No. 854,872. PATENTED MAY 28, 1907.

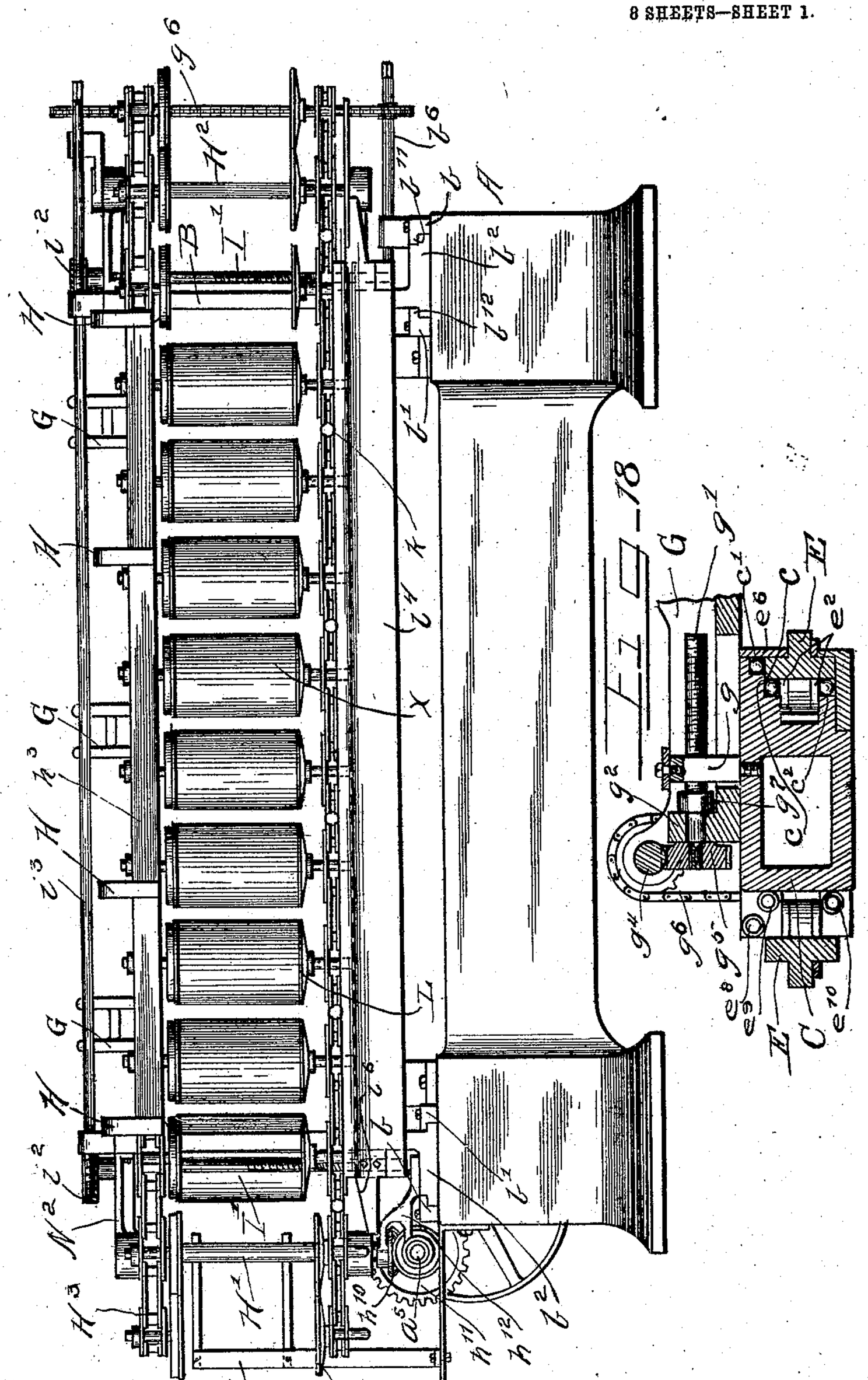
A. D. COLEMAN & C. STECHER.

LOCK SEAMING MACHINE.

APPLICATION FILED AUG. 4, 1905.

8 SHEETS—SHEET 1.

FIG. 1.



Witnesses

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H. H. Withenbury

Inventors

Arnold D. Coleman

Charles Stecher

by Charles W. Hill Atty.

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8 SHEETS—SHEET 2.

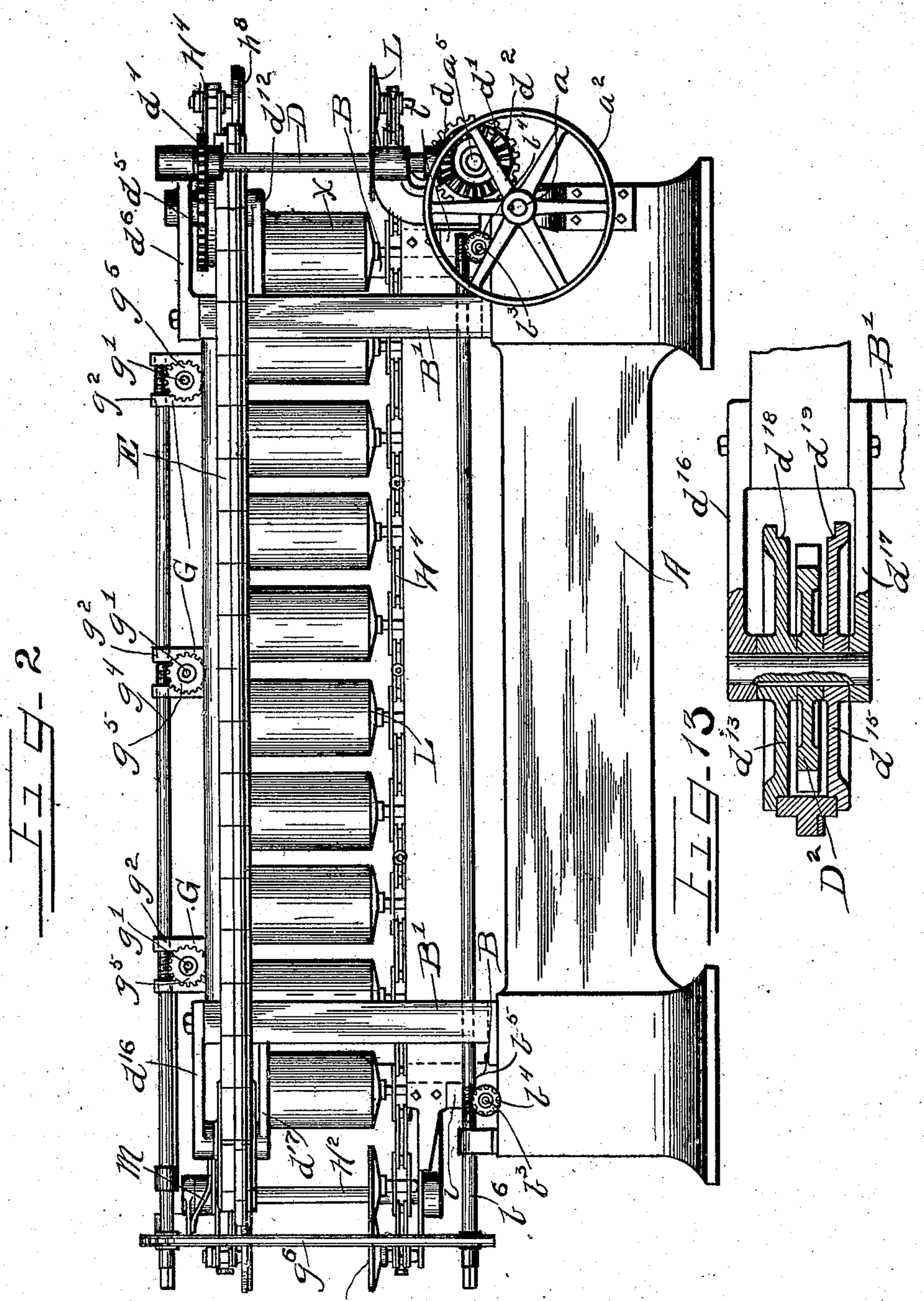

FIG. 2.

FIG. 13.

Witnesses
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8 SHEETS—SHEET 3

Fig-3

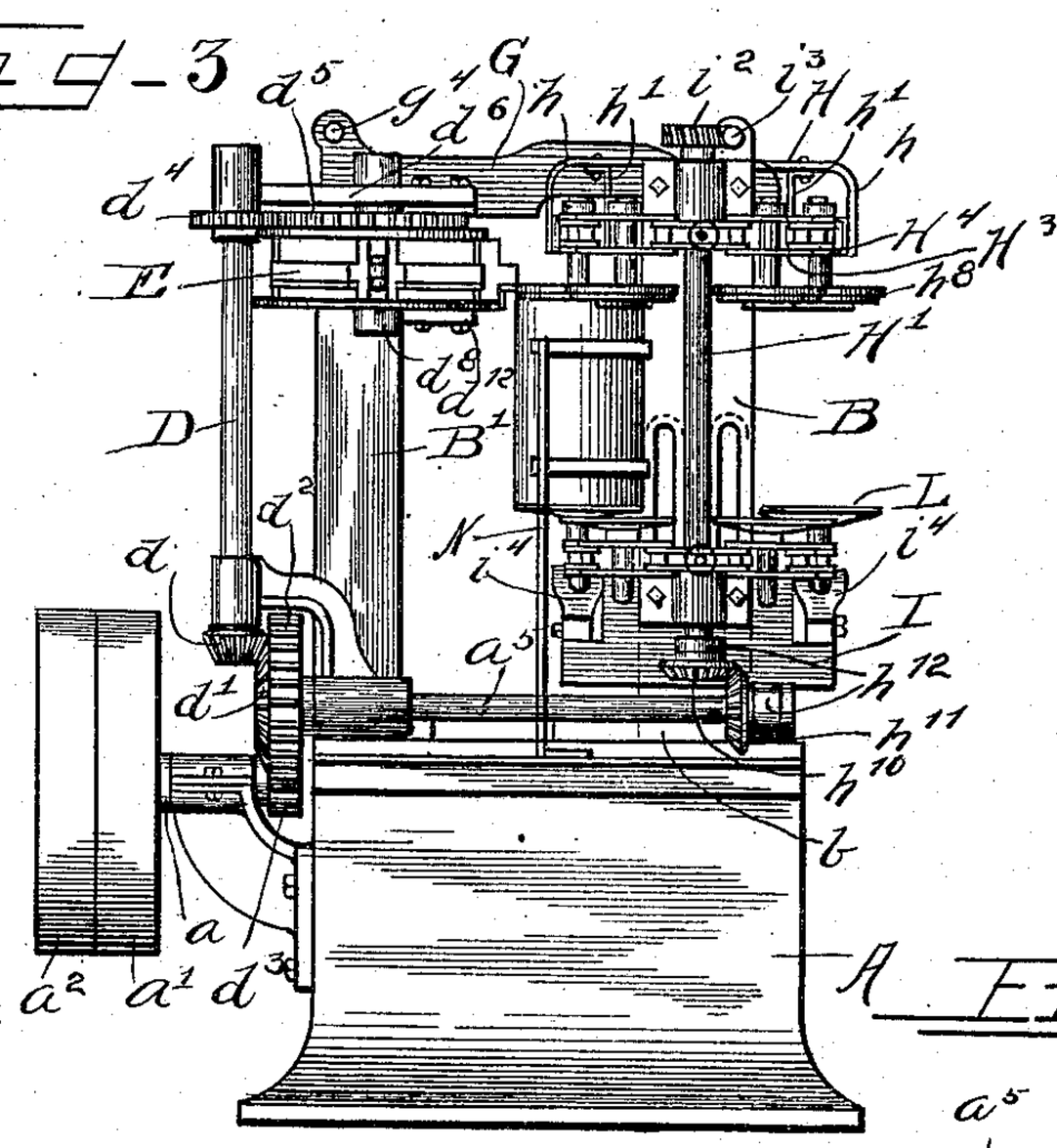


Fig-19

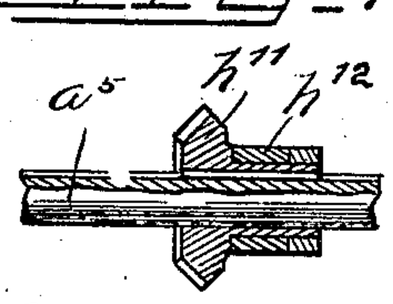
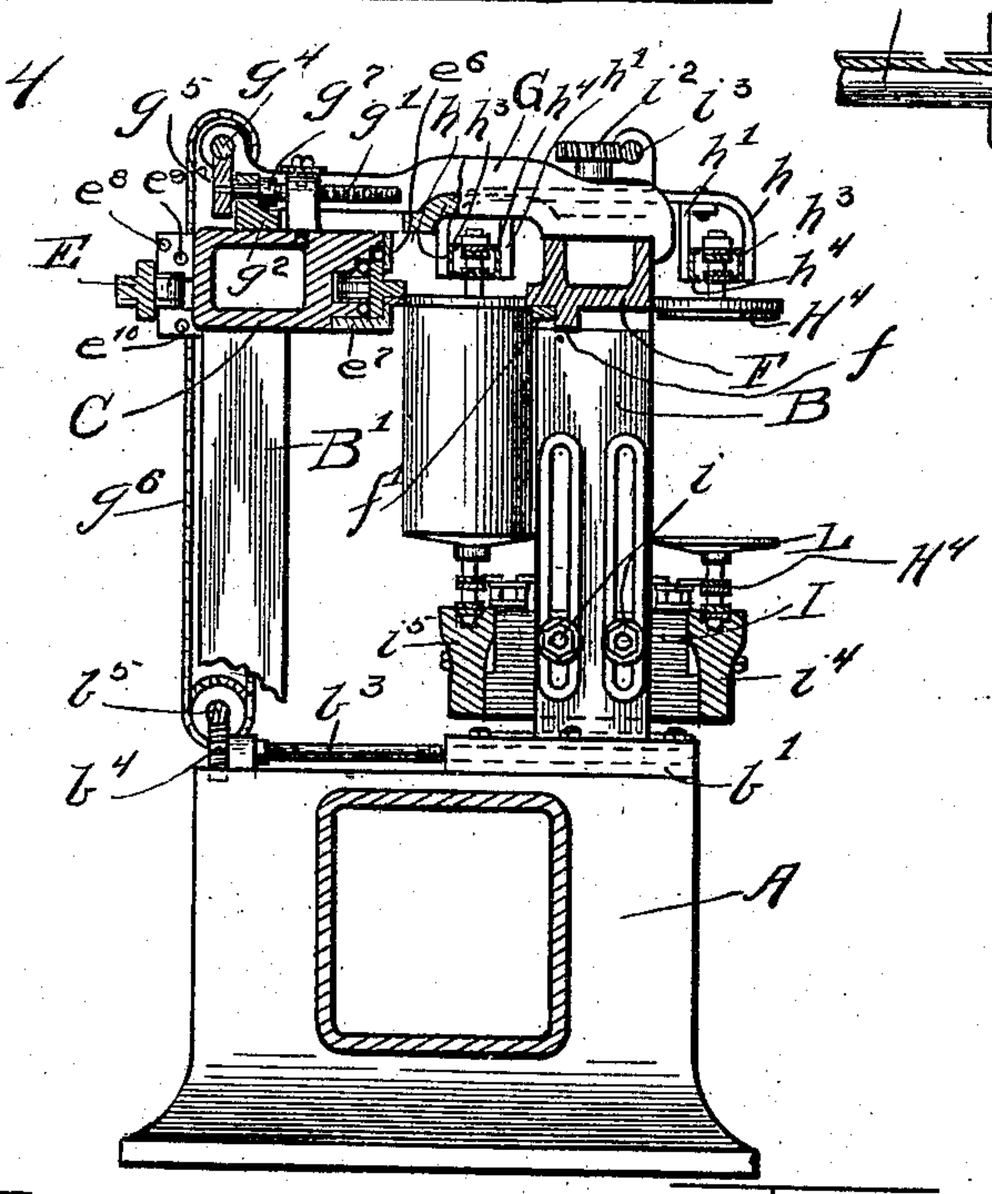


Fig-4



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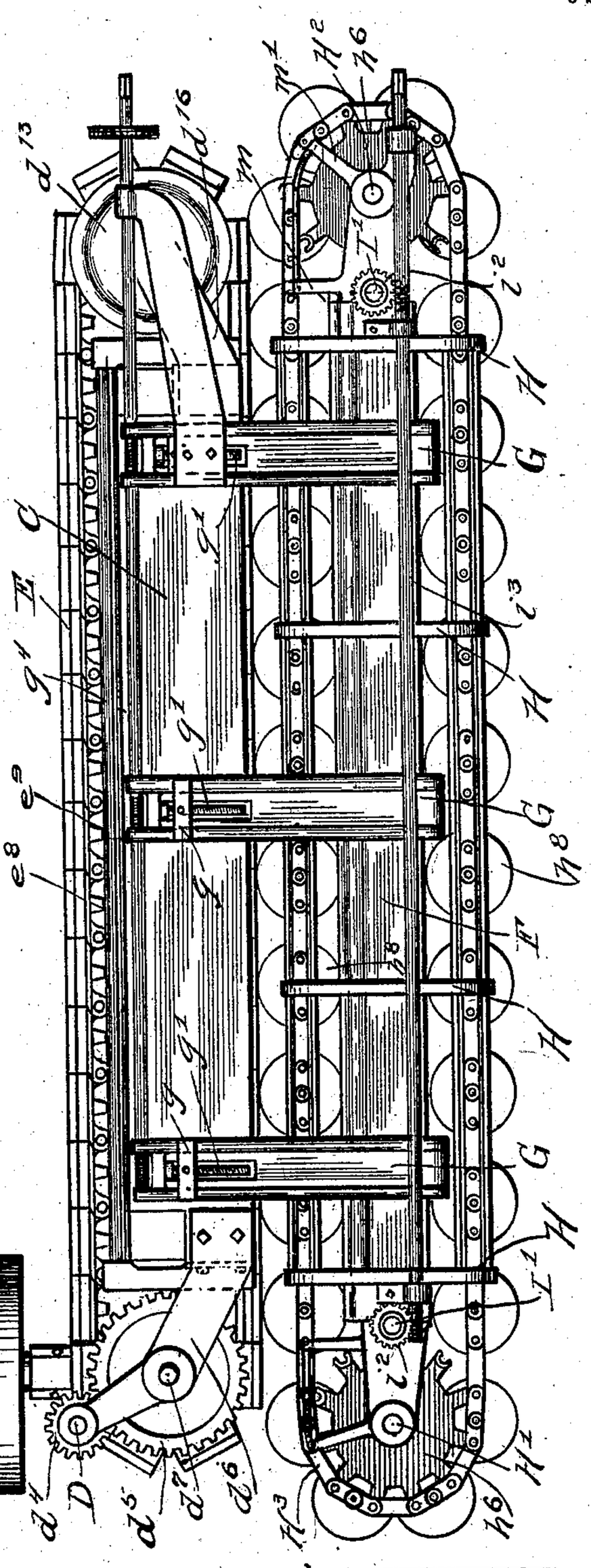
8 SHEETS—SHEET 4.

FIG. 5.



Witnesses

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APPLICATION FILED AUG. 4, 1905.

8 SHEETS—SHEET 5.

Fig. 6

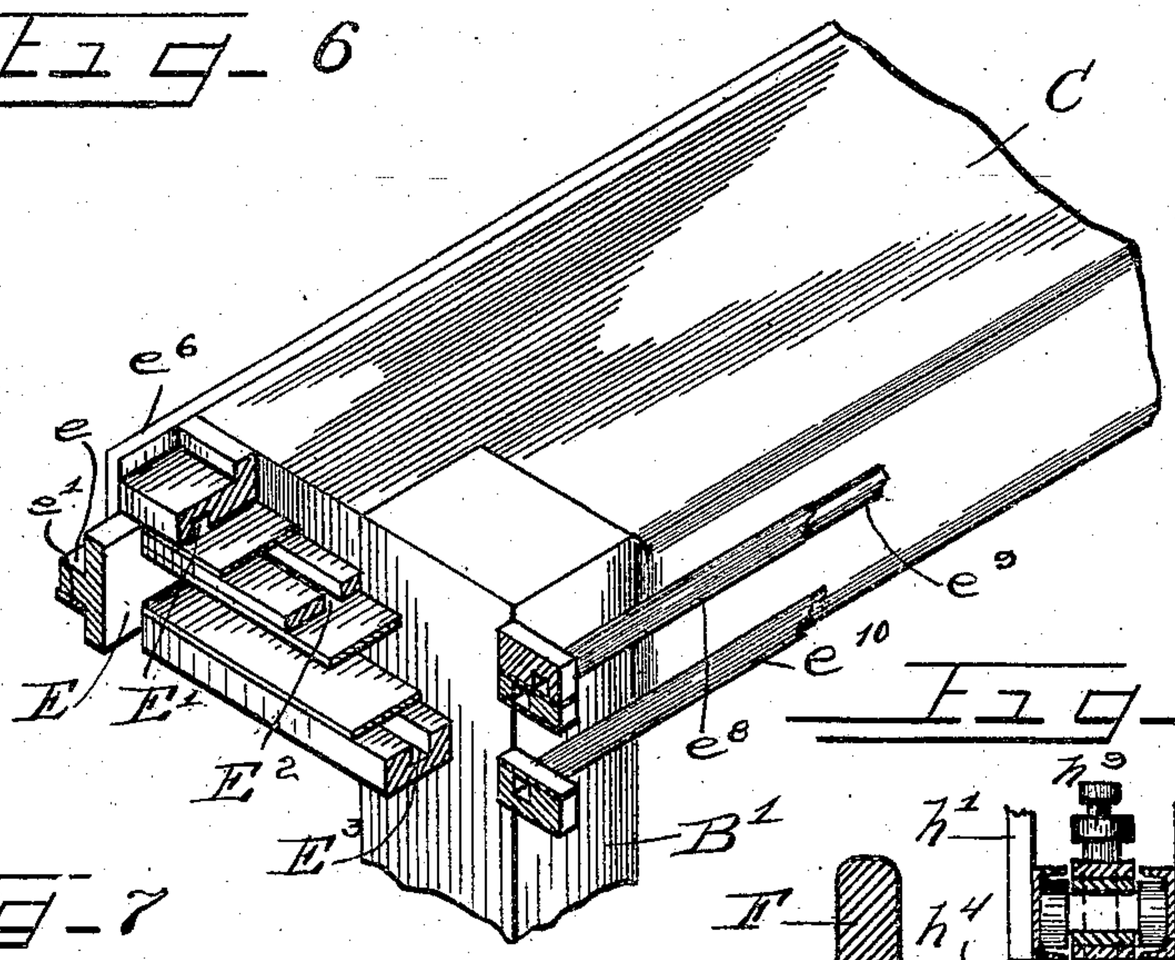


Fig. 8

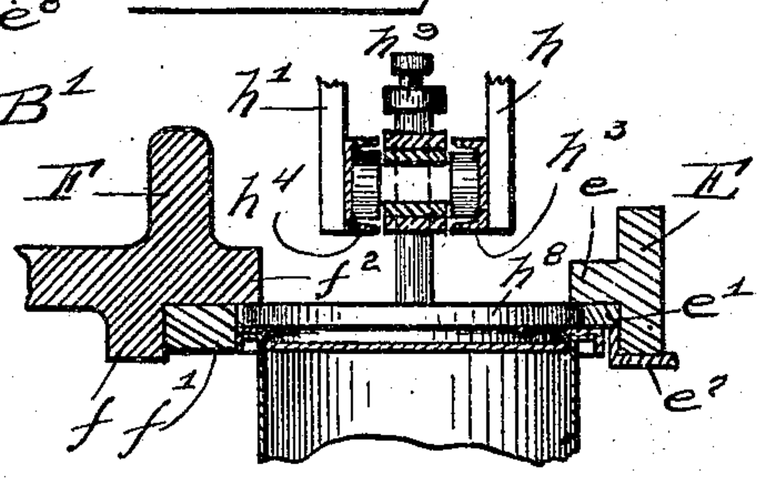


Fig. 7

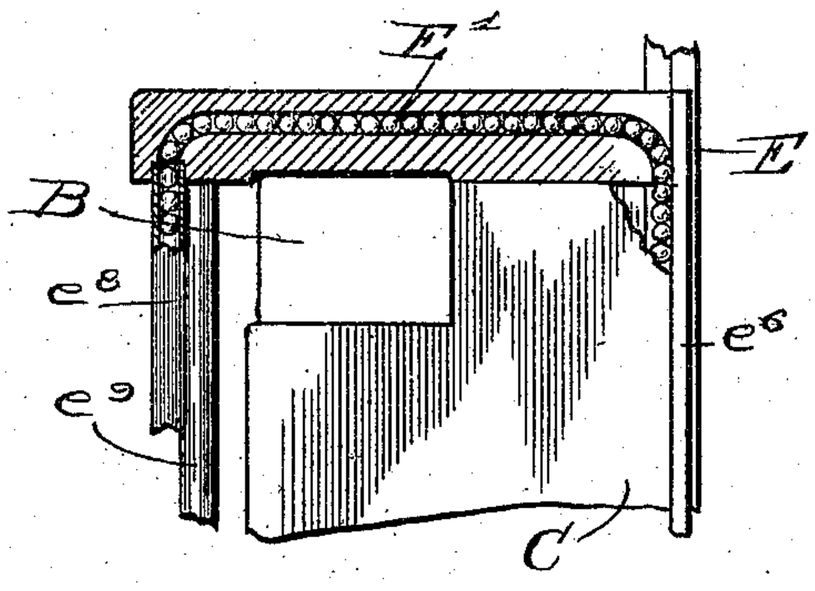


Fig. 9

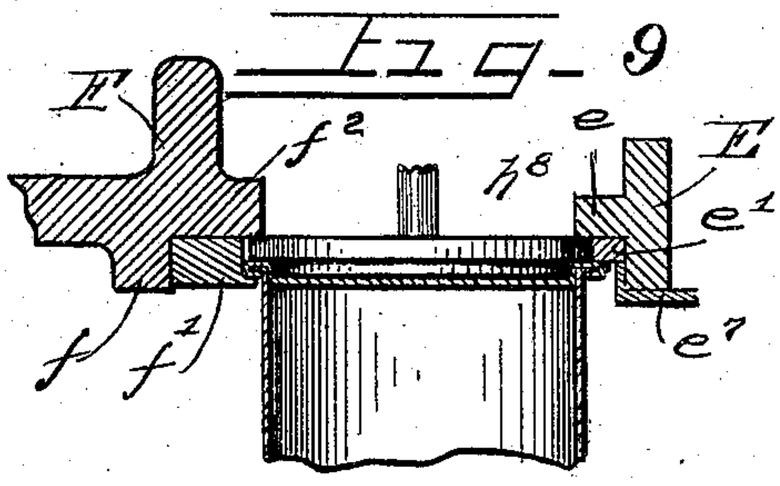


Fig. 11

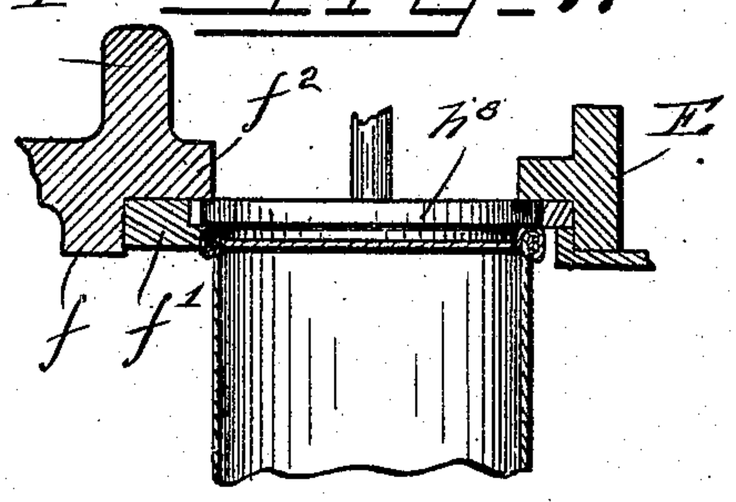
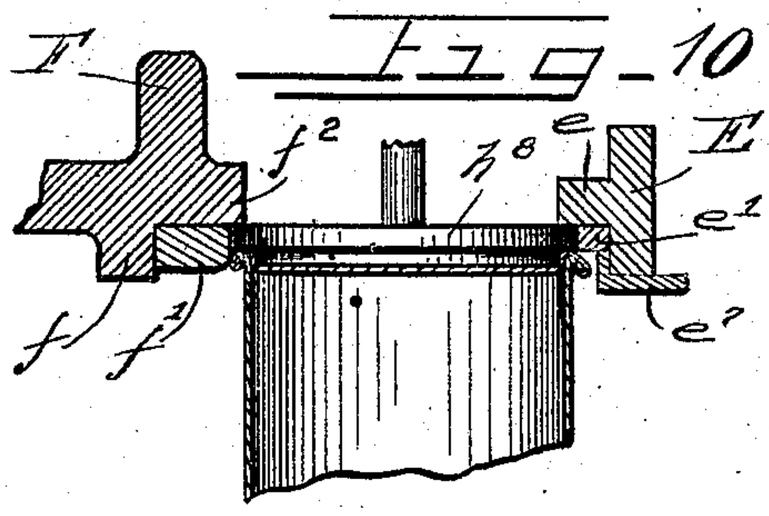


Fig. 10



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8 SHEETS—SHEET 6.

Fig. 12

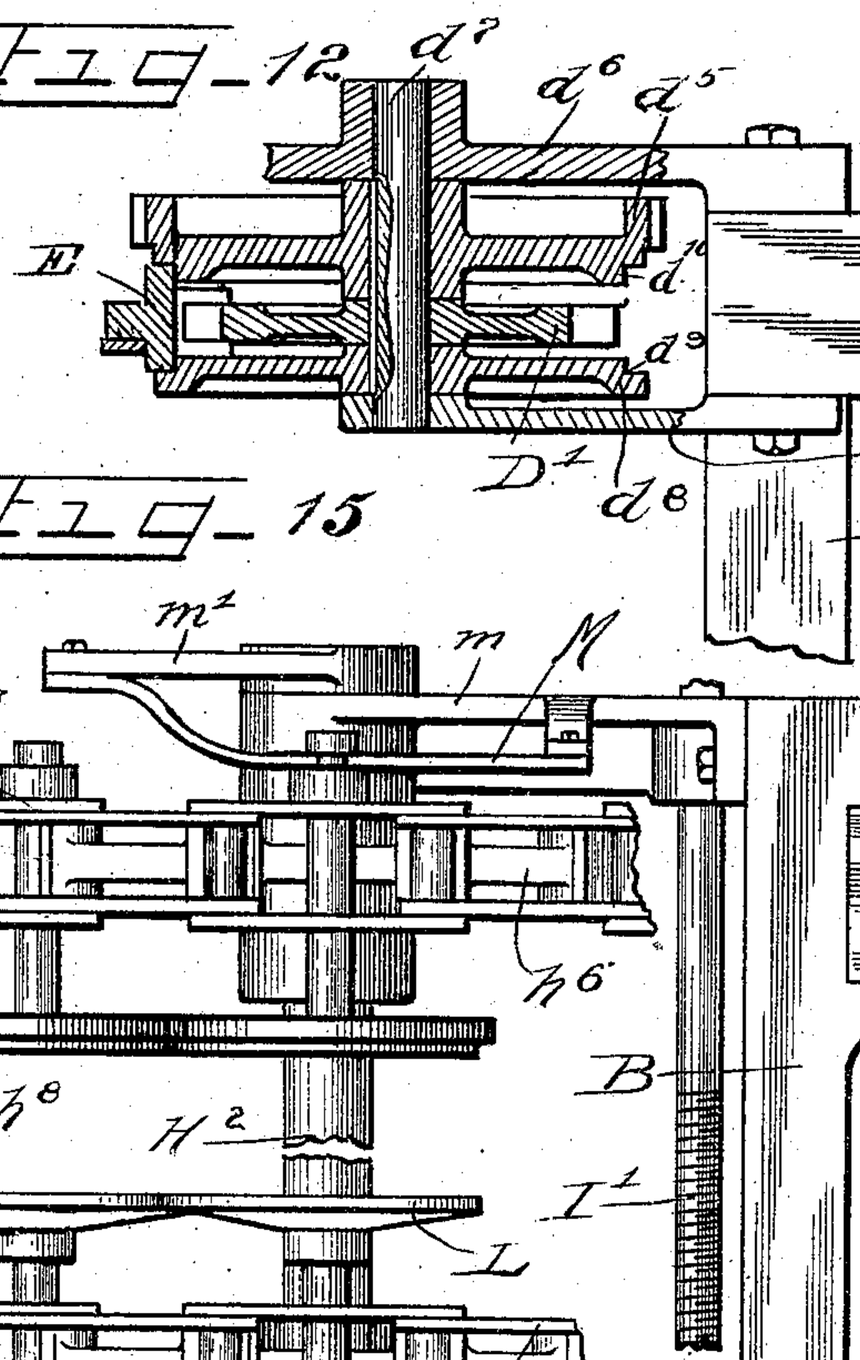


Fig. 14

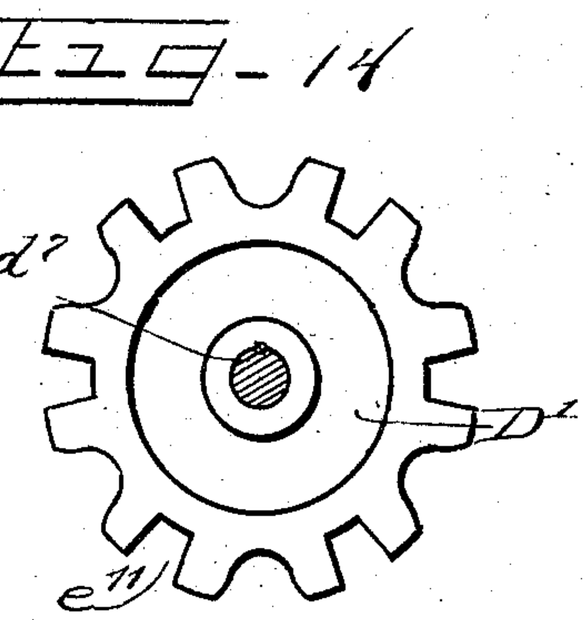


Fig. 15

Fig. 16

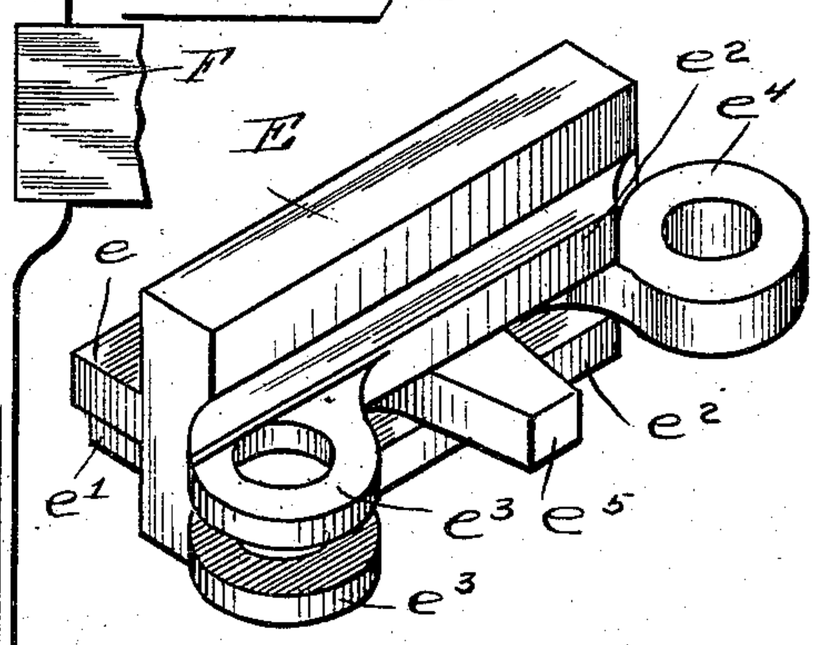
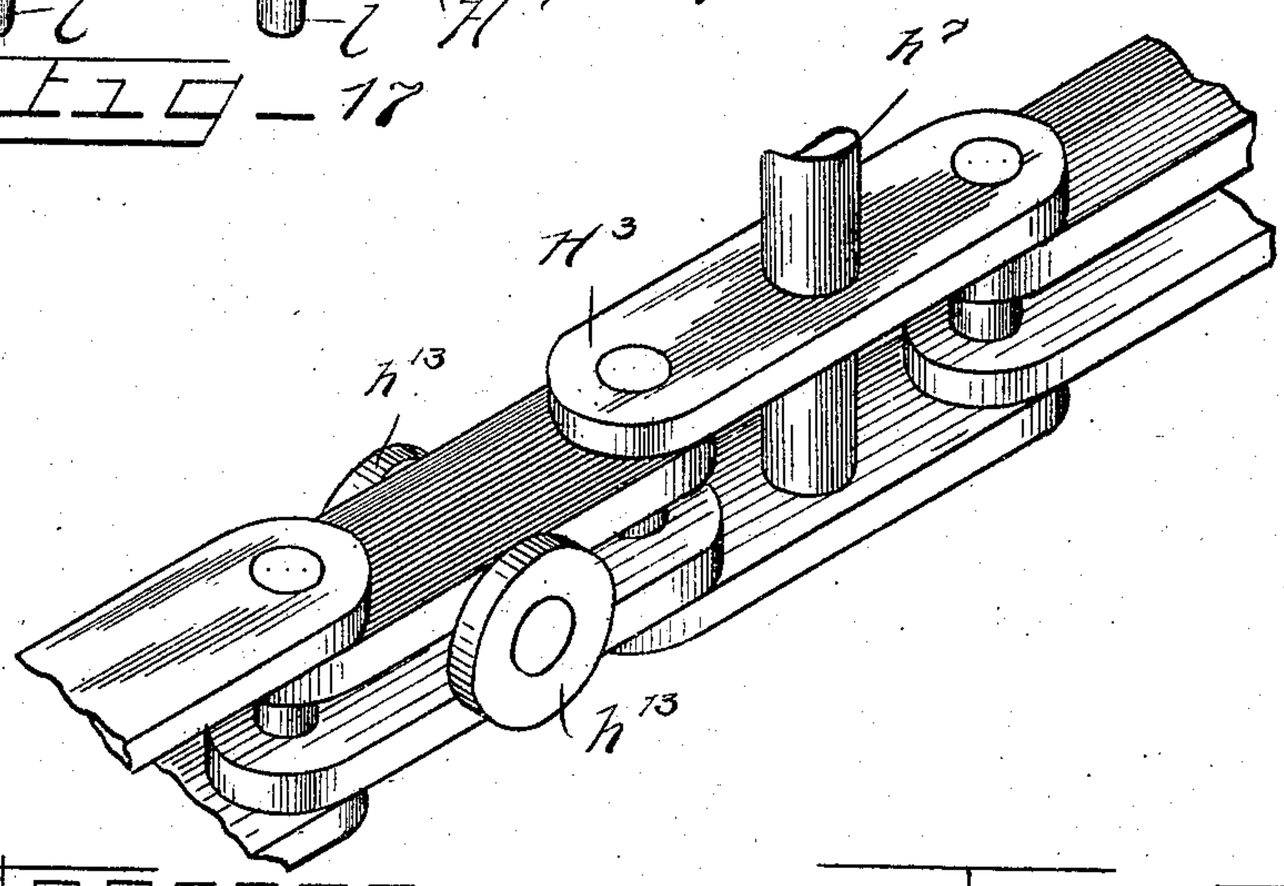


Fig. 17



Witnesses

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by Charles W. Fiele Atty.

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A. D. COLEMAN & C. STECHER.

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APPLICATION FILED AUG. 4, 1905.

8 SHEETS—SHEET 7.

Fig. 20

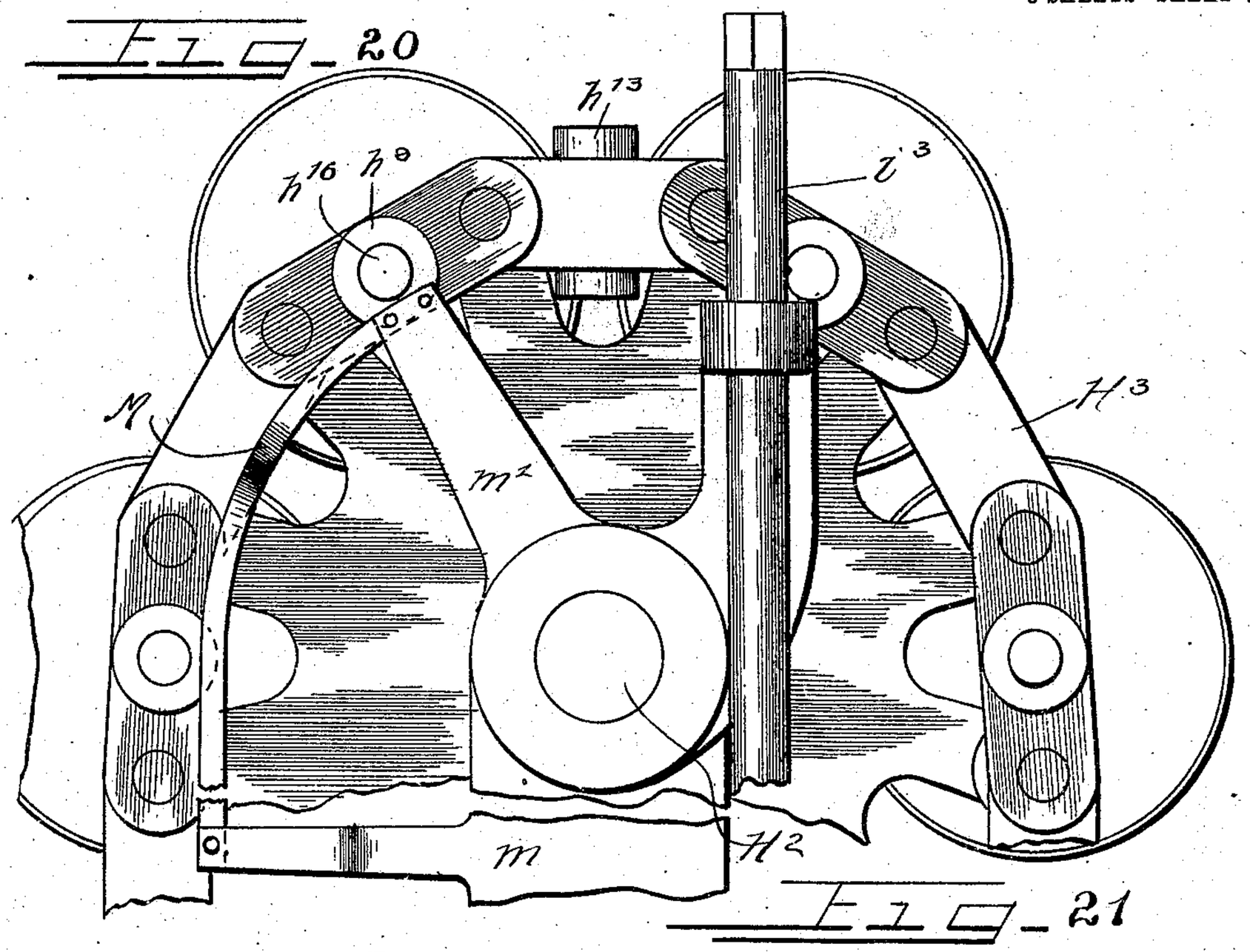

Fig. 21

Witnesses

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by Charles W. Hills Atty.

No. 854,872. PATENTED MAY 28, 1907.

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APPLICATION FILED AUG. 4, 1905.

8 SHEETS—SHEET 8.

Fig-22

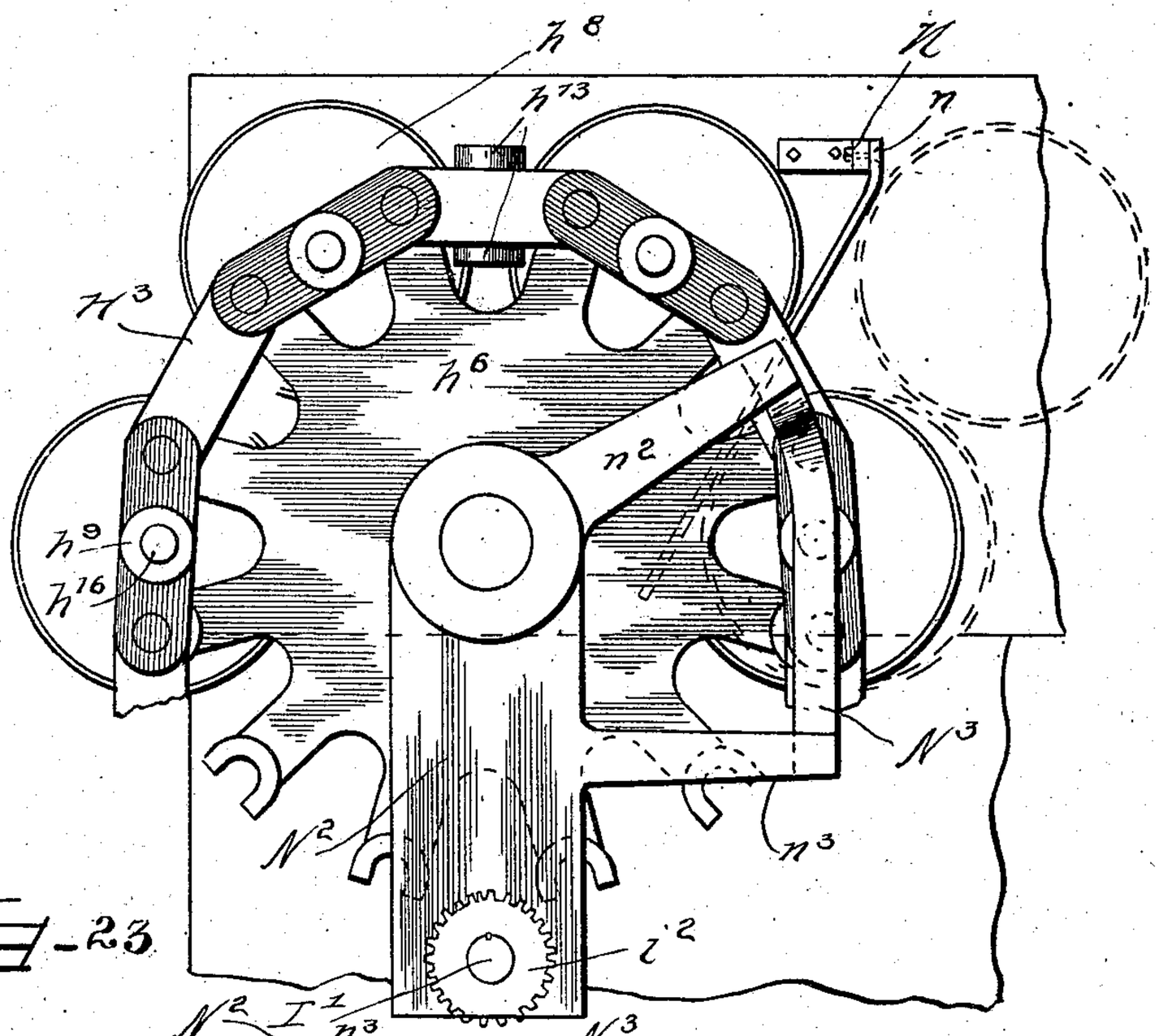


Fig-23

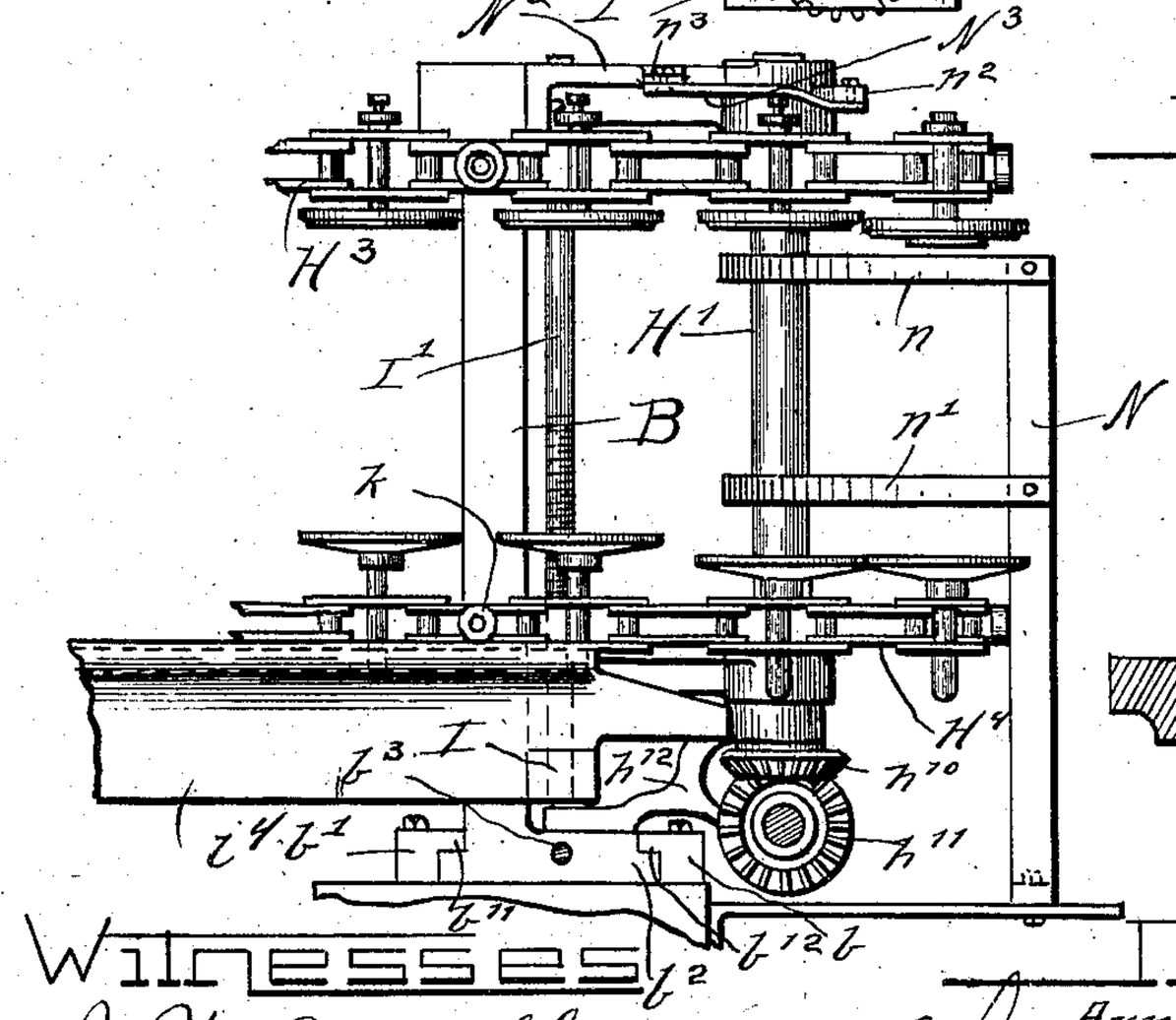
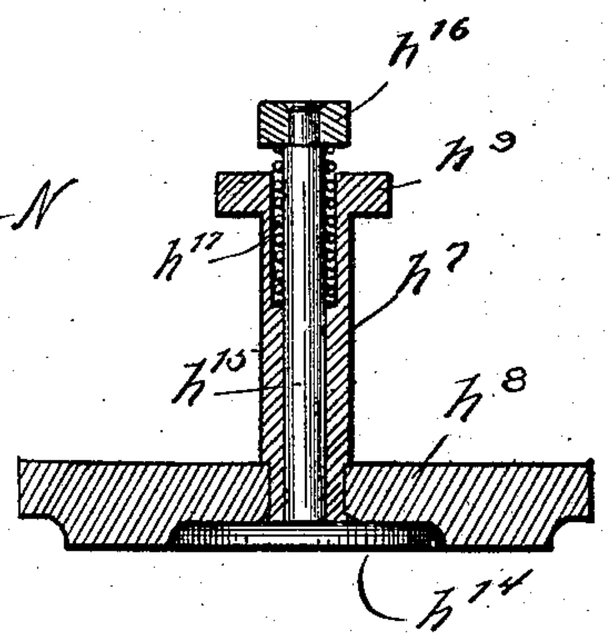


Fig-24



Witnesses

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W. W. Witherbury

Inventors

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Charles Stecher.

by Charles D. Kiles Atty.

UNITED STATES PATENT OFFICE.

ARNOLD D. COLEMAN AND CHARLES STECHER, OF CHICAGO, ILLINOIS.

LOCK-SEAMING MACHINE.

No. 854,872. Specification of Letters Patent. Patented May 28, 1907.

Application filed August 4, 1905. Serial No. 272,688.

To all whom it may concern:

Be it known that we, ARNOLD D. COLEMAN and CHARLES STECHER, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lock-Seaming Machines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in lock seaming machines and more particularly to a lock seaming machine adapted for automatically securing the heads on filled cans or the like, affording lock seams therefor.

The invention belongs to that class of lock seaming machines in which a can with the head in place is engaged between suitable revoluble chucks and the can body and head flanges rolled against a stationary die, thereby turning, folding and closing the seam as the can passes through the machine.

This invention has for its object the construction of a strong simple and durable mechanism for the purpose stated, capable of operating on many cans filled or empty, simultaneously and delivering the can with seams perfectly closed at a high rate per minute.

It is also an object of the invention to afford a strong, simple and durable construction for the die and for the movable element whereby rotation is imparted to the chucks and to the can, and also to afford means for adjusting the machine to cylindric cans of any desired size.

It is a further object of the invention to support the pressure chain against the thrust on the chucks on antifriction bearings thus insuring precision and ease in movement. It is also an object of the invention to afford a construction whereby the cans, which, if preferred may be filled, are moved through the machine on end, thus enabling the filled cans to be securely held in the chucks without danger of spilling the contents.

The invention embraces many novel features and consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a view in elevation of the other side thereof. Fig. 3 is an elevation of the drive end thereof. Fig. 4 is a central transverse section thereof. Fig. 5 is a top plan view of the machine. Fig. 6 is an enlarged fragmentary detail illustrating parts of the upper frame and the ball races for the link belt. Fig. 7 is a sectional detail of the same showing one of the transverse ball races. Fig. 8 is an enlarged transverse section showing one of the upper chucks, its carriage, the die, and the chain belt and illustrating a preliminary bend or fold in closing the seam. Fig. 9 is a similar view illustrating the second step in the folding or bending operation, the fold being turned under. Fig. 10 is a similar view and shows the fold completed and the seam nearly closed. Fig. 11 is a similar view and illustrates the final closing of the seam. Fig. 12 is an enlarged fragmentary section of the bracket and the sprocket wheel driving the link pressure belt. Fig. 13 is a similar view of the idler sprocket. Fig. 14 is a face view of the said sprocket wheel. Fig. 15 is an enlarged fragmentary view of the sprocket wheels and related mechanisms for driving the upper and the lower chuck chains. Fig. 16 is a perspective view of one of the sections or links of the pressure link belt. Fig. 17 is an enlarged detail of the chain for carrying the chucks. Fig. 18 is an enlarged detail illustrating the ball bearings for the pressure link belt. Fig. 19 is an enlarged detail of the gear for driving the chuck chains. Fig. 20 is an enlarged fragmentary top plan view of the idler sprocket and upper chuck chain. Fig. 21 is a side elevation thereof. Fig. 22 is an enlarged plan view of the driving sprocket for the chuck chain. Fig. 23 is a side elevation thereof. Fig. 24 is an enlarged vertical section of a chuck and its knockout.

As shown in said drawings: A indicates the machine base or table which as shown is constructed of cast metal and affords great rigidity, secured on said frame are upwardly extending standards B and B′ on opposite sides of the machine one pair being at each end thereof. The standards B are each provided with a foot or pedestal b^2 slidably secured transversely of the frame by means of ways or guides b—b' rigidly bolted in parallel pairs at each end of the machine and on the same side thereof between which the feet b^2

of the standards fit and flanges b^{11}—b^{12} are provided on said ways which overlap the feet of said standards and hold them in place.

As shown a screw shaft b^3 extends transversely of the machine and into the foot b^2 of the standard B and is provided on the opposite side of the machine with a worm gear b^4 which intermeshes with a worm b^5 on a shaft b^6 which extends the entire length of the machine and is shaped at one extremity to permit the same to be engaged by a wrench or other suitable tool or lever for rotating the same, thereby adjusting the standards B inwardly or outwardly simultaneously and to like extent. The standards B′ are rigidly bolted to the frame and extend upwardly to a height equal to that of the standards B.

Rigidly secured on the upper ends of the standards B′ is a horizontal longitudinal frame C affording a guide way on each side of the same. The guide way on the inner side of the frame is formed by grooving the same longitudinally to sufficient depth affording a relatively narrow central groove at the bottom and is provided with two longitudinal parallel shoulders or ledges indicated by c—c' in the upper wall of the groove which afford ball races as shown in Fig. 18. In the lower side wall of the groove a longitudinal shoulder c^2 is provided opposite the race c affording a lower ball race.

At the drive end of said frame is provided an upwardly extending shaft D the upper end of which is journaled in a bracket arm d^6 rigidly secured at the end of the frame C. The lower end is journaled on the base and provided at its lower end with beveled pinion d which intermeshes with a beveled gear d' secured on a shaft a^5 extending transversely of the top of the bed and provided on its end adjacent said beveled gear d' with a gear d^2 which intermeshes with a corresponding pinion d^3 on a main driving shaft a on which are provided the usual tight and loose pulleys a' and a^2 in a familiar manner. Journaled in said bracket d^6 and a corresponding bracket or arm d^{12} beneath the same is a shaft d^7 on which is rigidly secured a gear d^5 which intermeshes with the gear d^4 on said shaft. Beneath said gear d^5 and secured on the same shaft d^7 therewith is a sprocket wheel D′ and likewise rigidly secured upon the shaft below said sprocket wheel is a carrying disk d^8 the periphery of which at its upper edge is cut away to afford an outwardly directed shoulder d^9 as shown in Fig. 12 corresponding with a similar shoulder d^{10} on the under side of the gear wheel d^5 and adapted to receive the link pressure belt E between the same. At the opposite end of said frame C are secured brackets d^{16}—d^{17} corresponding with the brackets d^6—d^{12} between which are journaled an upper disk or plate d^{13} and a lower disk d^{15} each of which is provided with an inner outwardly facing shoulder d^{18}—d^{19} corresponding with those on the gear d^5 and the disk d^8 and a sprocket wheel D² is secured between said disks and together with the sprocket wheel D′ carries the link pressure belt or chain. Said belt or chain E as shown comprises a plurality of rectangular links each comprising a block or mass of metal each of which comprises a vertical flat face from near the center of which extends an outwardly directed longitudinal rib e provided on its under side with a wear plate e' adapted to bear against the projecting edge of the upper chucks. Each link is provided on its rear side with longitudinal parallel ribs e^2 shaped on the outer side to afford a part of a ball race and to register with the shoulders c—c^2 in the frame C. At one end of each link is provided outwardly extending apertured knuckles e^3 adapted to receive between the same an apertured knuckle e^4 on the abutting end of the adjacent link, and disposed between said ribs e^2 is a central tooth or projection e^5 adapted to positively engage in complemental notches e^{11} in the sprocket wheels D′, D² and between which are alternately disposed relatively deep rounded notches adapted to receive the knuckles formed by the articulations between said links.

From the construction described it is evident that except when passing around the sprocket wheels, the outer faces of the links form a practically continuous rigid bearing face and that the outward pressure against said pressure belt is received on the ball bearings therefor. As shown one set of said balls engage on the upper edges of the links and the two other sets engage between the ribs e^2 and the frame thus affording great strength and rigidity affording but slight frictional resistance to movement as each link is mounted on antifriction bearings. As shown a plate e^6 engages on the inner face of the frame and extends downwardly over the outer face of the links between the sprocket wheels and as shown in Figs. 4 and 18 affords a part of the upper ball-race. In a like manner an angle plate e^7 engaged on the under side of the frame projects beneath the links and upwardly along their face holding the same firmly against the balls.

At each end of the frame C as shown in Fig. 6 are transverse ball-races E′, E² and E³ which communicate with the respective ball-races at the inner side of the frame and which at their outer ends are connected with pipes e^8, e^9 and e^{10} the other ends of which communicate in similar transverse ball-races opening into said ball-races between the frame and chain belt thus completing the circuit. On the opposite side the machine at a height corresponding with the height of the working face of the pressure chain or belt and supported on the adjustable standards B, is a rigid die bar F having on its under side a downwardly directed longitudinal rib f

against which and secured to the die bar is a hardened steel die f' which extends for the entire length of the die bar. The edge f^2 of the die bar projects beyond the working edge of the die and corresponds with the central rib e on the links. Said working edge of the die face at the receiving end of the machine affords an inclined shoulder adapted to engage the can head and can body flanges and to roll the same together to afford a lock seam. The working face of the die consequently varies in form in cross section at different points in its length as dependent upon the part of the operation of closing the seam taking place at any given point in said bar as shown in the cross sectional views thereof in Figs. 8 to 11 inclusive.

Rigidly secured on the bar F and extending across and upon the frame C are tie bars G one of which is provided over each standard B and one at the middle of the machine. The ends of said tie bars resting on said frame C are slotted longitudinally as shown in Fig. 18 and are provided with bearings g^2 at their outer ends for the longitudinal screw shafts g'. Each of said screw shafts has a worm gear g^5 at the outer end thereof. Secured to the frame C in each slot is a nut g through which extends one of said threaded shafts. Each of said shafts is provided at the inner side of the bearing g^2 with a collar g^7 and the worm gear g^5 at the outer end of said shaft intermeshes with the corresponding worm on the shaft g^4 which is connected with the shaft b^6 by means of a sprocket chain g^6 trained over corresponding sprocket wheels of said shafts so that rotation of the shaft b^6 by means of any suitable crank or hand wheel acts to adjust the standards B and the rigid die bar F simultaneously toward or from the pressure chain E.

The cans X in an upright position with the head to be secured thereon, in place are carried along and rolled against the stationary die, making one or more complete revolutions in closing the seam. Movable chucks are provided for supporting and rotating said cans and moving the same through the machine. Said chucks as shown comprise an upper and a lower set and the chucks of each set are connected by chains and move together.

As shown transverse carrying bars H are supported across the top of the die bar F and upon the inner and outer end of each carrying bar parallel downwardly extending arms h, and h' are provided in which are secured horizontal, inwardly facing parallel channel bars h^3 and h^4, the lower flanges of each pair of which afford a track on each side of the die bar and somewhat above the same. Journaled at each end of the machine on the adjustable standard B is a vertical shaft H' and H^2 respectively. A beveled gear h^{10} is secured on the lower end of the shaft H' and meshes with a like gear h^{11} feathered on the transverse driving shaft a^5 and a yoke h^{12} which also affords the bearing for that end of the shaft a^5 acts to slide said gear on said shaft with the movement of the standard B thus keeping said gears always in mesh. Secured on each of said shafts H' and H^2 at a level with the tracks afforded by said channel bars is a sprocket wheel h^6 about which is trained a link chain H^3 such as illustrated in Fig. 17 and which connects the upper chucks h^8. Said chain as shown comprises plates or straps of metal pintled together as usual or in any suitable manner. Alternate links in said chain are provided with lateral rollers h^{13} journaled centrally thereon, which run on the track afforded by said channels thereby reducing friction while carrying the chain horizontally. Extending through each intermediate link and at right angles with the axis of said rollers h^{13} is a rotatable cylindric stem h^7 slidably secured therein. Each stem is rigidly secured to its chuck h^8 which comprises as shown a circular plate or disk having its under half reduced in size to fit into the recess in the can head when the same is placed upon the can and providing above the same an outwardly projecting concentric rim adapted to roll against the die and to be firmly forced thereagainst and rolled thereon by the chain or belt E. The upper end of each stem as shown is provided with an enlarged head h^9 which prevents the stem falling through the apertures of the chain when the can is removed. As shown each chuck h^8 is provided with a knockout plate h^{14} recessed in the under face thereof and provided with a stem h^{15} which extends upwardly through a central bore in the chuck stem h^7 and is provided with an enlarged head h^{16} beneath which engages a spring h^{17} which acts to support the knockout in its elevated position as shown in Fig. 24.

The sprocket wheels h^6 over which the chuck carrying chain H^3 is trained are each constructed with outwardly directed arms having notches in the end thereof adapted to engage the pintles by which the links of the chain are articulated. As shown in Fig. 15, the lower chuck chain H^4 corresponds with the upper chain H^3 in construction and is trained around sprocket wheels h^{18} secured on the shafts H' and H^2 and carries the lower chucks L hereinafter described.

Each standard is provided with parallel vertical slots as shown in Figs. 3 and 4 opening therethrough longitudinally of the machine and movably secured therein on each standard is a carriage I which is adjustably secured to said standards by the stud bolts i which extend through said slots and into the carriage. Means are provided for adjusting said carriages vertically on said standards comprising as shown two shafts I' one at each end of the machine whose lower ends have

threaded engagement in apertures in said carriages. The upper end of each shaft is provided with a worm gear i^2 both of which are driven by a worm shaft i^3 one end of which is shaped to be engaged by a wrench, crank or any suitable means for rotating the same and which, when rotated in one direction, acts to elevate the carriages and in the other to lower the same thus simultaneously adjusting both carriages of the machine for various lengths of cans. Rigidly connecting and bolted on each side of each of said carriages and extending longitudinally of the machine and directly beneath the channel iron tracks for the upper chucks are ways i^4 and i^5 each having a longitudinal groove therein and flat upper faces, and at the rear or discharge end of the machine having an inclined end i^6 as shown in Fig. 1. The chuck chain H^4 trained around the lower sprocket wheels h^{18} is provided at short intervals in its length with links having lateral rollers k on each side thereof adapted to track on the flat faces of the ways and to support the weight of the chain reducing friction to a minimum. The lower chucks comprise upwardly facing circular disks L which engage in the recess in the can bottom to support the can and are each provided with a spindle or stem l slidably and rotatably engaged through the center of alternate links in said chain. Said spindles are rounded at the lower end to engage and slide readily in said track or grooves in the ways.

At the front or receiving end of the machine, and supported on arms m—m' is a curved cam M positioned above the enlarged heads h^9 of the chuck stems h^7 and acting to force the chucks down upon the can heads as the same are fed into the machine. At the discharge end of the machine at the end of the die, and the channel track is an upright or standard N having horizontal arms n—n' which project obliquely inwardly between the upper and the lower chucks and act to deflect the cans outwardly from the machine, and secured on arms n^2—n^3 on the bracket N^2 at the end of the frame C is a cam track N^3 positioned to engage the heads h^{16} of the knockouts, depressing the same and releasing the cans from the chucks.

The operation is as follows: The cans are fed into the machine at the end remote from the drive end, and may be fed either manually or automatically and may be previously filled if desired. The can is placed upon one of the lower chucks L and beneath the upper corresponding chuck h^8 with the can head in place. As the chuck chains carry the cans inwardly the projecting rim or edge of each upper chuck is engaged and held down firmly upon the can by means of the projecting lip of the die which engages over the same. The rib e of the pressure chain or belt E also engages over the chuck pressing the same downwardly while the wear plate e' engages against the edge of the chuck and forces each against the corresponding flat face of the die rolling the chucks along the edge of said die and continuously rotating the cans. The shape of the successive sections of the die act first to roll the flange of the sheet metal head inwardly as shown in Fig. 9 bends the fold down as shown in Fig. 10 and finally closes the seam down onto the side of the can as shown in Fig. 11, thus completing the closing of the seam. During the progress of the cans through the machine the rate of rotation is not sufficiently high to throw the fluid contents of the can therefrom, in consequence the can may be filled and headed without the necessity of soldering the same. As the pressure belt or chain moves along the frame C the balls in the various races against which the links are supported, roll around the frame across the end of the same and back again through the tubes and thence across the end again into the races behind the chain thus enabling great pressure to be brought to bear on the die thereby without increasing friction materially. In the same manner, the upper and the lower chains work to carry the chains and chucks with minimum friction at all times, and as the cans approach the discharge end of the machine the spindles for the lower chucks roll out of the grooves in the inner way and on to the downwardly inclined portion at the end of the way. The knockout now acts and the cans are released and may readily be removed either by an operator or by suitable automatic means to convey the same away.

The machine may be fed either automatically or by hand as preferred and may readily be adjusted for cans of any desired size inasmuch as the heads I, carrying the ways for the lower chucks can be adjusted to suit the length of the can by rotation of the shaft i^3. The adjustment of the standards B carrying the die and the chucks laterally therewith can be accomplished quickly and easily by means of the shaft b^5. When once adjusted the worms rigidly lock the standards in the adjusted positions preventing loss of adjustment through vibrations.

Obviously various constructions of chucks may be used and I do not purpose limiting this application for patent otherwise than necessitated by the prior art, as obviously many details of construction and operation may be varied without departing from the principles of our invention.

We claim as our invention:

1. A machine of the class described comprising oppositely disposed, rolling chucks having projecting edges adapted to receive a filled can therebetween in upright position and to clamp the head in place thereon, a stationary die and means engaging the upper chuck and rolling the can head and can body flanges against the die acting to seam

the head on the can without soldering, link belts carrying said chucks, anti-friction bearings for said belts and guideways for said chucks.

2. A machine adapted to head and seam filled cans comprising chucks adapted to engage the filled can therebetween in upright position and clamp a head thereon, a fixed relatively straight die extending parallel with the travel of the chucks, means for rolling the head and body flanges against said die adapted to afford a locked seam, anti-friction bearings for said means, means releasing the cans from the chucks at the delivery end of the machine, adjustable guideways for said chucks and anti-friction means adapted to actuate said chucks.

3. In a machine adapted for seaming heads on filled cans, oppositely disposed upper and lower chucks, adapted to engage therebetween a filled can and the head therefor means rolling the projecting head and body flanges along a die varying in cross section to correspond with the part of the seaming operation to be done thereby closing the seam.

4. In a machine for heading filled cans, upper and lower chucks, the one to support a can, the other to grip the head thereon a fixed die along which the projecting flanges of the head and body are rolled and continuously movable pressure mechanism acting to force the seam against the fixed die closing the seam.

5. In a machine of the class described, a chuck adapted to support a can in upright position, a complemental chuck adapted to engage a head thereon, a fixed die, means acting on one of the chucks to revolve the chuck and can, forcing the head and body flanges against the die, and mechanisms adjusting said chucks to various sizes of cans.

6. In a machine for heading filled cans upper and lower chucks, the one to support a can the other to grip the head thereon, a fixed die along which the projecting head and body flanges are rolled, a belt acting to force said flanges against the die and antifriction bearings for said belt.

7. In a machine of the class described a chuck adapted to support the can in upright position, an upper chuck to engage the head thereon, a fixed die, means revolving the chucks and can and forcing the head and body flanges against the die, and means adjusting said chucks relatively to each other to adapt the machine to various sizes of cans.

8. In a machine of the class described a stationary straight die, an oppositely disposed pressure belt upper and lower chucks, the upper rolling against the die by the action of said belt and cans engaged between the chucks, the head and body flanges engaging in said die and being closed thereby.

9. A machine for heading filled cans, a plurality of traveling lower chucks adapted to support the can, a complemental upper chuck adapted to engage the head thereon, a die supported at the height of the seam to be formed, movable means acting to hold the seam against the die and to continuously revolve the chuck and the can thereon and means for moving said cans and chucks continuously through the machine.

10. In a machine of the class described a die, connected upper and complemental connected lower chucks adapted to engage a can and its head therebetween, one set of said chucks being adjustable relatively to the other set to accommodate cans of different heights and means engaging the chucks acting to roll the head and body flanges against the die in closing the seam.

11. In a machine adapted to head and seam filled cans, comprising a plurality of continuously movable connected lower chucks complemental connected upper chucks adapted to engage a can and the head therebetween, a continuous die bar in position to be engaged by the upper chucks, a die thereon adapted to engage the projecting body and head flanges to form the seam, means for simultaneously moving said chuck longitudinally through the machine, a link belt applying rolling pressure to the upper chucks thereby rolling the cans and acting to force the projecting flanges against the die, the face of said die being varied in shape in its length to progressively form and close the seam and means for adjusting the die and said link belt relatively for different diameters of cans.

12. In a machine adapted for seaming heads on cans, flexibly connected upper and flexibly connected lower chucks arranged in pairs and adapted to engage the head to a can body between each pair of chucks, means for simultaneously moving said chucks and the cans through the machine, a fixed die positioned for engagement with the head and the body flanges and continuously moving pressure mechanism acting to roll the upper chucks on a part of the die bar thereby rolling the said flanges against said die.

13. A machine for seaming the heads on cans comprising a plurality of pairs of connected chucks adapted each pair to engage a can and its head therebetween a die bar positioned for engagement by the projecting edges of the upper chucks a die thereon adapted to receive the flanges of the can and the head and adjustable pressure mechanism also engaging the chucks acting to roll said projecting flanges against the die, the face of said die bar varying in its length in cross sections and adapted to form and close the seam.

14. In a machine for heading cans the combination with a plurality of pairs of oppositely disposed upper and lower chucks, of flexible connections spacing each of the upper chucks, and each of the lower chucks a uniform distance apart, means for simultane-

ously moving said chucks through the machine, mechanisms for holding said chucks in gripping relation upon the can and its head therein, a fixed die positioned to be engaged by the projecting head and body flanges of the can, and shaped on its face to form and close the seam, a link belt acting to engage the upper chucks of each pair and to force said flanges against the die and to continuously roll the can and antifriction bearings for said link belt.

15. A machine for the purpose set forth comprising opposing pairs of chucks each comprising an upper and a lower chuck adapted to engage the can and its head therebetween, a stationary die shaped at intervals in its length to form and close the seam, a link belt comprising articulated links each having a rib thereon engaging over and against the upper chucks and acting to rotate the chucks and the cans and to force said flanges against the fixed die, antifriction bearings for said links and upper and lower tracks affording guideways for said chucks.

16. In a machine for the purpose set forth, upper and lower chucks, a straight die bar, a die thereon varied in shape throughout its length to form and close the head and body seam of the can, a belt acting to force the head and body flanges against said die with rolling pressure, antifriction bearings for the belt, and means for adjusting the die relatively to the belt for cans of different diameters and means adjusting the machine for cans of different lengths.

17. In a machine of the class described, a die and a continuously moving link belt acting to roll the can body and head flanges thereagainst and antifriction bearings for the links of said chain, for a part of the run of the same adjacent the die.

18. In a machine of the class described an endless pressure belt comprising articulated sections, sprocket wheels therefor, a frame along which said belt is drawn, ball races formed in said frame and belt sections, antifriction balls in said races and plates engaging around said sections and holding the same to the frame.

19. In a machine of the class described a pressure chain comprising individual abutting and articulating sections each having a flat outer face and shaped on the back to afford knuckles whereby the sections are articulated together, a frame against which said sections slide, antifriction bearing members between the frame and the back of said sections and plates engaging the sections closely to the frame.

20. In a machine of the class described a pressure chain comprising articulated sections each forming one link in the chain, sprocket wheels at each end of the machine about which said chain is trained, a frame intermediate the sprocket wheels, a ball race between the frame and the back of each section or link, balls therein against which the chain runs, ball races at the ends and outer side of the frame communicating with the ball races adjacent the chain and affording a circuit for the balls.

21. In a machine of the class described a horizontally rotating sprocket wheel at each end of the machine, a link pressure chain trained around the same and having a continuous outer surface between the sprocket wheels, ribs on the back of each link, a frame against which the chain moves, a guideway in the frame, ball races at the back of each link and in the inner faces of said guide way, balls in said races, connecting ball races extending transversely of the frame at each end thereof and along the outer side of the frame and adapted to receive the balls from the races between the frame and the chain, a straight die opposite the chain and mechanism adapted to adjust the die and chain relatively to each other.

22. In a machine of the class described comprising standards, a straight die thereon, a pressure chain comprising duplicate articulated links, a rigid backing for said pressure chain or belt, antifriction bearings therein, rotatable means for adjusting the die and pressure chain, relatively, vertical shafts at each end of the machine, sprocket wheels thereon, upper and lower sprocket chains thereon, slidable and rotatable chucks spaced equal distances apart and in oppositely disposed pairs on said chains and adapted to engage the cans and can heads therebetween, the upper chucks engaged between the die and pressure chain and rolling the can and head flanges against the die and tracks or guideways acting to support the chucks in fixed relation while closing the seam.

23. In a machine of the class described the combination with a fixed die and a continuously movable pressure chain of chucks adapted to engage the can and head between the same, antifriction bearings for the pressure chain, a projecting lip on the face of each section of the pressure chain adapted to engage over and against the upper chuck and to clamp the can and can head together, and bear the chuck against the die, a guide way supporting the lower chucks at a uniform height, the face of said die varying in shape throughout its length and adapted to form and close the head seam.

24. In a machine of the class described the combination with a straight die having a face varying in cross section at intervals in its length of a pressure chain opposite the die and continuously movable and acting to roll the can and the head flanges against the die in closing the seam, a vertical shaft at each end of the machine, sprocket wheels on each, an upper and a lower sprocket chain trained around the sprocket wheels, tracks disposed

to support both runs of both sprocket chains between the sprockets, laterally disposed rollers on the chains adapted to support the same on the tracks and oppositely arranged chucks slidably and rotatably carried on alternate links of said upper and lower chains and adapted for vertical movement in inserting the can.

25. In a machine of the class described the combination with a straight die bar, of a link pressure belt opposite and parallel therewith and adapted to roll the can and head flanges against the die, upper and lower chucks adapted to engage and carry the can and head between the die and pressure chain, upwardly directed spindles on the upper chuck chains through alternate links of which said spindles extend, a track above the die on which said chain and the chucks are carried, downwardly directed spindles on the lower chuck, a chain in alternate links of which the spindles of the lower chucks are slidably engaged, a track below the lower chucks in which the spindles thereof engage and rotatable means adapted to adjust said track relatively thereby adjusting the chucks for different can lengths.

26. In a machine of the class described the combination with a die of rolling pressure mechanism acting oppositely thereto, means for adjusting said die and pressure mechanism relatively to each other comprising standards upon which the die is supported, adjusting means at the top and the bottom of said standards and rotatable means acting simultaneously to adjust said standards bodily to shift the die toward or from the pressure mechanism.

27. In a machine of the class described the combination with a die of pressure mechanism movable parallel to the die and acting against the same, adjustable standards on which the die is supported, upper and lower chuck carrying chains revoluble around said standards, upper and lower chucks carried thereon oppositely in pairs, a track carried on said standards and adapted to support the upper chuck chains, a vertically adjustable carriage on said standards acting to support the lower chuck chain and to afford a positive support for the chucks thereon, and means for adjusting said carriage to vary the distance between the opposite chucks.

28. In a can heading machine the combination with upper and lower chucks of sprocket wheels journaled at each end of the machine, upper and lower chuck carrying chains thereon, means for vertically adjusting the upper sprockets and chain, a stationary die extending longitudinally of the machine and against which the upper chucks revolve, a frame supported opposite said die and parallel therewith, a pressure chain carried on said frame and adapted to rotate said chucks and anti-friction bearings in said frame for said pressure chain.

29. In a machine for seaming heads on cans, a plurality of upper and lower chucks, a die extending longitudinally of the machine against which the upper chucks revolve, a frame extending parallel with said die, a guide way on the inner face thereof, a sprocket wheel journaled at each end of said frame, a pressure chain thereon adapted to move in said guide way, a longitudinal rib on said chain adapted to engage the upper chucks and revolve the same, anti-friction bearings for said chain, adjustable tie bars connecting said frame and die and means for simultaneously adjusting said tie bars and moving the die to and from the frame.

30. In a machine for heading cans the combination with upper and lower chucks of a stationary die bar against which the upper chucks revolve, a frame parallel with said die bar and having a guide way in its inner face, sprocket wheels journaled at the ends of said frame, a pressure chain carried therein and movable in said guide way, ball bearings in said frame for the pressure chain, a vertically adjustable carriage for the lower chucks, means adjustably connecting said die bar and frame and means for adjusting said carriage vertically.

31. In a device of the class described the combination with upper and lower chuck carrying chains, of chucks journaled therein, a die bar extending parallel with the travel of said chucks, adjustable standards supporting said bar in position for the upper chucks to revolve thereagainst, a screw shaft engaged on each standard, a worm shaft connecting said screw shafts and adapted to simultaneously adjust said standards, a frame supported parallel with said die bar, a guide way therein, a pressure chain movable in said guide way and adapted to revolve the upper chucks, antifriction bearings for said chain, longitudinally slotted tie bars carried on said die bar, nuts carried on said frame and extending through the slots in said tie bars, shafts having threaded engagement in said nuts and journaled in said tie bars, worm gears thereon, a worm shaft meshing with said gears and means operatively connecting said worm shafts.

In testimony whereof we have hereunto subscribed our names in the presence of two subscribing witnesses.

ARNOLD D. COLEMAN.
CHARLES STECHER.

Witnesses:
C. W. HILLS,
W. W. WITHENBURY.