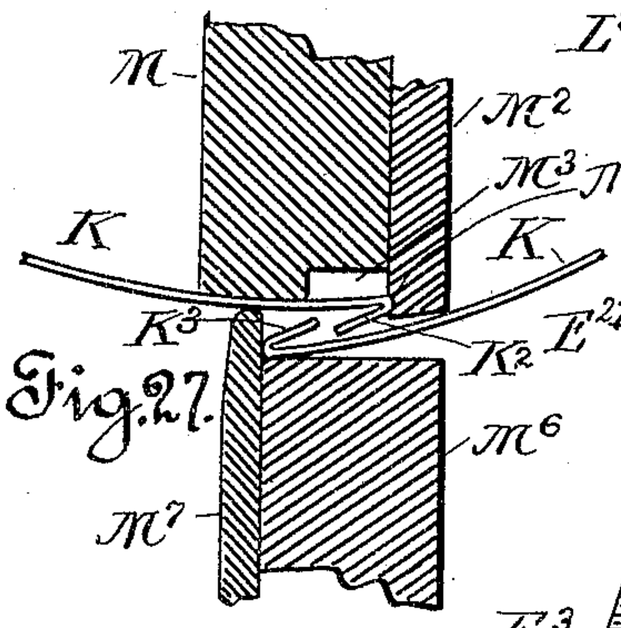

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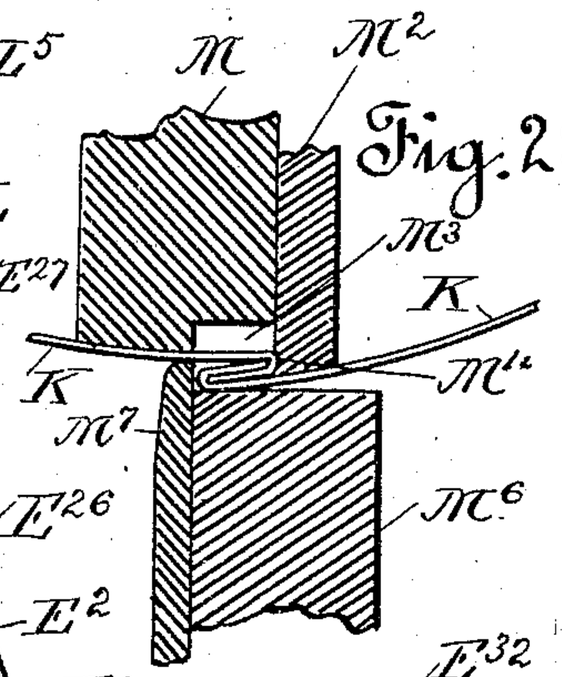

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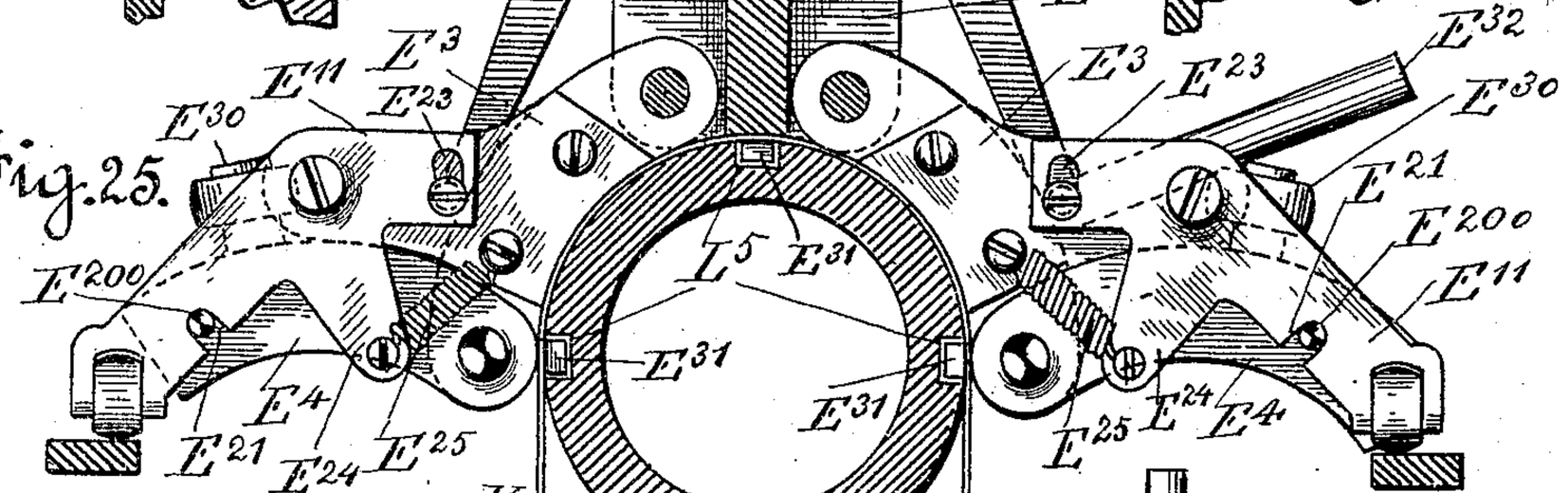

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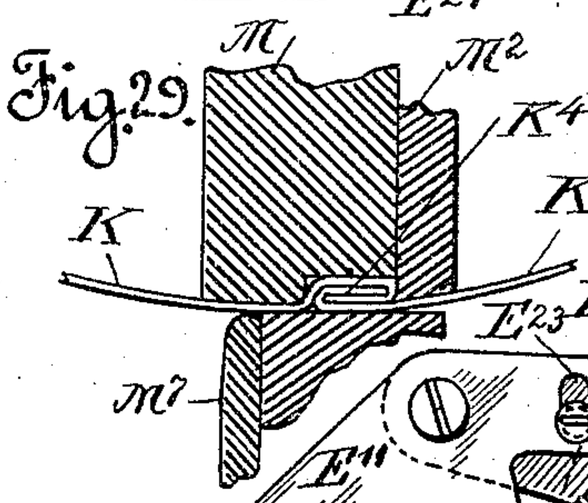

Fig. 26.

Witnesses.
F. A. Winterverde.
W. S. Boyd.

Inventor.
M. A. Wheaton

No. 785,584. PATENTED MAR. 21, 1905.

M. A. WHEATON.

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14 SHEETS—SHEET 12.

Fig. 30.

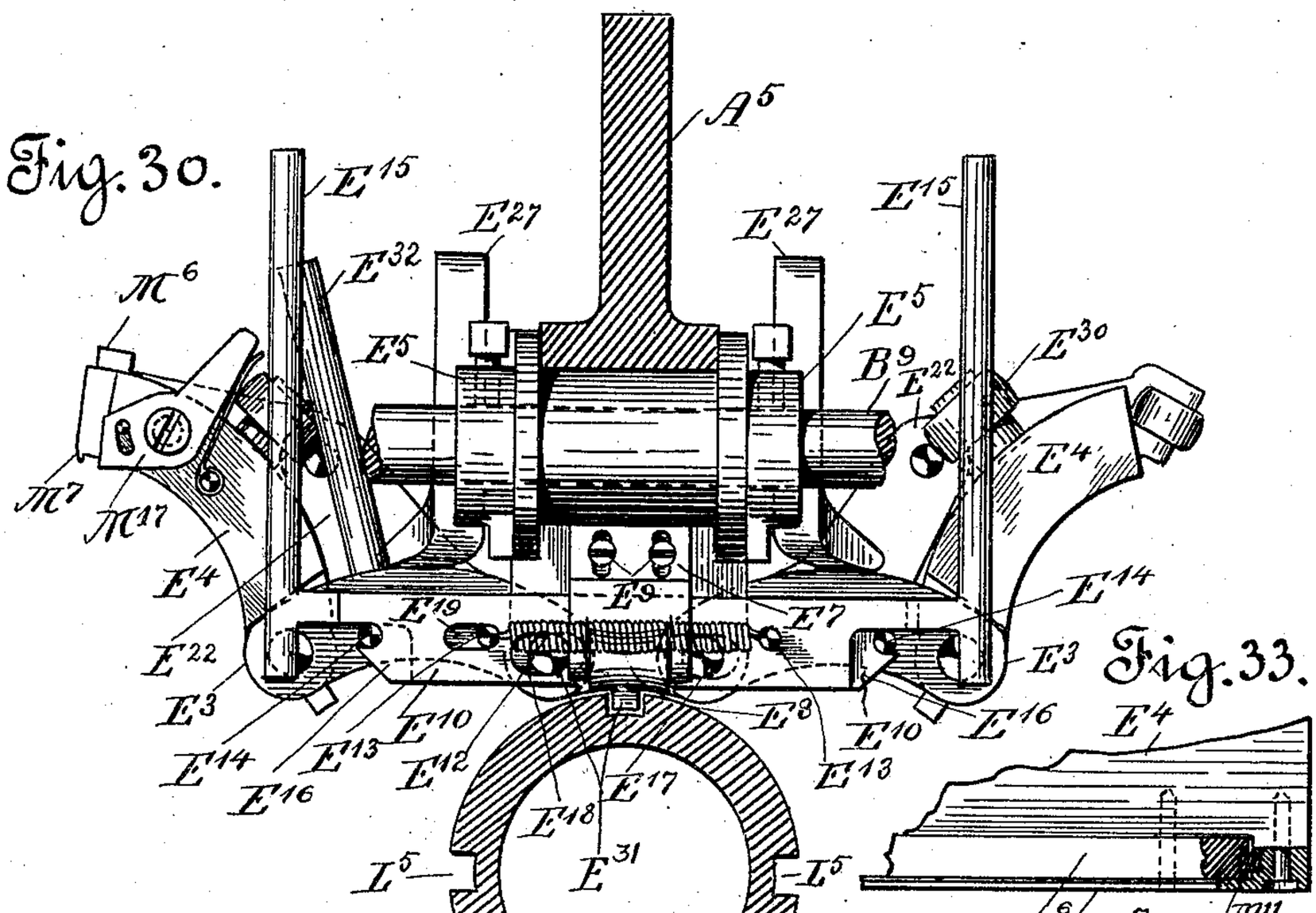
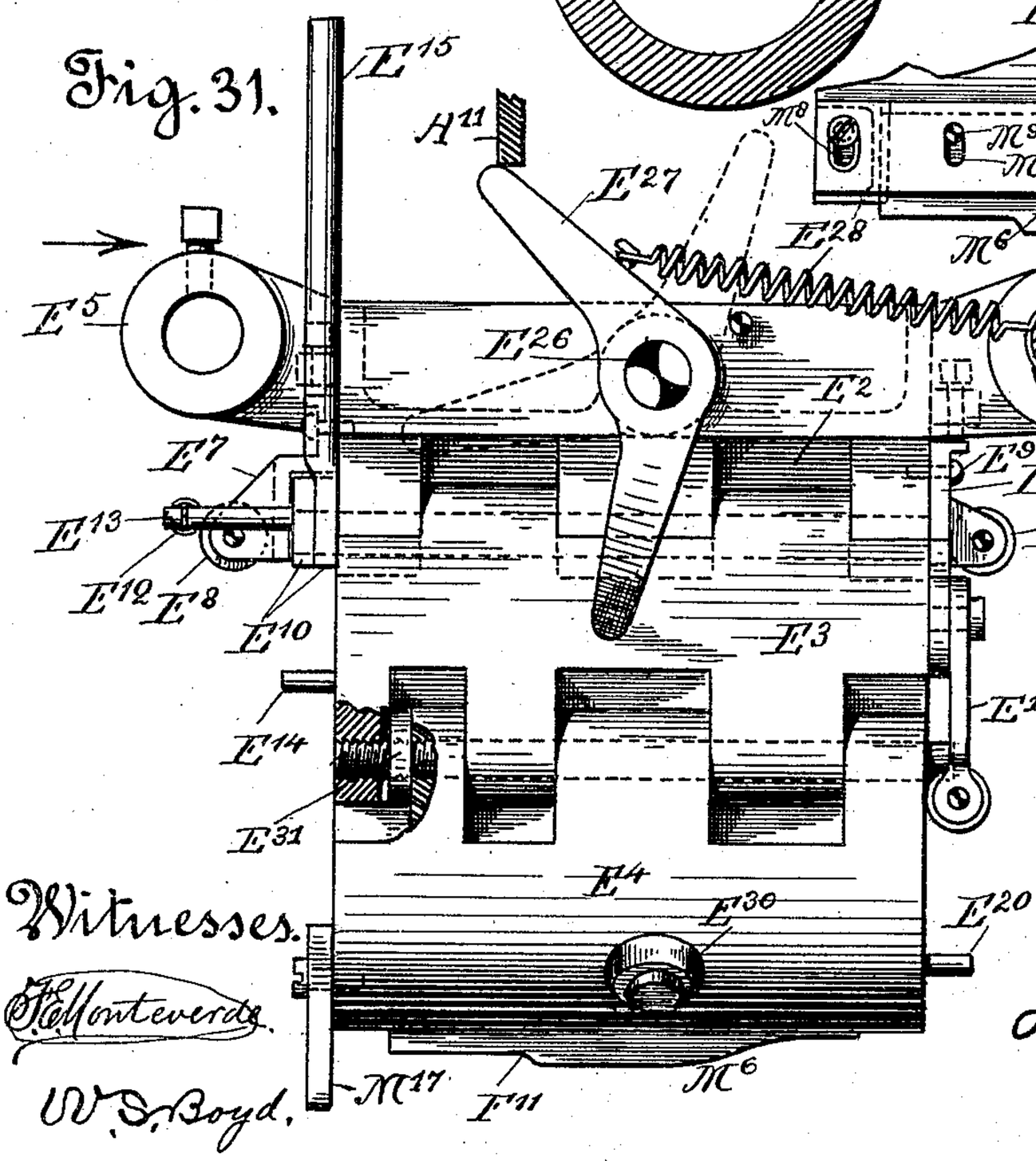


Fig. 33.

Fig. 31.



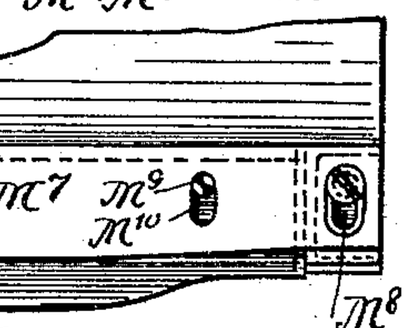
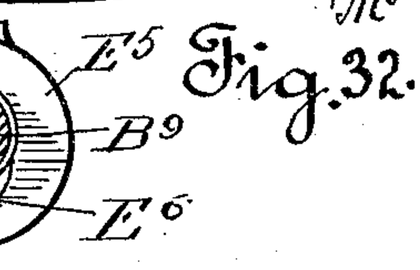


Fig. 32.



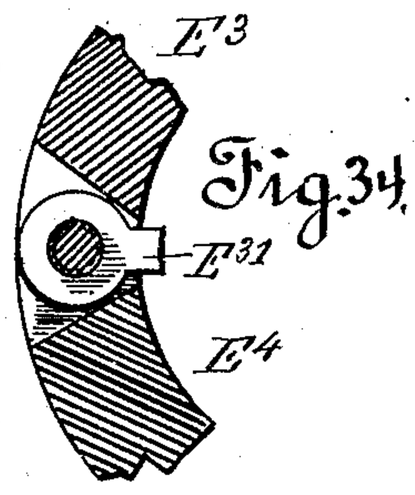


Fig. 34.

Witnesses.

F. E. Monteverde.

W. S. Boyd.

Inventor.

M. A. Wheaton

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14 SHEETS—SHEET 13.

Fig. 35.

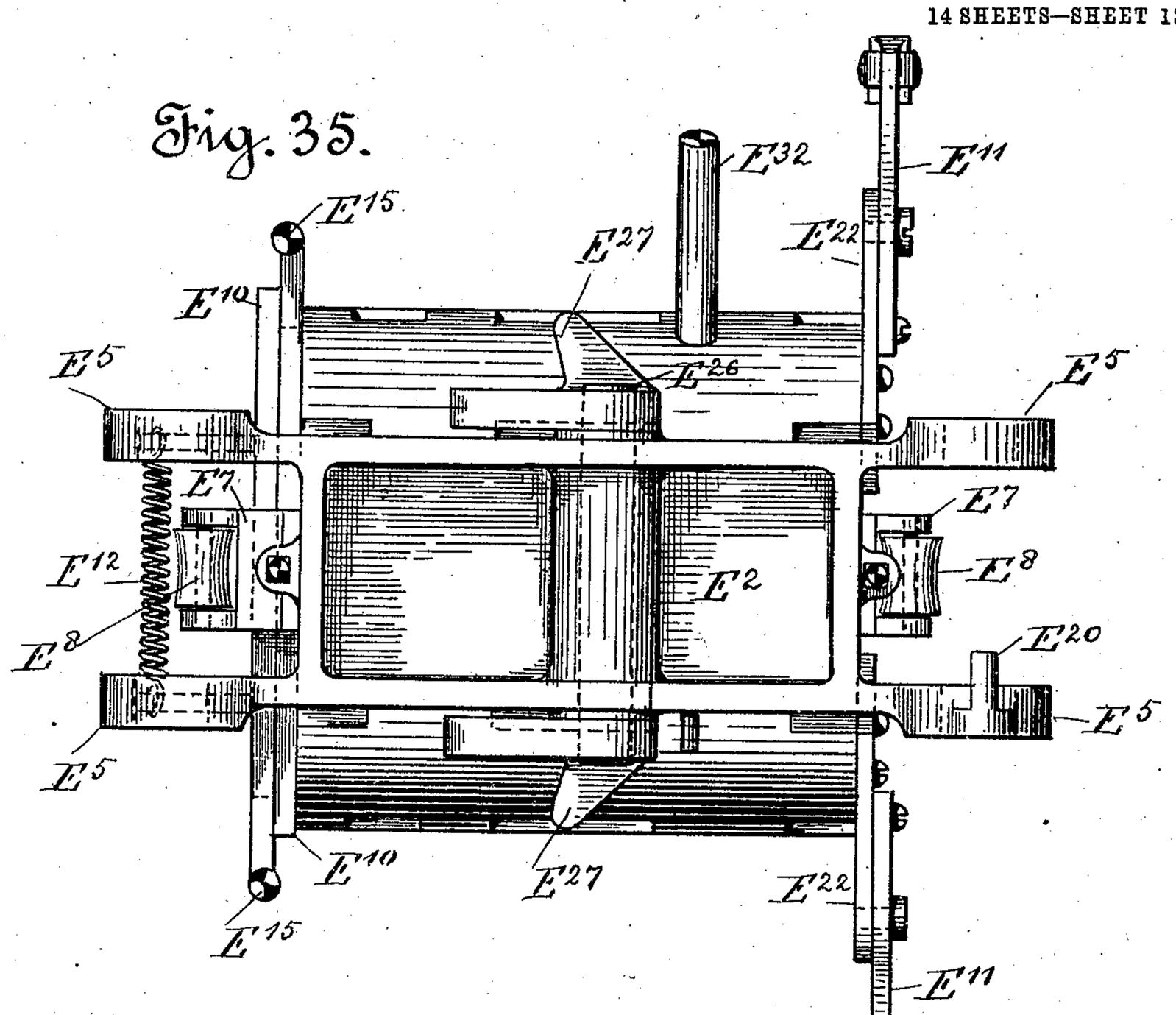


Fig. 36.

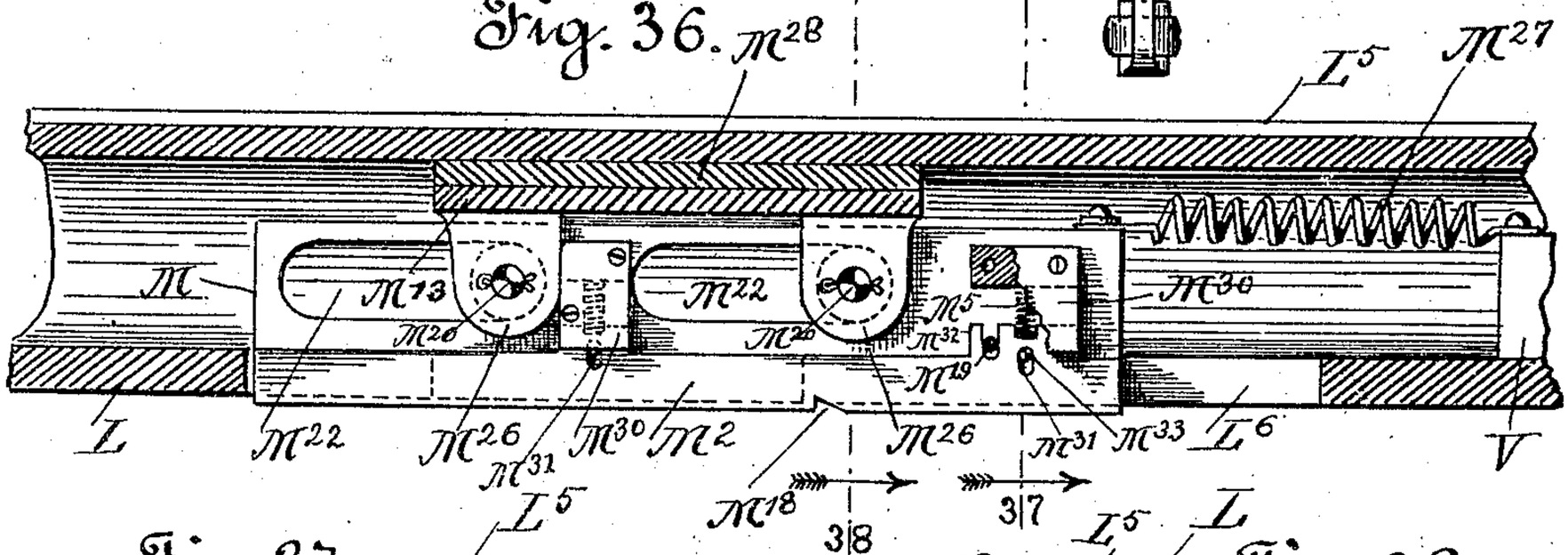


Fig. 37.

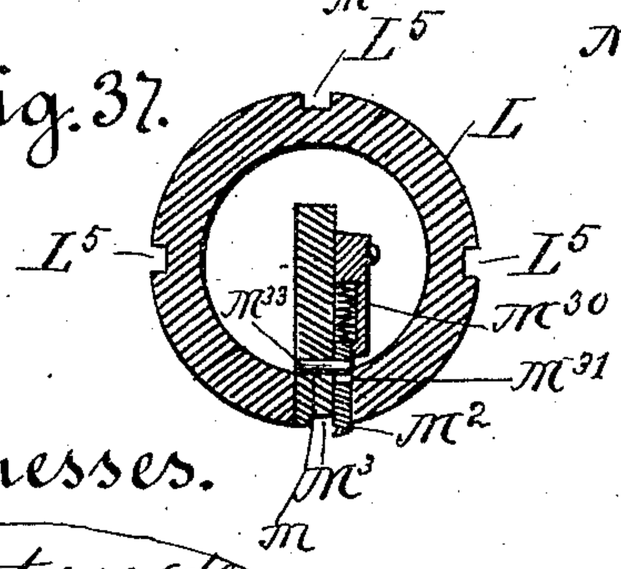
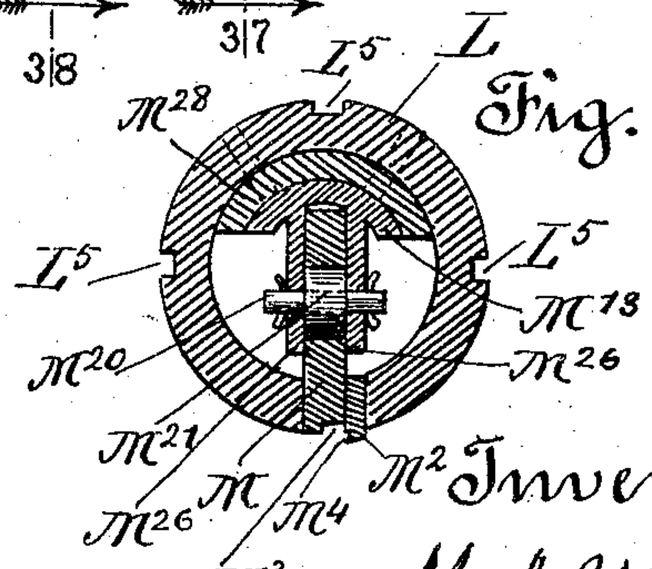


Fig. 38.



Witnesses.

F. E. Monteverde,

W. S. Boyd.

Inventor.

M. A. Wheaton

No. 785,584. PATENTED MAR. 21, 1905.

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14 SHEETS—SHEET 14.

Fig. 39.

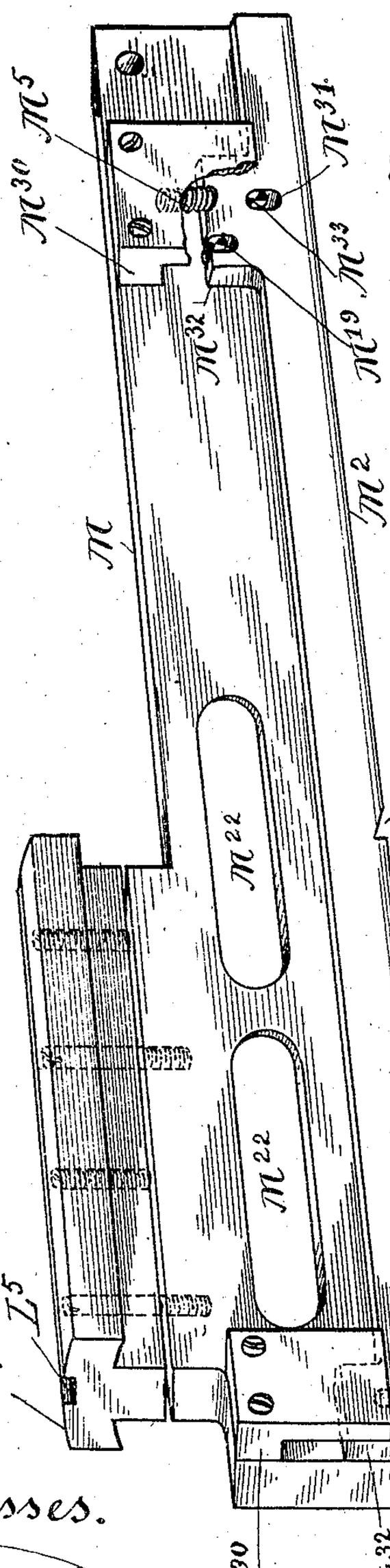

Fig. 41.

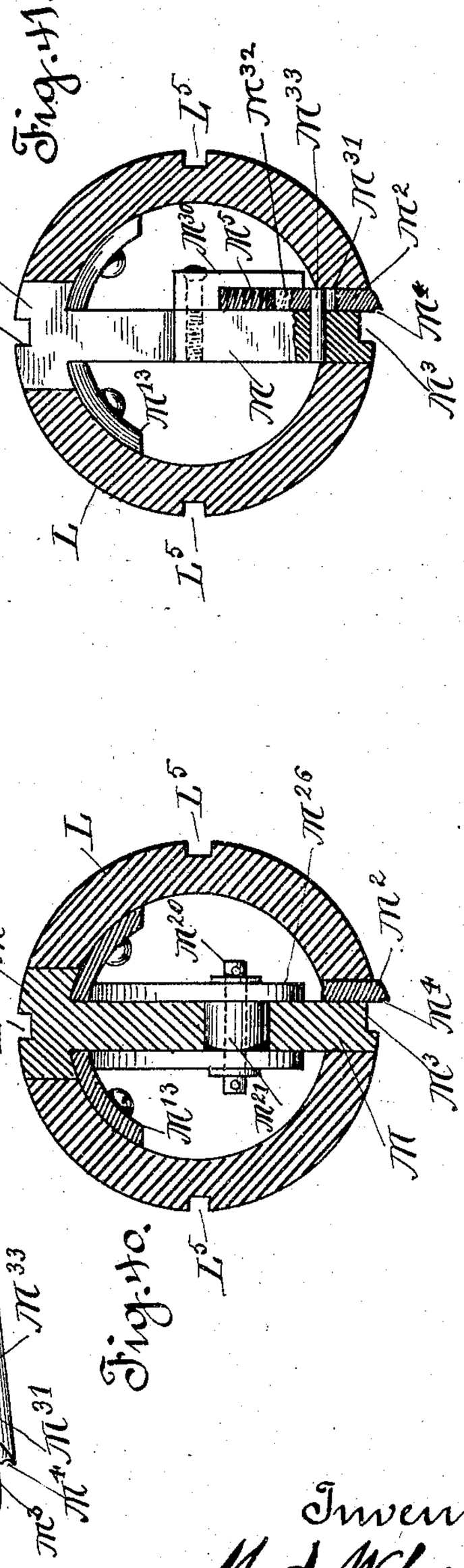

Fig. 40.

Witnesses.

F. Montevercle.

W. S. Boyd.

Inventor.

M. A. Wheaton

No. 785,584. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

MILTON A. WHEATON, OF SAN FRANCISCO, CALIFORNIA.

MACHINE FOR MANUFACTURING SHEET-METAL CAN-BODIES.

SPECIFICATION forming part of Letters Patent No. 785,584, dated March 21, 1905.

Application filed January 2, 1903. Serial No. 137,575.

To all whom it may concern:

Be it known that I, MILTON A. WHEATON, of the city and county of San Francisco, State of California, have invented a new and useful Machine for Manufacturing Sheet-Metal Can-Bodies, and particularly can-bodies that are made of tin, of which the following is a specification.

The operations of can-body machines generally consist of seven fundamental steps. The first is that of receiving the metal sheet, which is commonly called a "blank," and feeding it forward into the machine. The second is the bending or folding of the ends of the sheet over so that they may be subsequently made to interlock and form the side seam of the can-body. One of the ends of the metal sheets is folded over in one direction, while the other end is folded over in the opposite direction. In the specification I use the word "folded" to identify these bent-over ends of the metal sheet. I also use the word "blank" to identify the metal sheet which is made into the can-body. These blanks are cut to exactly the right size to make into the can-bodies before they are fed into the machine. The third step is the bending of the blank into a cylinder around a horn. The fourth is the locking of the folded ends of the blank into each other. The fifth step is the bumping of the interlocked folded ends of the blank, and thus pressing them into a locked seam. The sixth step is the fluxing of the seam by treating it to an acid-bath, and the seventh step is the soldering of the seam. With these operations performed the metal blank is converted into a finished can-body. In my invention I follow these fundamental operations in the order stated, except that I flux the folded ends of the blank before the seam is interlocked and while the blank is only bent half-way around the horn. In other respects I have new ways and new mechanism for performing most of the operations mentioned.

In the accompanying drawings, which are hereby referred to and made a part of this specification, Figures 1 and 2 taken together illustrate in side elevation one form of a machine embodying my invention, some of the parts being omitted to avoid obscurity. Fig. 3 is a front elevation of the same, some of the parts being omitted and others shown in section. Fig. 4 is a broken detail side elevation. Fig. 5 is a broken top plan view of the same. Fig. 6 is an enlarged side elevation, partly in section, showing a portion of the fluxing and seam-forming mechanism, looking in the direction of the arrow 6 in Fig. 7. Fig. 7 is a top plan view of substantially the same. Fig. 8 is a transverse sectional view of a portion of the same parts looking in the direction of the arrow 8 in Fig. 7. Fig. 9 is a cross-sectional elevation showing the fluxing mechanism and part of the body-forming mechanism. Fig. 10 is a transverse sectional elevation showing the horn in cross-section and also one end of the folding devices. Fig. 11 is a side elevation showing a portion of the folding apparatus and other parts. Fig. 12 is a top plan view of substantially the same. Fig. 13 is a transverse sectional view of the same, taken along line 13 of Fig. 12. Fig. 14 is an enlarged detail view of a portion of the guides that direct the blank to the folders, showing adjusting-screws. Fig. 15 is an enlarged side elevation of one of the folding devices. Fig. 16 is a transverse sectional view of the same with the guides for the blanks added. Figs. 17 and 18 are transverse sectional elevations of the folder-operating mechanism, the folders being shown in two positions and a blank K being twice shown, once before its ends are folded and again after its ends are folded. Fig. 19 is an enlarged longitudinal sectional view of the greater portion of one form of the seam-forming mechanism. Fig. 20 is a similar view of a modified form of the same, taken on line 20 of Fig. 21. Fig. 21 is a transverse sectional view of the same looking in the direction of the arrow 21 in Fig. 20. Fig. 22 is a top plan view of the soldering apparatus. Fig. 23 is a transverse sectional view of the same looking in the direction of the arrow 23 in Fig. 22 and showing its position relatively to the horn. Figs. 24, 25, and 26 are enlarged transverse sectional views of the body-forming mechanism, the former being shown in three different positions and the blank in two positions, the blank being omitted from View 26. Figs. 27,

28, and 29 are enlarged detail views of a portion of the seam-forming mechanism, showing the seam open, partly closed, and entirely closed, respectively. Fig. 30 is a transverse sectional view showing the former locked open, its wings being swung back to their greatest limit, and also showing other parts connected therewith. Fig. 31 is a side elevation of the former partly closed, the device for positively forcing down the upper wings of the former being shown in two positions, one being in dotted lines. Figs. 32 and 33 are a broken side elevation and a plan view, respectively, of part of the bumping or seam-closing devices. Fig. 34 is an enlarged detail view showing a part of the hinge between the first and second wings and one of the studs that carry the blank forward. Fig. 35 is a top plan view of the former closed. Fig. 36 is a longitudinal sectional view of a slightly-modified construction of a portion of the seam-forming mechanism. Figs. 37 and 38 are transverse sectional views of the same, taken on lines 37 and 38, respectively, of Fig. 36 and looking in the direction of the respective arrows. Fig. 39 is a perspective view of a portion of the seam-forming mechanism, and Figs. 40 and 41 are cross-sectional views showing details thereof.

In the drawings, A is the main frame, and comprises the two end frames A^2 A^2, which are joined together by side rails A^3 A^4, showing an intermediate support. Two shafts B^2 B^2 are journaled upon the frame, one being at each end thereof, and upon each one of the shafts B^2 are mounted two sprocket-wheels B^3 B^3. An additional shaft B^4 is journaled on the front end frame A^2 and receives power through a pulley B^5, which power is transmitted to the adjacent shaft B^2 through a gear-wheel B^6 and a pinion B^7, Figs. 1, 2, and 3. The pinion B^7 is on the shaft B^4. The gear-wheel B^6 and the pinion on shaft B^4 are indicated by dotted lines in Fig. 1.

The sprocket-wheels B^3 carry an endless double sprocket-chain that travels constantly in one direction when the machine is at work. Each one of the double sprocket-chains (marked B in the drawings) is composed of a series of links B^8, flexibly secured together by transverse link-rods B^9. Each one of these link-rods B^9 reaches across, so as to pass through the links of both the sprocket-chains, and connects the links together at their joints. It also reaches far enough beyond the links to engage with the sprocket-wheels B^3 and also to rest upon longitudinal rails or runways A^8, which are supported parallel with and at a short distance from two tracks A^5 and A^6. The two tracks A^5 and A^6 are secured longitudinally with the frame, one above the other, the top one being supported upon brackets A^7, which rise from the main frame. (See Figs. 1, 2, 3, and 7.) The outer ends of the link-rods may be shouldered and the links secured thereon by pins B^{10}, Fig. 7. The bearing for the shaft B^2 at the discharge end of the machine is fastened with bolts to the main frame, Fig. 2. The holes through which these bolts pass are slotted, so that the bearing can be moved back and forth to adjust the tension of the traveling sprocket-chain carrier B.

The feeding mechanism comprises a reciprocating carrier C^2, Figs. 11, 12, and 13, which is supported on a table or platform C^{18} at the front end of the machine. The carrier is provided with plates C^4, which move back and forth in guideways C^5 of the platform, also with spring-actuated pawls or abutments C^6, which are fixed in the table and the forward ends of which normally project above the top thereof, and also with longitudinally-extending guide-bars C^7. The pawls C^6 are arranged in pairs and are each pivotally secured at its rear end, while its forward end may move up and down, but is normally held upward at an angle by a spring C^8. When the carrier is moved backward toward the front of the machine, the high end of the first set of pawls will be pressed down by and pass under the blank; but when the carrier is moved forward toward the back end of the machine these pawls being in their normal position will engage with the back edge of the blank and move it forward a distance equal to the length of the stroke or movement of the carrier. As the carrier returns another set of the pawls will be drawn under the blank and will engage with it and carry it forward the length of another stroke of the carrier. The last set of pawls will place the blank in the folding mechanism D, hereinafter described, and will leave it there to be operated on by other mechanism. As the blank is pushed forward by the said pawls it is carried between the guide-bars C^7, Figs. 11 and 12, and it is also kept in position endwise by two adjustable side guides C^9 and C^{10}. An enlarged sectional view of two of the guide-bars C^7, with the side guide C^9 and adjusting-screws C^{12} passing through a supporting-bracket C^{11} for adjusting the position of the side guide, is shown in Fig. 14. Both of the side guides, with their relation to the other mechanism, are shown in Fig. 12. One of the guide-bars C^7 lies above the other, so that the blank may slide between them, and they are held in their relative positions by strong U-shaped supporting-brackets C^{11}, Figs. 11, 12, and 13. The guide C^9 is preferably shorter than the other and may have its end curved a little outward and may also be left to spring outward, so as to facilitate the entry of the blank when it is placed upon the table, with one end butted up against the longer projecting end of the guide C^{10}. The adjusting-screws are operated by having two of them screw into the side guide and draw it outward, while the middle screw is threaded to screw through the bracket and have its point push the side guide inward. By these means the side guides

can be adjusted to the exact position desired. Besides these means of adjustment the table itself is so supported in recessed brackets A^{18} in the front end frame A^2 by means of flanges C^{13} that it can be adjusted laterally by screws C^{14} and held in that position by vertical screws C^{15}, which project through slots C^{16} in said flanges, Figs. 10 and 13. The carrier is reciprocated by means of a bell-crank lever having arms J^2 and J^5 and turning upon the pivot J, a link J^3, that joins the top of arm J^2 of the bell-crank lever with a descending lug of the carrier, and a pitman J^4, that is moved up and down vertically by a crank-arm J^6 on the end of the shaft B^4, Figs. 1, 3, and 11. The length of the movement is adjustable by means of a slot J^7 through the arm J^6, that allows the wrist-pin to slide lengthwise of the arm and be fastened at a greater or less distance from the shaft B^4, thereby making the distance that the pitman J^4 will move up and down greater or less, as may be desired, and also by means of a turnbuckle J^8 in the pitman J^4, Fig. 3, which can be used to make the pitman longer or shorter at will. After the blank has been pushed by the feeding apparatus into the folding mechanism D its end edges are turned partly over in opposite directions, as shown at K^2 and K^3 in Fig. 24. These end edges are so bent over as to be subsequently interlocked and pressed together, thus making the side seam of the can-body, as shown at K^4, Fig. 29. The folding mechanism comprises two oscillatory longitudinally-slotted folders D^2, each of which is provided with a journal D^3 at each end, which is mounted in bearings formed in plates D^4 and caps D^5, Figs. 10, 11, 15, 16, 17, and 18. The plates are secured above the flanges C^{13} by screws C^{15}, and the caps are held in position on the plates by screws D^6, Fig. 13. Each plate and cap is adjustably held in position by the screw D^7, which passes through the slots D^8. The inner ends of the plates and caps are recessed or cut away, so as to form a slot D^9. (Shown in Fig. 10.) This opening registers with the opening between the guide-bars C^7 and also with the slots D^{29}, cut through the round parts of the oscillating folders. The object of these registering openings is to form a continuous opening through the several parts, so that the blank will have a continuous open passage into the folders and also out of the folders after its ends are folded over. The guide-bars C^7 pass longitudinally beyond the folders, but are cut away so as to allow the journals and round parts of the folders to be set back into them. This is necessary, because the space between the upper and lower bars C^7 is the passage-way for the blanks and each blank must have each of its ends extend to and a little beyond the axial line of the folder's rotation. The folders also are each cut away fully one-half of its diameter to make room for the edges of the bars C^7 to reach to the axial line of the folder's rotation. The margin of each of the bars C^7 is beveled, D^{10} and D^{11}, Fig. 17, to an edge along that portion of them which is adjacent to the cut-away portion of the folders. The sharp edge of one of these bars C^7 in each folder is adjusted so as to be on the axial line around which the folder rotates. The other one of the bars C^7 in each folder is also beveled, as shown in Fig. 16 and in other figures. The object of thus beveling the edges of these plates is to furnish room for the folder to oscillate in and also to furnish a sharp edge bearing around which to bend the end of the blank and form the fold. As one end of the blank is folded around upwardly and the other end is folded around downwardly, it is necessary that the edge of the upper bar C^7, around which the fold is bent upwardly, should be located along the axis of the folder's oscillation and that the edge of the lower bar C^7, around which the fold is bent downwardly, should also be located on the axial line of the folder's oscillation. To assist in obtaining an exact adjustment of the part of the folder that turns the end of the blank over to form the fold, I cut away more material from the folder and place in it a butting bar D^{14}, Figs. 15 and 16. This butting bar has a shoulder D^{15} along its length, against which the end edge of the blank rests. This shoulder should be adjusted so that it will bend the end of the blank over and in close contact with the edge of the bar C^7, that is fixed at the axial line of the folder's oscillation. These abutting or adjusting bars D^{14} are fixed and held in position by means of screws D^{16} and D D, Figs. 15 and 16. As shown in Fig. 16, these screws are set quartering or at right angles to each other. There are five screws in each line. Two of the screws in each line are marked D D. These two screws are threaded into the bar and tend to pull it against the folder. The other three screws in the line are each marked D^{16}. These are threaded through the folder and tend to push the bar away from the folder. The two lines of screws being at right angles to each other will not admit of any great amount of adjustment of the bar; but by putting the screws in a little loose enough movement is obtained to fix the exact and delicate adjustment required. The folders are oscillated simultaneously by means of a reciprocating bar D^{17}, which is arranged transversely of the machine. The folders each have a gear-wheel D^{19} fixed upon its journal. Upon the bar D^{17} are fixed two racks D^{18} D^{18}, and into these racks are meshed the gear-wheels of the folders, so that as the bar is reciprocated the folders are oscillated. Another rack D^{18} is attached to the under side of the bar D^{17}, and this rack is engaged with and driven by the segmental rack D^{20}. (See Figs. 17 and 18.) The rack D^{20} is rocked on its pivot D^{21} by a pitman D^{22}, which is reciprocated by a

pear-shaped cam D^{23}, having a pear-shaped cam groove or channel cut in its face adjacent to its periphery on the shaft B^4, Figs. 1, 3, and 17. The upper end of the pitman is slotted longitudinally, as shown at D^{24}, Fig. 1, to allow the shaft B^4 to pass through it, and thereby guide it in a straight line as it moves up and down. This pitman is also provided with a stud or pin D^{25}, which engages with the cam-groove and carries the pitman up and down. An antifriction-roller may be mounted on the pin and travel in the cam-groove, and thus avoid friction. The amount of the reciprocation of the folders is regulated and adjusted by securing the lower end of the pitman D^{22} in a block D^{26}, which can be moved in a slot D^{27} in the segmental rack D^{20} by an adjusting-screw D^{28}, Fig. 18. The movements of the folders are so timed that they can be rotated to form the folds after the blank has been deposited therein and before it can be moved forward beyond them. For this purpose the pear-shaped cam D^{23} is made very abrupt, so as to actuate the folders very quickly, and by properly arranging the parts the abrupt portion of the cam is made to act while the parts are descending, thereby utilizing the weight of said parts to assist in operating the folders while they are doing the work of bending over the ends of the blank. The folders rotate to the distance required to sufficiently bend over the end of the blank and immediately return to their original position while the blank remains in them. This is requisite in order that the slotted passage-way through the folders for the ends of the blank to pass through may register with the passage-way for the blank between the upper and lower bars C^7, and thus allow the blank to pass on beyond the folders. As a convenient way of obtaining the sharp edge for the folders to bend the ends of the blank over I cut away the inside face of each one of the bars C^7, that has the axial edge around which the end of the blank is folded, and place in the space thus cut away a thin wear-plate D^{12}, Fig. 16. The wear-plate runs the length of the beveled part of the bar and is wide enough to furnish a good surface for securing it to the bar. It may be held by countersunk screws D^{13}, passing through it into the bar that carries it. The holes through which the screws pass may be somewhat larger than the screws, and thus leave room for adjustment. The edge of the wear-plate when used becomes the sharp edge around which the ends of the blanks are folded, and is placed at the axial line around which the folder oscillates. After the blanks have thus had their ends folded they are carried forward by a former and bent around a horn L into a semi-cylindrical form. They then have the flux applied and afterward have the folded ends interlocked and pressed into a firm seam. They are next finished by soldering. The former is carried by the endless traveling double sprocket-chain B, mounted on the double sprocket-wheels B^3 B^3, already described. The former is carried by said double sprocket-chain and is carried with it in one continuous endless movement around a single endless path and having no back or reciprocating movements whatever. The horn L is made long enough so that the can-bodies will be soldered and finished when they leave it. One end of the horn is secured close to the rear end of the table C^{18} in an extension L^2 of a bracket C^3. The horn is supported at a point some distance forward of the bracket C^3 by a pillar L^3, Figs. 1, 10, and 11. This leaves the longer portion of the horn projecting longitudinally, with the machine free and independent of any support, so that the former and blanks and can-bodies may slide over the horn without meeting with any obstructions. A casting T, Figs. 10 and 11, is turned to fit inside of the horn and extends back into the extension L^2, thus connecting the horn with the said extension. A bolt L^4 secures the casting in the said extension, and a pin R secures the end of the horn to the said casting. The pillar L^3 is threaded at its lower half and passes down into a standard, as shown in Fig. 1 and also in Fig. 6. A large nut rests upon the top of the standard and carries the pillar. By turning the nut in different directions the pillar is raised or lowered as desired, and the position of the horn is thereby adjusted. The former mentioned is made in shape so that it will bend the blank around the horn and form it into a cylinder for the making of a can-body. The former is made with five parts, which when joined together by hinges may be placed around the horn and form a cylinder the inner circle of which will make a complete hollow circle in cross-section of just the right diameter to inclose the horn with the thickness of the blank bent into a cylinder around the exterior of the horn and the interior of the former. The formers as a whole are marked E in the drawings. The five parts of which the former is composed are longitudinal with the machine and are all hinged together. The middle piece or base E^2 has extended ears E^5, two at each end. These ears are perforated, and through them are passed the link-rods B^9, upon which the formers are mounted and by means of which they are connected with and carried by the double sprocket-chain B, Figs. 7, 19, 35, and 31. Fig. 35 is a top view showing the base-piece E^2 and also the two adjacent wings E^3, that are hinged to it. This figure shows the former in its closed position. Another wing, E^4, is hinged to each one of the wings E^3, thus completing the connection of the five pieces that make up the former. Fig. 7 is a top view that shows the former in an open position and the wings E^4 E^4 in an extended position. At the top of Fig. 3 is shown in end elevation all of the wings of the former E in an extended position. It

is in this position when it is traveling back toward the forward end of the machine and is riding on the top of the chain. The weight of the wings while in this position is sufficient to hold the former open, as shown. In the same figure the former is shown in the same open position, where it first begins pressing upon the top of the horn at the commencement of its forward movement. The wings of the former are held in their extended position by means of locking-bars E^{10} and hinged levers E^{11}. The locking-bars E^{10} control the wings E^{3}, while the levers E^{11} control the wings E^{4}.

E^{17} represents two pins that are fixed in and project backward from the base-piece E^{2} of the former. The bars E^{10} are made with slotted holes E^{18} through them, by means of which they are placed upon said pins, so that they may slide crosswise of the machine a sufficient distance to permit of their being locked and unlocked by and from the pins E^{17}. The bars E^{10} are placed one in front of the other and are supported upon the pins E^{16}, which pass through both of the bars, Fig. 30. The bars are held upon the pins E^{17} by any suitable means, as by the bracket E^{7}, which is cut away for their passage, as shown in Figs. 19 and 31. The bars E^{10} are beveled at their lower sides at E^{16}, and at the upper edge of the bevel each contains a socket that will receive the pin E^{14}, which projects from the wing E^{3}, Fig. 30. When the pins E^{14} come in contact with the bevels E^{16}, the bars will be moved endwise in opposite directions from each other a sufficient distance to allow the pins E^{14} to enter the said sockets and hold up and support the wings E^{3} in their proper positions. Each of the bars E^{10} extend some distance beyond the pins E^{14} at each end, so as to allow both ends of the bars to rest and slide upon those pins when the bars are being locked or unlocked.

E^{13} represents two pins, one of which is fastened in and projects forward from the outer bar E^{10}, while the other is fastened in and projects forward from the inner bar E^{10}.

E^{19} is a slot cut through the outer bar E^{10}, so as to allow the bar to slide endwise, with the pin E^{13} of the inner bar thus passing through it.

A coil-spring E^{12} (shown in Figs. 30 and 35) has one of its ends fastened to one of the pins E^{13} and its other end fastened to the other pin E^{13}. This coil-spring draws the outer bar E^{10} toward the left side of the drawings and causes it to lock with the pin E^{14} at that side, while the same spring draws the inner bar E^{10} in the opposite direction and causes it to lock with the pin E^{14} at the right-hand side of the drawings.

E^{15} represents two long vertical trips or handles, one of which is fast with one of the bars E^{10} and the other is fast to the other bar E^{10}. In going forward these two vertical trips or handles are tripped by the stops or deflectors A^{10}, Figs. 6 and 7, and in so doing they draw the vertical trips or handles apart and unlock the bars E^{10} from the pins E^{14}. When this is done, the wings E^{3} swing downward onto the horn and form a semicircular contact therewith. When the blank is in place, it is bent into the form shown in Fig. 25. Fig. 24 shows the forward end of the former with the wings all extended, and Fig. 25 shows the same when the bars E^{10} are unlocked and the wings E^{3} have dropped down over the horn and the blank. Ordinarily the wings E^{3} will be turned down, as described, by means of their own weight alone; but in order to make their action in this respect certain I construct a rock-shaft with levers and arms so arranged as to force the wings E^{3} to turn downward when unlocked from the bars E^{10}. In Fig. 35 of the drawings is shown the rock-shaft E^{26}, journaled to and across the base-piece E^{2} of the former. It has an L-shaped lever E^{27} secured to each end and in position to engage with a portion of the frame A, as a stop A^{11}, Figs. 31 and 8, with its upper arms, and have its opposite arms extend downward, and which latter may be deflected slightly outward. In Fig. 31 is seen at one of its ends the rock-shaft with its arms as it is forcing the wings E^{3} downward, its upper lever being in contact with the stop A^{11}, that compels it to turn backward and downward. When desired to have the arms continue to hold the wings E^{3} down, the lever may be left in the position in which the stop places it while it is passing. Otherwise the spring E^{28}, which connects the lever with one of the link-rods B^{9}, is used, and it will draw the lever when it has passed the stop back to its position, as shown by the dotted lines in Fig. 31. This rock-shaft with its levers and arms is seen in Figs. 1, 6, 7, 8, 9, 25, 30, 31, and 35. Whether it is needed or not in the machine will depend upon the weight of the wings in the former.

A^{5}, Figs. 1, 2, 3, 4, 6, 7, 8, 9, and 30, is a strong T-shaped track rigidly fixed in its position. It is placed at a short vertical distance over the horn and is parallel with it. In operation the formers pass between the track A^{5} and the horn. Flanged rollers E^{29} are mounted upon the link-rods B^{9}, between the ears E^{5} of the former. Each link-rod B^{9} passes through the two ears of the former, and also through the flanged roller E^{29}, that is between them. These flanged rollers run underneath the guide-track A^{5}, the flanges reaching upward on the side thereof. The flanged rollers and also the ears E^{5} of the formers are kept from moving laterally along the link-rods by set-screws that extend down through the ears of the former, as shown in Fig. 30. The track A^{5} should be made adjustable. This is easily accomplished by slotting the bolt-holes through which the bolts pass that secure the track in its position, as shown at S in Figs. 1, 2, and 4. Cross-beams

made with convenient projections or shoulders, as shown in Fig. 3, or any other convenient additions to the frame may be utilized as devices to which the tracks may be attached, and thereby secured in their proper positions in the machine. A^6, Figs. 1, 2, and 3, is another track parallel with and at a distance above the track A^5, over which the rollers and former travel in going back toward the front of the machine. This track A^6 is not a necessity, as the chain will travel without it.

At the back end of the former are three studs E^{31}, which as the former travels forward engage with the back edge of the blank and carry it forward from the folders, where the feeding devices left it. One of these studs projects downward from the center of the back end of the middle piece E^2 of the former. The other two are preferably mounted upon the back ends of the pintles that join the wings E^3 and E^4 together on each side of the former. Fig. 34 shows one of these studs so mounted on the pintle with a small section of the two wings. (See also Figs. 24 and 30.) By making the ends of the pintles screw-threaded and also threading the hole through the stud through which the pintle passes the stud can be adjusted longitudinally with the former by turning the pintle. Longitudinal grooves or channels L^5 are formed in the top and sides of the horn for the reception of these studs, thereby insuring a secure engagement of the studs with the back edge of the blank at three points, which will carry it forward squarely, one end going just as fast as the other, so that the two ends of the blank will lock squarely together and make an even seam at the ends of the can-body. The forward end of the top groove in the horn registers with a corresponding groove C^{17} in the top of the table C^{18}, into which the stud in the rear of the base part of the former enters to engage with the back edge of the blank to carry it forward, Fig. 12. The table is a little too high to allow the stud to pass over it without the cutting of the groove C^{17} for the stud to pass through.

In the machine made as herein described the forward end of the former in passing forward over the blank would naturally come in contact with it and force it out of its position before the studs would reach its back edge unless means were taken to prevent it. In order to overcome this difficulty, I secure to the forward end of the lower track A^5 a short supplemental track A^{12}, Figs. 4, 5, and 1. I also slot vertically the holes through the forward ears E^5 of the former, through which the link-rod passes, as at E^6. This permits the forward end of the former to rise vertically and pass over the blank without touching it. A projection extends upward from the said forward ears of the former, and into this projection is fastened a pin E^{20}, that reaches far enough horizontally to engage the short track A^{12}, the forward end of which is slightly inclined downward, so that the pin E^{20} will run up onto it. This being done, the forward end of the former is raised so that it will not touch the blank until it is engaged by the studs E^{31}. The track A^{12} is made just long enough to carry the forward end of the former over the blank when the pin E^{20} runs off from the track and the forward end of the former drops to its lower position. The pin E^{20} is shown in various positions in Figs. 4, 5, 6, 24, and 35. In Fig. 4 it is shown in two positions. In one the link-rod is at the lower part of the slot E^6, and in the other it is at the upper part of the slot. In the forward end of the middle piece E^2 of the former is placed another stud E^{37}, that enters the groove in the top of the horn when the forward end of the former comes down at the time that the pin E^{20} runs off of the end of the short track A^{12}. This stud is placed so that it will nearly or quite contact with the forward edge of the blank. The blank is thus confined between the three studs at its back edge and one stud in the middle of its forward edge. These studs control the position of the blank and keep it in its place until it becomes a finished can-body. When the former is dropped upon the blank, as described, only the middle or base piece E^2 comes in contact with the blank. The inner shape of this middle piece being in cross-section a curve corresponding to the curve of the circumference of the finished can-body presses the blank down upon the horn and gives it the bend shown in Fig. 24. By the unlocking of the bars E^{10}, as already described, the two wings E^3 of the former are turned down, bending the blank into a half-circle and placing the wings and blank in the positions shown in Fig. 25, the wings E^4 being still held up by the levers E^{11} and pins E^{200}, which are held in the notches E^{21} of the levers. While the former with the blank is traveling forward in this position, the flux or acid is applied as follows: G^2, Fig. 9, is an acid-tank, and G^3 and G^4 are branch pipes leading from the same to the folds at the ends of the blank. Acid will flow from the pipe G^3 to the inside of the fold K^2, which bends outward. The pipe G^4 carries the acid from the tank to and keeps saturated with the acid a sponge or fibrous mass G^5, against which the outside face of the fold K^3 rubs and becomes wet with the acid as it passes along. This puts the acid or flux on those parts only of the folds which do not form any part of the inside of the can, and hence no acid gets into the inside of the can to injure its contents. A pan or other ordinary receptacle should be placed underneath to catch the acid that will drip from the folds.

E^{200} represents pins that are fastened in and project forward from the two wings E^4. Each of these pins is adapted to engage with the

notched portion E^{21} of its respective lever E^{11}. Each lever E^{11} is pivotally secured to a laterally-projecting bracket E^{22}, that is attached to the adjacent wing E^{3}, so as to permit of the notched portion E^{21} having a swinging motion for engaging with or being disengaged from its pin E^{200}. The inner end of each lever is slotted, as at E^{23}, for the passage of a retaining-screw, and it is also provided with an arm E^{24}, to which a spring E^{25} is secured for drawing the outer or notched end downward, Figs. 24, 25, and others. As soon as the former has passed the standard L^{3} the outer ends of the levers E^{11} are lifted by running upon inclined trips A^{13}, Figs. 6, 1, 8, and 25, and the pins E^{200} are thereby disengaged from their notches, and the wings E^{4} swing downward to the position shown in Fig. 31 and at the left side in Fig. 6 and also in Fig. 26.

In Figs. 1, 6, 7, 8, 24, 25, 26, 30, and 31 is shown a friction-roller E^{30}, attached to each of the wings E^{4}. As the former moves forward after the said wings E^{4} are released from the notched levers E^{11} these rollers E^{30} will each enter into a channeled guide A^{14}, that is shaped and arranged in the machine so as to force the roller on each wing E^{4}, together with the wing which carries it, inwardly and toward the other. This action closes the wings E^{4} around the lower part of the horn and places the end K^{2} of the blank, which is folded outwardly against the horn and laps the other end of the blank K^{3}, which is folded inwardly over the end K^{2}, thus placing the folds of the blank in the position shown in Fig. 27. In drawing the folds together there are used the blade M^{7} and spring-guide M^{2}, which are hereinafter described and explained. In Fig. 8 of the drawings are shown standards which support the channel-guides and also end views of the guides in which the form of the channels A^{14}, with the rollers E^{30} therein, are clearly shown. The longitudinal form of these channel-guides and their relations to each other are shown in Fig. 7 at its left-hand end. They are formed so as to first draw the rollers inwardly toward each other until the wings E^{4} are closed around the horn and the fold K^{3} of the blank is lapped over the fold K^{2}, as shown in Fig. 27. They are then drawn a little apart, so as to draw the folds together, as shown in Fig. 28, after which the folds are bumped or pressed together and the seam formed as shown in Fig. 29. When the seam is thus formed, the rollers pass out of the channeled guides at their farther ends and perform no further service until they again reach the point where the wings E^{4} are to be again closed to form another can-body. These channel-guides must be arranged so that the wing that carries the fold K^{2} will be closed a little before the other wing E^{4} is closed in order that the first fold may be in its place around the horn when the fold K^{3} is brought around to lap over it.

A^{16} (shown in the left end of Fig. 7 and in Fig. 8 and also in dotted lines in Fig. 6) is a spring placed along the wall of the channel A^{14}. This spring is for the purpose of holding the wing against the horn with an easy and certain pressure.

As an auxiliary means for drawing the folds together after they have reached the position shown in Fig. 27 the following mechanism is added to the guides A^{14} and the rollers E^{30}, already described: A pin E^{32} is fastened in and projects from one of the wings E^{3} in such a manner that when its outer end is raised the lower wing E^{4} will be drawn along with it and the blade M^{7}, against which the fold K^{3} rests, will be carried forward with the wing E^{4}, to which it is attached. These movements will draw the fold K^{3} forward into the fold K^{2}, as shown in Fig. 28, ready for the bumping operation. The outer end of the pin E^{32} passes along the under surface of a bar E^{35}, Figs. 7 and 8. This is for the purpose of holding the wing closed down until the folds are ready to be drawn together, at which time the pin E^{32} passes out from under the bar E^{35} and goes upon the upper surface of a track E^{33}, which raises the pin E^{32} and draws the fold K^{3} into the fold K^{2}, as shown in Fig. 28. In Fig. 8 the pin E^{32} is shown just as it has passed out from under the bar E^{35} and risen upon the track E^{33}. At the upper end of the standard which carries the track E^{33} is fixed a spring device E^{34}, on the top of which the track E^{33} is carried. This holds the track up with a yielding pressure, which is an advantage of importance. The form of this spring is shown in Fig. 6. One view of it is presented in Fig. 8. It is supported upon a metal strip which is secured to the standard by screws E^{36}. The lower arms of the rock-shaft E^{26} must be loose enough to allow the wing E^{3} to be moved by the pin E^{32}, as above described.

Secured by bolts E^{9} to each end of the former are brackets E^{7}, and E^{8} represents friction-rollers carried in these brackets. These friction-rollers run on the top of the horn and are adjusted to sustain a part of the pressure which is created by the bearing of the inner surface of the former against the horn. The blank is carried between the inner surface of the former and the outer surface of the horn; but it does not extend far enough to be under either of the rollers E^{8}. The part of the pressure that is sustained by the rollers E^{8} is that much less pressure upon the blank and makes it slide more easily along the horn. I do not, however, regard these brackets and rollers of much importance, as without them the blank slides over the horn without being injured by the friction.

For drawing the folds together it is necessary that pressure should be made to bear against the outside of the bights of the folds in order to push them together. It is also a great advantage to have the parts that do the

bumping or pressing together of the folds capable of traveling forward while the bumping is being performed, since the former is always going forward with the carrying-chain to which it is attached, and unless the said parts did so travel the blank would be held around the horn with too much friction and would be injured or destroyed. To obtain this traveling of the bumping parts while the bumping is being performed, I use a hollow horn. Into this horn I place a bracket M^{13}, Figs. 19, 20, 40, 41, and 36. This bracket has four depending legs M^{26}, two of the legs being near the front end of the bracket and two near its back end. Between each pair of these legs is placed an antifriction-roller M^{21}, Fig. 19, which is held in place by pin M^{20}, which passes through the legs and the roller. Within the horn is placed an anvil M. Its form is shown in cross-section in Figs. 8, 21, 26, 27, 28, 29, 38, 40, and 41 and in longitudinal elevation in Figs. 19, 20, and 36. Fig. 39 is a large perspective view of the anvil and the spring-guide M^2, before mentioned. The anvil is made somewhat longer than the length of the can-body, or, what is the same thing, the width of the blank. A slot L^6 is cut through the bottom of the horn, and the anvil projects through this slot, so that its face is flush with or a trifle lower than the surface of the horn. Slots M^{22} M^{22} are cut longitudinally through the anvil, as shown in Figs. 19, 20, 36, and 39. These slots are just wide enough to receive the rollers M^{21}. The bracket M^{13} is fixed rigidly and immovably in place by being screwed firmly to the upper surface of the inside of the horn, and the rollers M^{21} are therefore held constantly in one immovable position. The anvil is hung upon these rollers, which fit into the slots M^{22} so closely that the anvil cannot move vertically either up or down to any appreciable extent. The anvil, however, may travel lengthwise of the horn the length of the slots M^{22}. These slots should be long enough to allow the anvil to travel freely along the horn during the time that the bumping is taking place and while the folds of the blank are being pressed together. If necessary, both the slots M^{22} can be cut into one—that is, made long enough to give the anvil all the travel that it may need. To get the anvil into its place in the horn and have its face project downward through the bottom thereof, the anvil is first mounted on the wheels in the bracket M^{13}. The bracket and anvil are then together shoved endwise into the hollow of the horn, which they will loosely fill, until the anvil is over the opening L^6 through the bottom of the horn. Into and through this opening the anvil is then lowered. This operation carries the anvil and bracket downward and leaves a vacant space between the top of the bracket and the top of the inside of the horn. This is filled by shoving the shim M^{28} endwise into the space, which it may fit somewhat loosely. Screws are then passed from the outside through the shell of the horn and the shim M^{28} and are threaded into the bracket M^{13}. These screws have their heads countersunk into the shell of the horn, and as they are tightened they draw the bracket and shim firmly to their place against the top of the inside of the horn and securely hold them there. Dotted lines in Figs. 19 and 38 indicate the proper places in which these screws may be put, although it is not necessary to place them in any exact location, as they may be put in any place where they will draw the bracket, shim, and horn together and hold them firmly in place. A groove M^3 (shown in cross-section in Figs. 26, 27, 28, 29, 37, 38, 40, and 41) is cut longitudinally in one side of the face of the anvil. This groove provides a space in which the folds of the blank are forced together to form the seam, as shown in Fig. 29, in such way that the swell of the seam will be inside of the can-body, leaving the outside of the can-body smooth without any projection from its side seam, so that the head will fit the end of the body closely, leaving little or no space to be filled up with solder.

M^2 is a spring-guide that is fastened longitudinally to the side of the anvil in such manner that it may move up and down against the anvil a very short distance.

Plates M^{30} are fastened rigidly to the side of the anvil and are cut away, as shown in Figs. 21, 37, 39, and 41, so that a groove is formed next to the anvil, into which the spring-guide is received and held in place. Within these plates are coil-springs M^5, that press the spring-guide downward, so that in its normal position its lower edge will project a little below the surface of the horn, Figs. 19, 36, 37, 40, and 41. This spring-guide forms a longitudinal stop or shoulder against which the outside of the bight or fold K^2 will bear and be held in place, as shown in Figs. 27, 28, and 29. Preferably a very slight groove M^4, Figs. 27, 28, 38, and 39, is made along the inside of the spring-guide close to its lower edge, so that it will have a better hold upon the fold K^2 of the blank. This spring-guide has short arms M^{32} projecting upward inside of said plates M^{30}. A pin M^{19}, Figs. 36 and 39, passing into the anvil through a notch in the spring-guide, keeps the two always in the same longitudinal relation to each other. Underneath each of the plates M^{30} is a vertical slot M^{31} in the short vertical arm M^{32} of the spring-guide, and a pin M^{33} passes through each of the slots into the anvil. These vertical slots and pins prevent the spring-guide from passing too far downward.

M^{18} is a notch in the lower edge of the spring-guide.

To the back end of one of the wings E^4 is attached a spring-pressed catch M^{17}, Figs. 19 and 20. As the former travels forward this catch is pressed into the notch M^{18}, and the

former thereby draws forward the spring-guide and the anvil to which it is attached, and the anvil is thus made to travel forward while the folds of the blank are being pressed together. As soon as the folds of the blank are thus pressed together the can-body is finished ready for the soldering of the seam. In pressing the folds of the blank together, as described, the bearing of the anvil and spring-guide upon the horn presses the spring-guide upward flush with the surface of the horn. This action releases the catch M^{17} from the notch M^{18}, and the anvil and spring-catch are left free to be returned to their normal position by the action of the spring M^{27}, which is attached at one end to a fixture V in the horn and at its other end to the anvil M, Fig. 36.

The foregoing description shows the anvil M hung upon the antifriction-rollers M^{21} in the bracket M^{13}, fixed in the hollow horn L, as shown in Figs. 19 and 36. With this arrangement of the parts the machine is operative and will make good can-bodies. To further reduce the friction caused by the contact of the moving blank along the upper surface of the horn, a slot L^7, Fig. 20, is cut through the top of the horn and down through the shim M^{28} and bracket M^{13}, both of which are longer than the slot L^7, and the anvil is extended so that its upper surface is as high as the upper surface of the horn or a little higher. By this construction the traveling blank is placed between the inner surface of the former and the upper surface of the anvil, both of which are traveling with it, and its frictional contact with the upper surface of the horn during the bumping operation is largely avoided. When the anvil thus passes up through the top of the horn, its upper part M^{23} is made wide, as shown in Figs. 8, 21, 39, 40, and 41, in order to obtain a wide bearing for the blank to rest on. The groove L^5 along the top of the horn must be continued through the top of the anvil, as shown in figures last mentioned. The two sides of the head M^{23} are marked M^{24} in Fig. 26. When the anvil is made to pass upward through the upper part of the horn, as described, the slots M^{22} M^{22} should be cut away along their lower edges, so that the upward pressure of the bumper against the anvil will be surely borne by the inner surface of the former over the horn and not by the rollers M^{21}, lifting the bracket M^{13}, and thereby causing the horn to spring upward. As shown in Fig. 39, the upper part of the anvil may be made in a separate piece and connected with the lower part by adjusting-screws. A part of the screws are threaded in the lower part of the anvil, so as to draw the upper part downward, while the other screws are threaded through the upper part of the anvil and bear with their points against its lower part, so as to push the two parts of the anvil apart. By these means the distance between the two parts of the anvil can be regulated and adjusted and the top of the anvil fixed at any desired elevation.

The spring-guide M^2 being operated from the inside of the horn furnishes a bearing or stop against which the inside fold K^2 of the blank can bear while the folds are being drawn or pushed together. Other means are provided for actuating the other fold, K^3, of the blank, as follows: This fold K^3 laps over the other fold and is reached from the inside of its wing E^4. On the lower edge of the wing E^4 is placed a blade M^7, having lugs on the inside of each end that hold the blade some distance away from the edge of the wing. Screws pass through the ends of the blade and lugs and fasten them to the edge of the wing, leaving a rectangular space between the two lugs, the blade, and the edge of the wing. Into this rectangular space is loosely fitted a hammer M^6, which in the bumping operation moves a short distance in and out in a direction approximately toward the center of the horn, Figs. 20, 32, and 33. Figs. 27, 28, and 29 are enlarged sectional details that show the anvil M, the spring-guide M^2, the hammer M^6, and the blade M^7 as they are associated together in the operation of bumping the folds of the blank to form the side seam of the can-body. Fig. 26 shows in cross-section the same parts and their association, arrangement, and positions with reference to each other. In Fig. 32 the holes M^8 through the blade and its lugs are slotted, so as to allow an adjustment when fastening them to the edge of the wing. The hammer is held in place by screws or pins M^9, which pass through slotted holes M^{10} through the blade M^7 and through the hammer into the edge of the wing. These holes through the hammer are slotted vertically, as shown, so as to allow the hammer to move inwardly and outwardly, as before stated. A key M^{11}, one end of which is shown in Fig. 33, is used to assist in holding the hammer in place and guiding its movements.

Two methods are shown for operating the hammer M^6. In Fig. 31 the bottom edge of the hammer is made with a cam-shaped projection. In Figs. 1, 6, and 19 is shown a bumper-wheel F^{10}, that is in a fixed position and placed so that as the former moves forward the cam-bottom of the hammer will bear against the wheel F^{10} and be lifted upward and press the folds together, as shown in Fig. 29. The wheel F^{10} is supported on a base consisting of two horizontal plates, which are hinged together at one side. The upper plate F^{12} carries two uprights, which are fixed rigidly to the plate. The wheel F^{10} is mounted upon a short shaft that passes through its center and through the upper ends of the uprights. A screw-bolt F^{13} is threaded through the edge of the upper plate F^{12}, opposite to the edge that carries the hinge. By turning this screw-bolt one way or the other the

said upper plate is moved either up or down, as may be desired, and thereby the wheel F^{10} is adjusted to any height desired. This base rests upon a cross-bar A^{15} of the frame A. (See Figs. 1, 6, 8, and 19.) Fig. 8 shows a transverse view of the same. To facilitate the passage of the hammer over the roller, its forward end is cut away and beveled, as shown at F^{11}, Figs. 19 and 31. The greatest vertical width of the hammer is substantially midway of its length, so that the pressure caused by the roller at the time of forming the lap will be evenly distributed from end to end of the hammer. The rear of the hammer may be cut away, so that after the pressure has been applied the forward movement of the hammer will cause it to be quickly relieved of the pressure of the roller. Another and I believe a better means for raising the hammer in bumping the seam is shown in Figs. 20 and 21 of the drawings, in which a bar F^2 is pivotally supported at its ends on two links F^3, which in turn are pivotally mounted on a base F^4 by means of standards F^5, which are made adjustable vertically by being screw-threaded and being held in nuts both above and below the base F^4, which is secured to the cross-bar A^{15}. (Shown in Fig. 1.) An adjustable stop F^6 is at one end, against which the bar engages and is held on its return movement. A spring F^7 is secured to the base and to the bar for returning the bar to its original position after it has been actuated to form the seam. The bar is carried forward into its operative position by a pin F^8 on one of the wings E^4, which engages with a shoulder F^9 near the rear end of the bar. In this construction it is evident that when the pin engages with the shoulder the bar and links F^3 will be carried forward into the positions shown in dotted lines in Fig. 20. The links F^3 will be swung on their pivots and in moving forward will gradually carry the bar upward until they pass the highest point or dead-center, after which they will carry it downward until it passes below the pin F^8, after which the pin and former will continue to move forward, and the bar being released from the pin will be returned by the action of the spring F^7 to its normal position. As the bar moves upward it engages with the hammer M^6 and forces it up against the folds of the blank, and thus forms the seam, as before described. In this method the hammer is made with a straight bottom.

Another means employed to bring the anvil and spring-guide M^2 back to their normal positions as soon as the seam of the can-body is bumped is shown in Figs. 1, (partly in dotted lines,) 6, and 9. Brackets are fastened to the horn on its bottom surface. A lever M^{16} bent to nearly or quite a right angle is fixed in the brackets with its upper arm extending to the inside of the horn. The upper end of this vertical arm is connected with the spring-guide by a bar M^{15}. (Shown in Fig. 20 and in cross-section in Fig. 9.) The other or lower arm of the bent lever remains normally in nearly a horizontal position and near its end there is hung the weight M^{14}. Obviously when the spring-guide M^2 is drawn forward the weight M^{14} will be raised, and when the spring-guide is released from the catch M^{17} the weight will descend and draw back the spring-guide and the anvil with it. In some respects this weighted apparatus is better than the spring M^{27}, as the greatest tension of the spring comes where it is least wanted and its least tension comes where its greatest tension is most needed.

After the seam of the can-body is bumped and finished the former still continues to travel forward, and in so doing carries the can-body over the soldering apparatus with its side seam at the lower surface of the horn. In order to prevent the solder from becoming smeared on the horn the latter is cut away, as shown in the long longitudinal slots L^8, which are cut through the horn below its side grooves L^5. Said slots are shown in Figs. 1 and 2 and in cross-section in Fig. 23. As shown in the latter figure, there is enough left of the bottom of the horn to furnish a sufficient bearing for the seam of the traveling can-body to bear against. In the soldering apparatus there is a solder-tank H^2, located underneath the horn and in close proximity therewith, Figs. 2, 22, and 23. Immediately underneath the horn along the line that is traveled by the seam of the can-body is arranged a line of soldering-wheels H^3, the upper edges of whose peripheries will bear against the seam of the can-body as it passes along. These soldering-rolls are geared so that the periphery of each alternate roll will travel a little faster than the can-body will travel and the periphery of each of the intermediate alternate rolls will travel a little slower than the can-bodies travel. These rolls take up the melted solder and apply it hot to the seam with a rubbing pressure which results from the difference in the rates of speed at which the can-bodies and the peripheries of the soldering-rolls travel. To operate the soldering-rolls, there is mounted upon the shaft B^2 at the back end of the machine a sprocket-wheel H^8, which carries and drives a sprocket-chain H^7, which in turn drives a smaller sprocket-wheel H^9, that is mounted on a short shaft H^{10}, that is fixed in the machine transversely to its length.

H^4 is a shaft fixed longitudinally in the machine, and upon it is mounted a series of beveled gear-wheels H^5. Corresponding with the number of beveled gear-wheels H^5 there are mounted upon short transverse shafts beveled gear-wheels H^6, which mesh with and are revolved by the wheels H^5. The said short shafts carry the rolls H^3 and pass transversely into the solder-tank H^2 through the packed bearings H^{12}. Upon the shaft H^{10} is mounted the beveled gear-wheel H^{11}, which meshes with

one of the beveled gear-wheels H^5, and thereby drives the soldering-wheels, Figs. 2, 22, and 23. Each alternate one of the wheels H^5 is made a little larger than the others, and thus makes the peripheries of one-half of the soldering-wheels H^3 run a little faster than do the peripheries of the others. These wheels are so timed that the peripheries of the faster of the wheels H^3 will run faster than does the can-body passing over them, while the peripheries of the slower of the wheels H^3 will run a little slower than will the can-bodies. By this arrangement the melted solder is raised and rubbed into the seam of the can-body by the peripheries of the soldering-wheels H^3 as the can-body passes over them. The soldering-tank may be heated by gas delivered underneath the tank by gas-jets H^{13}, delivered in the usual manner through pipes, such as H^{14} and H^{15}. (See Figs. 1, 2, and 23.)

H^{16} is a chute for delivering the finished can-bodies from the machine, Fig. 2.

In Figs. 1 and 2 is shown a guide-rod A^{17}. The end of this guide-rod nearest the bumping mechanism is bent downward and inward so as to be near the horn, as shown in Fig. 1. In Fig. 2 the same guide-rod A^{17} is shown extending parallel with the horn as far as the horn reaches and then continuing on still farther and bending upward in a circle that is nearly or quite concentric with the shaft B^2, that carries the sprocket-wheel B^3. The guide-rod A^{17} ends at a point that is a little higher than the center of the sprocket-wheel. On the opposite side of the horn is another guide-rod (not shown in the drawings) that is a mate to the rod A^{17} and is precisely like it in shape, size, and corresponding location, except that the bend at its first end in turning toward the middle of the horn places that part of the bend in a direction that is opposite to the corresponding bend in the rod A^{17}. Both of the said rods are guide-rods, and they perform the work of spreading, raising, and guiding the lower wings E^4 of the formers, and they operate as follows: As each of the formers leaves the bumping mechanism its wings pass beyond the guides which have so far controlled them, and the weight of each one of the lower wings E^4 will cause it to swing downward and away from its contact with the lower half of the horn and to hang downward from its hinge-pin at the side of the horn. This action carries the wings E^4 so far downward and so far apart that as they move forward they will pass outside of the bent ends of the said guide-rod A^{17} and its mate, and as the former goes still farther forward the upward bends in the guide-rods will raise the wings E^4 far enough so that the notch E^{21}, which is in each of the levers E^{11} will receive the pin E^{200}, that is in the end of each one of the wings E^4. This will lock the wings E^4 in their raised positions, and both the wings E^4 and also the wings E^3 will be in the same positions with reference to the horn as they are shown to be in Figs. 9 and 25—that is, the middle or base piece of the former and the two wings E^3, with the tin underneath them, will rest upon and encircle the upper half of the horn and the wings E^4 will be elevated to a position that is nearly or quite horizontal. The tin, however, instead of hanging down vertically from the sides of the horn, as shown in said Figs. 9 and 25, will be bent around the horn and be formed into the cylinder of a can-body. The parts will remain in these relative positions to each other, while the former and can-body are traveling forward until they have passed the soldering apparatus and the can-body is ready to be discharged from the machine. This arrangement keeps the wings clear from all contact with the soldering apparatus. As the former continues on its course with the wings E^4 so raised it will follow a circle around the sprocket-wheel B^3 at the back end of the machine, following the guide and its said mate A^{17}, which are bent upward in a corresponding curve until the former reaches an elevation higher than the center B^2 of the sprocket-wheel, when the force of gravity will cause the wings E^3 to also spread apart, as shown at the top of Fig. 3. In this position it remains until it arrives again at the front of the machine ready to begin the formation of another can-body.

Having described my invention, I claim—

1. The new and improved can-body machine, constructed with a single long horn over which the can-bodies are formed while sliding along over the horn, and having folding wings made with a base, and two hinged wings on each side of the base, and moving continuously while the can-body is being formed, substantially as herein described.

2. The combination of feeding mechanism herein described, consisting of the shaft B^4, the crank-arm J^6, carried thereby and slotted so that the wrist-pin carried therein may be adjusted at any desired distance from the shaft B^4, and thereby regulate the distance that the pitman J^4 will be moved up and down, the pitman D^{22}, the turnbuckle J^8 for regulating the length of the pitman J^4, the pivot-shaft J, the arm J^5, upon the pivot-shaft J, the arm J^2, the reciprocating carrier C^2, the link J^3, that connects the arm J^2, with the reciprocating carrier, the guide-bars C^7, one above the other and side guides C^9, and C^{10}, all arranged and operating substantially as described.

3. In a can-body machine, the combination of the continuously-rotating pear-shaped cam with the slotted oscillating folders and intervening mechanism constructed and arranged as herein described, including a pitman reciprocated only by the abrupt portion of said cam, so that while the blanks are being moved into and out of the folders the latter will remain stationary and their slots will register with the guide-openings through which the

blanks are moved into and out of the folders, and the blanks in their turn will remain stationary while the folders oscillate and form the hooks on the ends of the blanks.

4. In a can-body machine, the combination of the oscillating folders, the continuously-rotating pear-shaped cam and the straight-moving pitman engaging said cam, with the transverse racks and intermediate gearing arranged so that the metal blanks and the oscillating folders will assume fixed immovable positions, and also their moving actions, alternately with each other, all substantially as herein set forth.

5. In a can-body machine, the combination of the guide-bars C^7 one above the other over the feeding-table, the reciprocating feeder, and the intermittingly-oscillated folders, with the channeled guideways through the folders registering with said guide-bars, and the side guides C^9 and C^{10} substantially as herein described.

6. In a can-body machine a series of five-part formers carried on a double sprocket-chain combined with a stationary horn over and along which said formers successively pass substantially as herein described.

7. In a can-body machine a series of formers carried upon a constantly-moving double sprocket-chain, each former being composed of a middle or base piece, and double wings hinged to each of its sides, substantially as herein described.

8. In a can-body machine a series of five-part winged formers carried by a double sprocket-chain moving continuously forward in one direction, and means for closing the formers in successive steps while they are moving forward, substantially as herein described.

9. In a can-body machine, a series of five-part hinged formers carried upon a double sprocket-chain moving continuously forward and means for successively closing and releasing the respective parts of each former substantially as herein described.

10. In a can-body machine, a series of formers each containing two sets of hinged wings, a horn common to all of them, and means for continuously moving the formers along the horn, substantially as described.

11. In a can-body machine, a series of winged formers each containing two sets of hinged wings, a horn common to all of them, means for continuously moving the formers along the horn, and means for closing each former around the horn as it is moved forward, substantially as described.

12. In a can-body machine an overhanging horn a series of five-part formers carried constantly in one direction upon an endless double sprocket-chain with means for closing the formers around the horn while they are moving forward substantially as herein described.

13. In a can-body machine an overhanging horn, a series of five-part hinged formers carried constantly forward upon a double sprocket-chain and means for gradually closing each former around the horn while the former is moving forward substantially as herein described.

14. In a can-body machine, a series of winged formers each containing two sets of hinged wings, each provided with projections, a longitudinally-grooved overhanging horn, and means for continuously moving the formers forward with the projections in said grooves and gradually closing the formers around the horn, substantially as described.

15. In a can-body machine, a series of hinged formers each containing two sets of hinged wings, inwardly-projecting pins mounted on the hinges, a longitudinally-grooved horn, and means for moving the formers forward and closing them around the horn with the pins in the grooves, substantially as described.

16. In a can-body machine a series of five-part winged formers carried upon a double sprocket-chain, means for closing the formers in successive steps, and means for applying a flux between two of said steps substantially as herein described.

17. In a can-body machine, a series of winged formers, an overhanging horn, a support therefor adjacent to its inner end, means for partially closing the formers before they have passed the support and finishing the operation after they have passed it, substantially as described.

18. In a can-body machine, a series of five-part formers carried upon a double sprocket-chain, an overhanging horn, and means for adjusting the horn at its inner end substantially as herein described.

19. In a can-body machine, a series of five-part formers carried upon a double sprocket-chain, an overhanging horn and an adjustable pillar adjacent to its inner end for supporting the horn, substantially as described.

20. In a can-body machine, a supporting-table for the blanks that are to be operated upon, an overhanging horn secured at one end close to the inner end of the supporting-table and a series of forwardly-moving five-part formers carried upon a double sprocket-chain substantially as herein described.

21. In a can-body machine, a supporting-table having oscillating folders at its inner end, an overhanging horn projecting from said end, means for feeding blanks to the folders and a series of five-part continuously-moving formers carried upon a double sprocket-chain for taking the blanks after the hooks are formed upon their ends and bending the blanks around the horn while they are moving forward, substantially as herein described.

22. In a can-body machine, oscillatory folders arranged and adjusted to form hooks upon the blanks by making sharp bends in the blanks along the center line of the folders' oscilla-

tions, an overhanging horn, and means for taking the blanks from the folders with the hooks formed upon them, and bending them downward around the horn while they are moving forward, substantially as herein described.

23. In a can-body machine, longitudinally-slotted oscillatory folders, the intermediate portion of each of which is cut away, means for simultaneously oscillating the folders, a horn, means for intermittently feeding blanks to the folders, and continuously-moving formers for taking the blanks from the folders and folding them around the horn, substantially as described.

24. In a can-body machine, longitudinally-slotted folders, the intermediate portion of each of which is cut away and provided with a butting-bar, means for oscillating the folders, a horn, means for intermittently feeding blanks to the folders with their ends in engagement with said bars, and continuously-moving means for taking the blanks from the folders and bending them around the horn, substantially as described.

25. In a can-body machine, longitudinally-slotted oscillatory folders, the intermediate portion of each of which is cut away and shouldered, a longitudinally-shouldered butting-bar in the cut-away portion, and screws for adjusting the shoulder of each bar relatively to the axis of its folder, means for feeding blanks to said folders, and means for removing them from the folders and forming them into can-bodies, substantially as described.

26. In a can-body machine, oppositely-located oscillating folders, each of which is provided with a pinion and a reciprocating rack-bar, operated by a continuously-rotating pear-shaped cam and a pitman operatively associated with said cam whereby the oscillating folders are made to oscillate during a part of the time and to remain in a fixed position during another part of the time when the machine is in operation, substantially as herein described.

27. In a can-body machine, oppositely-located oscillatory folders, each of which is provided with a pinion, a rack-bar in engagement with said pinion, a segmental rack for moving the bar, and adjustable means for moving the bar variable distances, substantially as described.

28. In a can-body machine, oscillating folders, a reciprocating rack-bar meshing with pinions on each of the folders for operating them, a segmental rack having a slot for moving the rack-bar, a block adjustably mounted in said slot and a reciprocating pitman operated by a pear-shaped cam so as to produce an alternate moment of action and moment of rest for the said racks and folders, substantially as herein described.

29. In a can-body machine, oscillatory folders, a reciprocatory bar for operating the folders, a rack and a reciprocatory pitman for operating the bar, the upper end of the pitman being slotted and provided with a pin, and a shaft through the slot provided with a cam for engaging with said pin, substantially as described.

30. In a can-body machine, pairs of plates and caps secured thereto, the inner ends of which are cut away to furnish space for the blanks to pass through, oppositely-located longitudinally-slotted oscillating folders having bearings in said plates and caps and means for adjusting each pair, said folders being operated through the medium of a pear-shaped cam, so as to cause the folders to act a part of the time and to remain stationary a part of the time when the machine is at work, substantially as herein described.

31. In a can-body machine, a frame, a support adjustably mounted thereon, and folders adjustably mounted on the support, said folders being operated by a continuously-rotating pear-shaped cam and intervening mechanism comprising a pitman reciprocated only by the abrupt portion of said cam and provided with means for causing it to move in a straight line, the whole being so arranged that the folders will act a part of the time and will remain stationary a part of the time when the machine is at work, substantially as herein described.

32. In a can-body machine, a frame, a support with flanges adjustably mounted thereon, pairs of plates and caps adjustably mounted on said flanges and oscillating folders mounted in said pairs, said folders being operated by a pear-shaped cam, with intervening mechanism, so arranged that the folders will act a part of the time and will remain stationary another part of the time when the machine is at work, substantially as herein described.

33. In a can-body machine, a frame provided with recessed brackets, a flanged support adjustably mounted in the recesses of said brackets, screws in the brackets for adjusting the support, pairs of folder-supports adjustably mounted on said flanges, and folders mounted in the inner ends of said folder-supports, substantially as described.

34. In a can-body machine, a frame provided with brackets, one of said brackets being provided with a pocket-like projection, a supporting-table having folders, and a longitudinal guiding-groove in its upper surface, an overhanging horn having its inner end rigidly secured in said projection, the top of the horn being in the same horizontal plane with the upper surface of the said table, and the horn having a guiding-groove along its top that registers with, and is a continuation of the said guiding-groove in the upper surface of the supporting-table, substantially as herein set forth.

35. In a can-body machine, a grooved sup-

porting-table, folders adjustably mounted on opposite sides of the groove thereof each of said folders being slotted longitudinally and having its intermediate portion cut away, pairs of plates and caps for supporting the folders, a folding-plate in front of each folder, the inner edge of which is provided with an adjustable wear-plate, substantially as described.

36. In a can-body machine, a supporting-table, spaced bars extending longitudinally along each side thereof, U-shaped brackets secured to said bars, guides adjustably secured in said brackets, and means for moving blanks over the supporting-table and between the bars and the guides, substantially as described.

37. In a can-body machine, a supporting-table, bars at the sides thereof, U-shaped brackets secured at their ends to the bars, guides in the brackets, screws through the bottom of each bracket, two of which enter the guide and the other of which abuts against it, and means for feeding blanks forward between the bars and the guides, substantially as described.

38. In a can-body machine, a frame provided with a feeding mechanism, an overhanging horn, a track over the horn extending rearwardly from the feeding mechanism a series of five-part formers carried upon a double sprocket-chain between the horn and the track, substantially as herein described.

39. In a can-body machine, a frame provided with feeding mechanism at one end, two sprocket-wheels mounted at the ends of the frame, a double sprocket-chain, moving continuously forward along the horn, carried upon the wheels and provided with five-part formers, an overhanging horn projecting to the rear from the feeding mechanism, substantially as herein described.

40. In a can-body machine, a frame provided with a feeder at one end and a horn projecting therefrom, sprocket-wheels at the ends of the machine, a carrier on the wheels provided with formers, one end of each of said formers being vertically movable, and means for raising said end of the former as it passes over the rear end of the feeder, substantially as described.

41. In a can-body machine, a frame provided with a feeder at one end and a horn projecting therefrom, sprocket-wheels at the ends of the machine, a carrier on the wheels provided with formers, one end of each of said formers being vertically movable and provided with a projection, and a guide for engaging with said projection and raising said end of the former as it passes over the rear end of the feeder, substantially as described.

42. In a can-body machine, a frame provided with a feeder at one end and a horn projecting therefrom, sprocket-wheels at the ends of the frame, a linked carrier on the wheels, formers on the link-rods, one end of each of which is provided with a projection and an elliptical perforation, and an inclined guide for engaging with said projection and raising said end of the former as it passes over the rear end of the feeder, substantially as described.

43. In a can-body machine, a frame provided with a reciprocating feeder at one end, a horn, rigidly fixed in its place, and having a guide-groove along its top for holding the formers in place while they are moving forward, oscillating folders at the rear end of the feeder for forming the hooks on the ends of the blanks, and continuously-moving formers each having a lug or stud at its rear end for engaging with the guiding-groove in the top of the horn, and also engaging with the blanks so as to move the latter forward and bend them around the horn, substantially as herein described.

44. In a can-body machine, a frame provided with a reciprocatory feeder at one end and a horn projecting therefrom, folders at the rear of the feeder, a continuously-moving linked carrier provided with formers, the formers being so spaced on the carrier as to cause a former to pass the folders between each reciprocation of the feeder, substantially as described.

45. In a can-body machine, a frame provided with a feeder at one end, a fixed overhanging horn projecting therefrom, and having a guiding-groove along its top, the tracks A^5 and A^6 fixed to the frame, one of the tracks being above the other, and both tracks being over the horn, sprocket-wheels at the ends of the frame, a double sprocket-chain carried upon the wheels, the five-part folding formers carried upon the double sprocket-chain the wings of which are open while passing back over the upper track, and are made to close and bend the blank around the horn while they are moving forward between the lower track and the horn, substantially as herein described.

46. In a can-body machine, a frame, the guide-track A^5, flanged guide-rollers E^{29}, mounted upon the link-rods B^9, the rails A^8, the double sprocket-chain moving constantly forward and having the link-rods B^9 extending over the rails A^8, flanged guide-rollers mounted on said link-rods and running underneath the guide-track A^5, and engaging therewith, and the formers mounted upon and carried by said double sprocket-chain, substantially as described.

47. In a can-body machine, a frame, tracks thereon, one above the other, wheels at the ends of the frame, a linked carrier on the wheels, formers secured at their respective ends to the link-rods, one of said ends being movable vertically, means for moving said end, and a guide secured upon each side of the other end to engage with the track and prevent lateral movement of the former, substantially as described.

48. In a can-body machine, a frame, the lower track A^5, the double sprocket-chain hav-

ing the link-rods B^9, folding formers carried upon said double sprocket-chain, each former comprising a middle or base piece, and having double wings hinged upon each side thereof, each end of the middle or base part of the former having perforated ears through which the link-rods of the double sprocket-chain passes, the double-flanged guiding-rollers E^{29}, running underneath the said track A^5 and engaging therewith, means for locking the wings open independently of each other, and means for successively releasing the open wings substantially as described.

49. In a can-body machine, a frame provided with tracks, a carrier provided with folding winged formers movable along said tracks, longitudinally-movable locking-bars at one end of each former for one set of wings and swinging levers at the other end for the other set, and means for closing said wings after they have been released from said bars and levers, substantially as described.

50. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side thereof, pins in the ends of the wings, longitudinally-movable notched bars moving crosswise of the machine at one end of the base for engaging with the pins of two of the wings, and notched levers at the other end for engaging with the pins of the other wings, and means for withdrawing the bars and levers from said pins, substantially as described.

51. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, two longitudinally-movable locking-bars moving crosswise of the machine for two of the wings, and notched levers for the other wings, a spring connected with and common to both of said bars, and means for withdrawing said bars and levers from engagement with said wings, substantially as described.

52. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, two longitudinally-movable locking-bars for two of the wings, each provided with a pin, a spring engaging at its ends with said pins, means for moving the bars outward against the tension of said spring, and means for locking and releasing the other wings, substantially as described.

53. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, and each wing being provided with a pin at one end, two superimposed longitudinally-movable bars for two of the wings, the outer end of each bar being notched and provided with an inclined nose and one of them being slotted, a pin projecting outwardly from each bar, one pin projecting through the slot in said bar, a spring secured at its ends to the two pins in said bars, means for moving the bars outward against the tension of said spring, and means for locking and releasing the other wings, substantially as described.

54. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, pins projecting from the base and from one end of each of the wings, two superimposed longitudinally-slotted spring-actuated locking-bars on the pins at one end of the base, the outer ends of which bars engage with the pins of two of the wings, a recessed bracket on the end of the base and overhanging said bars, means for moving the bars outward against the tension of the spring, and means for locking and releasing the other wings, substantially as described.

55. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, the base being provided with laterally-extending brackets, locking-bars at one end of the base for engaging with two of the wings, and notched levers on the brackets for engaging with the other two wings, said levers and bars being spring-actuated, and means for moving them against the action of said springs to release the wings, substantially as described.

56. In a can-body machine, a frame forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, the base being provided at one end with laterally-projecting brackets, a notched lever on each bracket having its inner portion slotted and provided with a projection, a screw through the slot and a spring engaging with the projection, spring-actuated locking-bars at the opposite end of the base, and means for moving the levers and bars against the action of said springs to release the wings, substantially as described.

57. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, a bracket adjustably secured to each end of the base and provided with an anti-friction-roller, means for locking and releasing said wings, a horn, and means for moving the formers along the same, substantially as described.

58. In a can-body machine, a frame, forwardly-moving formers thereon, each former comprising a base and two hinged wings at each side, spring-actuated means for locking the wings open, each spring being arranged to be above the hinge when the wings are open, and means for releasing the wings from said locks, substantially as described.

59. In a can-body machine, a frame provided with the lower track A^5, the double-flanged guide-rollers E^{29}, the double sprocket-chain carried upon four sprocket-wheels, a fixed horn

with a longitudinal guide-groove in its top surface, trippers, guides and seam-forming mechanism, five-part formers carried by said double sprocket-chain moving continuously forward and carrying the formers in position to be closed as they pass the trippers, guides and seam-forming mechanism, substantially as described.

60. In a can-body machine a frame with the lower track A^5 fixed therein, the double-flanged guide-rollers running underneath the same and engaging therewith, the fixed horn common to all the formers with a guide-groove along its top surface and also guide-grooved along each of its sides, a series of five-part formers moving continuously forward along the horn with means for causing the formers to take the metal blanks after the hooks are formed thereon from the oscillating folders and bend each one into a cylinder by the time it reaches the seam-former, substantially as herein described.

61. In a can-body machine, a frame provided with a horn and with trippers and guides adjacent thereto, an anvil in the horn, a bumper below the anvil, a series of folding formers provided with means for engaging with the trippers, the guides and the bumper, and means for moving said formers forward continuously, substantially as described.

62. In a can-body machine, a frame provided with a fixed horn having a longitudinal guide-groove in its upper surface and which horn and groove is common to all of the formers, five-part formers moving continuously forward along the horn, each former having a guiding lug or stud that engages with the guide-groove in the top surface of the horn, and means for operating each former so that it will bend a blank into a cylinder at successive steps and form the seam upon the interior of the can after the last step, substantially as described.

63. In a can-body machine, a frame provided with a horn, deflectors adjacent thereto, forwardly-moving hinge-winged folders, locking-bars for two of the wings and levers for the other two, the bars being provided with handles for engaging with a portion of the deflectors and the extended ends of the levers being adapted to engage with the others, and means below the anvil for forming the seam, substantially as described.

64. In a can-body machine, a frame provided with a horn, cam-grooves adjacent thereto, forwardly-moving folding formers, a portion of the wings of each of which is provided with means for entering said grooves and holding the wings closed, and means for forming the seam while the wings are so held, substantially as described.

65. In a can-body machine, a frame provided with a horn, grooves adjacent thereto, each of said grooves being provided with a cam-like curve, one of the curves being in advance of the other, forwardly-moving folding formers, a portion of the wings of each of which is provided with pins for entering said grooves and closing the wings, and means for forming the seam while the wings are closed, substantially as described.

66. In a can-body machine, a frame provided with a horn, grooves adjacent thereto, each of said grooves being provided with a cam-like curve, one of the curves being in advance of the other, forwardly-moving folding formers, a portion of the wings of each of which is provided with rollers for entering said grooves and closing the wings and means for forming the seam while the wings are closed, substantially as described.

67. In a can-body machine, a frame provided with a horn, trippers and guides adjacent thereto, forwardly-moving hinge-winged formers provided with means for engaging with the trippers and guides, and levers on the formers for engaging with the trippers and with the wings before the wings engage with the guides, substantially as described.

68. In a can-body machine, a frame provided with a horn, trippers and guides adjacent thereto, forwardly-moving hinge-winged formers provided with means for engaging with the trippers and guides, a rock-shaft journaled in each former, a lever on each end of the shaft, one end of which is adapted to engage with the trippers and the other end with the wings, and a spring for returning the levers to their normal position, substantially as described.

69. In a can-body machine, a frame provided with a horn, and channel-guides adjacent to the horn, a spring in one of the guides, forwardly-moving hinge-winged formers provided with means for engaging with the guides whereby each former is closed around the horn, and means for forming the seam while the wings are closed, substantially as described.

70. In a can-body machine, a frame provided with folders and a horn, forwardly-moving hinge-winged formers, means for closing one of the wings of the former before the other one, means for subsequently moving the other wing outward, and means for forming the seam while the second wing is so held outward, substantially as described.

71. In a can-body machine, a frame provided with folders and a horn, an anvil in the horn provided with a projection, forwardly-moving hinge-winged formers, one wing of each of which is provided with a projection that is adapted to pass beyond the projection of the anvil, means for closing the wings one in advance of the other and subsequently moving the one outward that is provided with the projection, and a hammer for forming the seam, substantially as described.

72. In a can-body machine, a frame provided with folders and a horn, an anvil in the horn provided with a longitudinally-recessed blade, forwardly-moving hinge-winged formers, one

wing of each of which is provided with a blade that is adapted to be carried outside of and beyond the blade of the anvil, a hammer between said wing and its blade, means for closing the wings and subsequently moving the one with the hammer outward from the other so as to draw the folds together and means for operating the hammer, substantially as described.

73. In a can-body machine, a frame provided with folders and a horn, an anvil in the horn, the face of which is grooved longitudinally, a blade on the side of the anvil adjacent to said groove, forwardly-moving hinge-winged formers, one wing of each of which is provided with a projection and a hammer, means for closing said wings one in advance of the other, means for subsequently moving one of said wings outward from the other and means for operating the hammer, substantially as described.

74. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers provided with means for engaging with the anvil to move it forward, and a hammer adapted to be operated during said movement of the anvil, substantially as described.

75. In a can-body machine, a frame provided with folders and a horn having a slot, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, a base adjustably secured below said slot, and adjustable means on the base for engaging with the hammer, and forcing it upward, substantially as described.

76. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, a bar, and means for moving it upward and forward in contact with the hammer, substantially as described.

77. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, adjustable standards, a bar pivotally secured at its ends to said standards, and means for simultaneously forcing the bar upward and forward in contact with the hammer, substantially as described.

78. In a can-body machine, a frame provided with folders and a horn having a slot, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, a bar on the frame below said slot, a base adjustably secured thereto, standards adjustably secured to the base, links pivotally secured to the standards, a bar secured at its ends to the ends of the links, a support for the bar, means for moving the bar forward in contact with the hammer, and means for returning it to its normal position, substantially as described.

79. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, a base below the slot in said horn and provided with standards and an adjustable stop, links secured to the standards, a notched bar on the links, one end of which is adapted to rest on the stop, a spring for returning the bar to its normal position, and a pin on the former for engaging with the shoulder of the bar and moving the bar upward and forward, substantially as described.

80. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, a base adjustably secured below the slot, in the horn and a wheel journaled in the base for engaging with the hammer and forcing it upward, substantially as described.

81. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, a leaf-like base below the slot, a set-screw through one of the leaves of the base and in engagement with the other leaf, and a wheel journaled in the upper leaf in position to engage with the hammer and force it upward, substantially as described.

82. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers, each provided with a hammer, the central portion of which is wider than either end, and a wheel adjustably mounted in position for engaging with the hammer and forcing it upward, substantially as described.

83. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving hinge-winged formers, a blade adjustably secured to the free edge of one of said wings, a hammer between the blade and said wing, and means for forcing the hammer upward, substantially as described.

84. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving hinge-winged formers, a slotted blade adjustably secured on the free edge of one of said wings, a hammer between the blade and said wing, pins in the hammer projecting through the slots of the blade, and means for forcing the hammer upward, substantially as described.

85. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, a notched blade on the anvil, forwardly-moving folding

formers, a latch thereon for engaging with the blade, a hammer and means for operating it while the anvil is being moved, substantially as described.

86. In a can-body machine, a frame provided with folders, and a slotted horn, a bracket in the horn, a longitudinally-slotted anvil on the bracket, a spring-pressed blade on the side of the anvil, forwardly-moving folding formers, each provided with a hammer and means for engaging with said blade, means for operating the hammer, and means for returning the anvil to its normal position, substantially as described.

87. In a can-body machine, a frame provided with folders and a slotted horn, a longitudinally-movable anvil in the horn, forwardly-moving formers, each of which is provided with a hammer and with means for moving the anvil forward, and adjustable means below the anvil for forcing the hammer upward, substantially as described.

88. In a can-body machine, a frame provided with folders and a horn, said horn being slotted longitudinally along its top and bottom, a bracket in the horn, a longitudinally-movable anvil supported by said bracket with its top and bottom fitting in said slots, forwardly-moving folding formers, each provided with a hammer, and means for forcing each hammer upward as it passes said anvil, substantially as described.

89. In a can-body machine, a frame carrying folders and a horn, said horn being slotted along both its top and bottom, a bracket in the horn, a longitudinally-moving two-part anvil supported by said bracket and being divided longitudinally and horizontally into an upper and a lower part, the two parts being adjustably connected together as by screws or their equivalents, the said anvil being adapted to move back and forth in said slots in said horn, forwardly-moving formers, each provided with a hammer and means for forcing each hammer upward and pressing together the folds of the blanks and forming the side seams of the can-bodies, substantially as described.

90. In a can-body machine, a frame provided with folders and a horn, folding formers, means for closing the formers and forming the seam and means for opening the lower wings of the formers without releasing the upper wings from the can-body, substantially as described.

91. In a can-body machine, a frame provided with folders and a horn, folding formers, means for closing the formers and forming the seam, and a wedge-like separator for opening the lower wings of the formers and holding them open, substantially as described.

92. In a can-body machine, a frame provided with folders and a horn, folding formers, means for closing the formers and forming the seam, diverging rods for opening the lower wings of the formers and holding them open during the soldering operation, substantially as described.

93. In a can-body machine, a frame provided with folders and a horn, folding formers, means for closing the formers and forming the seam, diverging rods for partially opening the formers, the rear ends of which extend beyond the rear end of the horn and are curved upward, substantially as described.

94. In a can-body machine, a frame provided with oscillating folders that form hooks on the ends of the blanks, a long fixed horn that is common to all of the formers, folding formers that move constantly forward along the horn, a flux-receptacle, means for applying the flux to the blank as it is carried forward by the former, means for forming the seam, and means for soldering the body before it leaves the horn, substantially as described.

95. In a can-body machine, a frame provided with oscillating folders that form hooks on the ends of the blanks, a long fixed horn that is common to all of the formers, folding formers that move constantly forward along the horn, a flux-receptacle provided with two discharges, means for partially closing the formers before they reach said discharges, means for applying flux to one of the folded ends of the blank by one of the discharges and to the other folded end of the blank by the other discharge, means for completely closing the formers and forming the seam, and means for soldering the body before it leaves the horn, substantially as described.

96. In a can-body machine, a frame provided with oscillating folders that form hooks on the ends of the blanks, a long fixed horn that is common to all of the formers, folding formers that move constantly forward along the horn, a flux-receptacle provided with two discharge-pipes, a mass of fibrous material at the end of one of the pipes for applying flux to one surface only of the hook on the end of the blank, means for forming the seam and soldering the body before it leaves the horn, substantially as described.

97. In a can-body machine, a frame provided with oscillating folders that form hooks on the ends of the blanks, a long fixed horn that is common to all of the formers, folding formers that move constantly forward along the horn, means for forming a locked side seam in the can-body, means for partially opening the folding formers after the said side seam is formed and means for soldering the said side seam before the body leaves the horn, substantially as described.

98. In a can-body machine, a frame provided with a horn, a soldering-box adjacent thereto, soldering-wheels journaled in the box, means for rotating them at different speeds, and means for forming the body and moving it forward in contact with said wheels, substantially as described.

99. In a can-body machine, a frame provided

with a horn, a soldering-box adjacent to the horn, a series of soldering-wheels journaled in the box, each of which is provided with a gear-wheel for rotating it, some of the gear-wheels being larger than the others, a shaft adjacent to the gear-wheels and provided with wheels of different diameters for engaging with said gear-wheels, and means for rotating said shaft and moving the can-body forward in contact with the soldering-wheels, substantially as described.

100. In a can-body machine, a frame provided with a horn, a soldering-box adjacent to the horn provided with a shaft extending longitudinally thereof, gear-wheels of different diameters on said shaft, soldering-wheels journaled in the box, each provided with a gear-wheel in engagement with one of the wheels on the shaft, an operating-shaft provided with a sprocket-wheel, sprocket-wheels on the frame, a carrier thereon provided with formers, and a sprocket-chain from one of the wheels on the frame to the sprocket-wheel on the operating-shaft for rotating the soldering-wheels simultaneously with the forward movement of the formers, substantially as described.

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