C. W. SADLER.

IRONING MACHINE.

APPLICATION FILED JUNE 4, 1915.

1,166,856.

Patented Jan. 4, 1916.

7 SHEETS—SHEET 1.

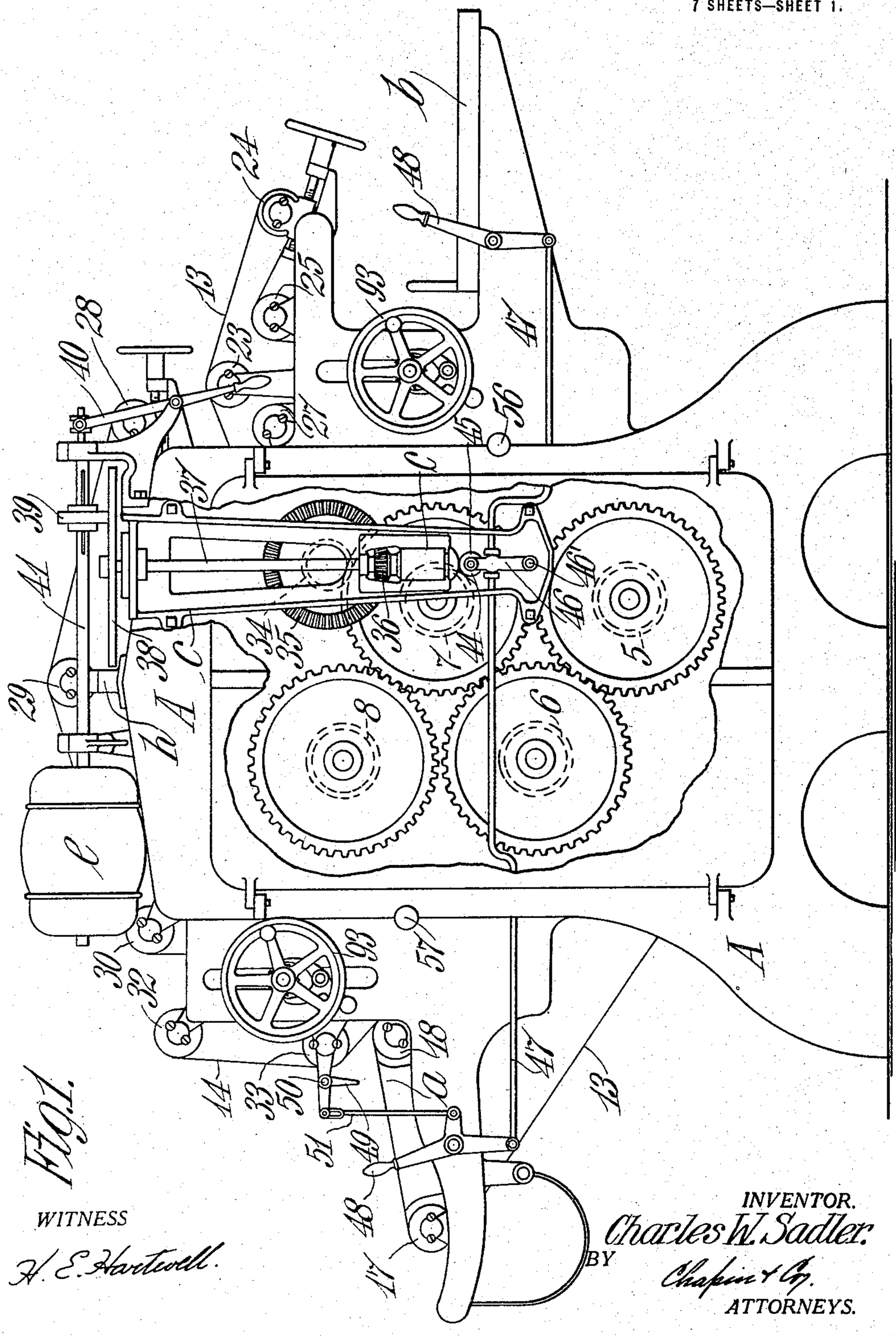

Fig. 1.

WITNESS

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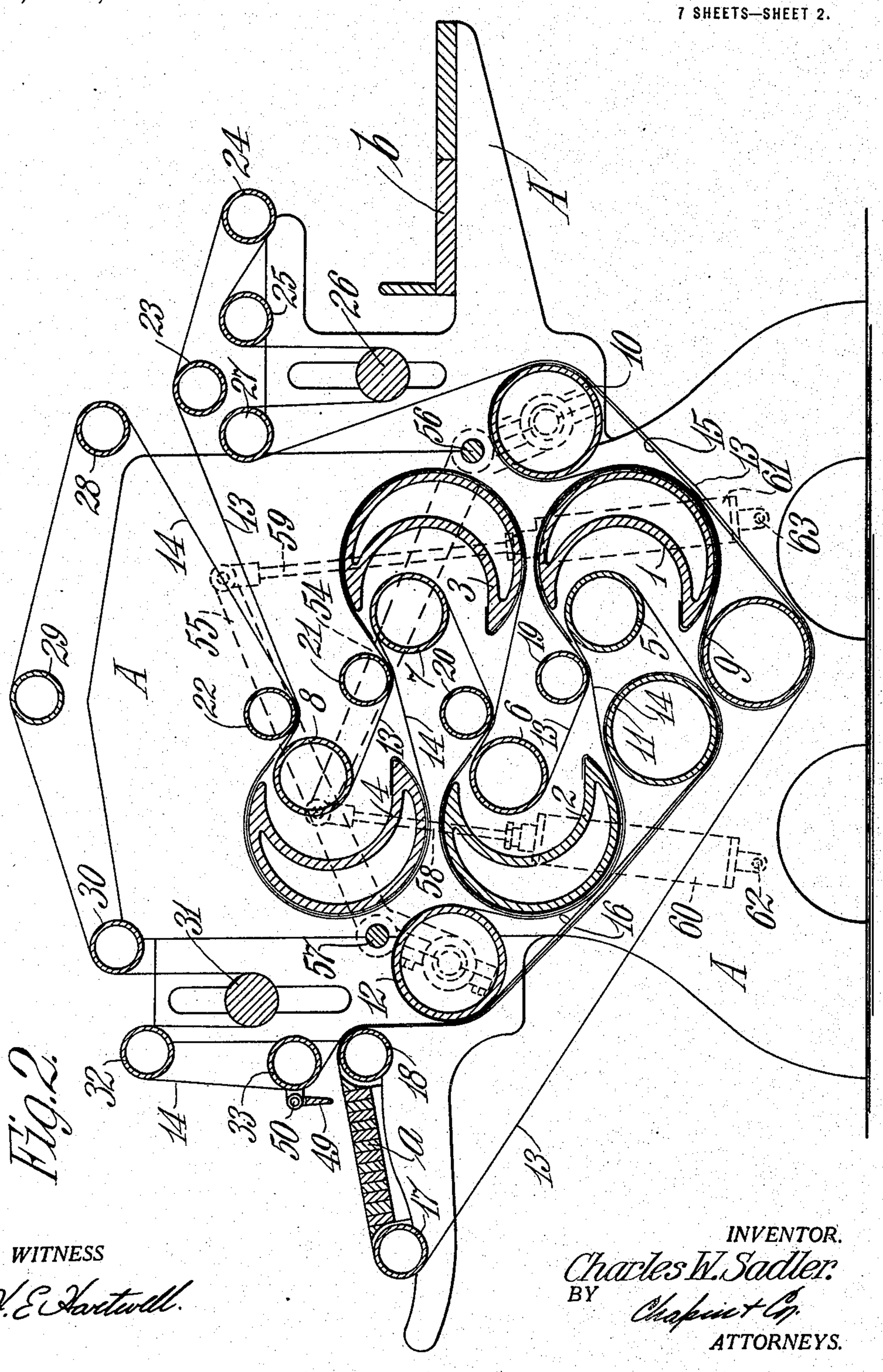

Fig. 2.

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Fig. 3.

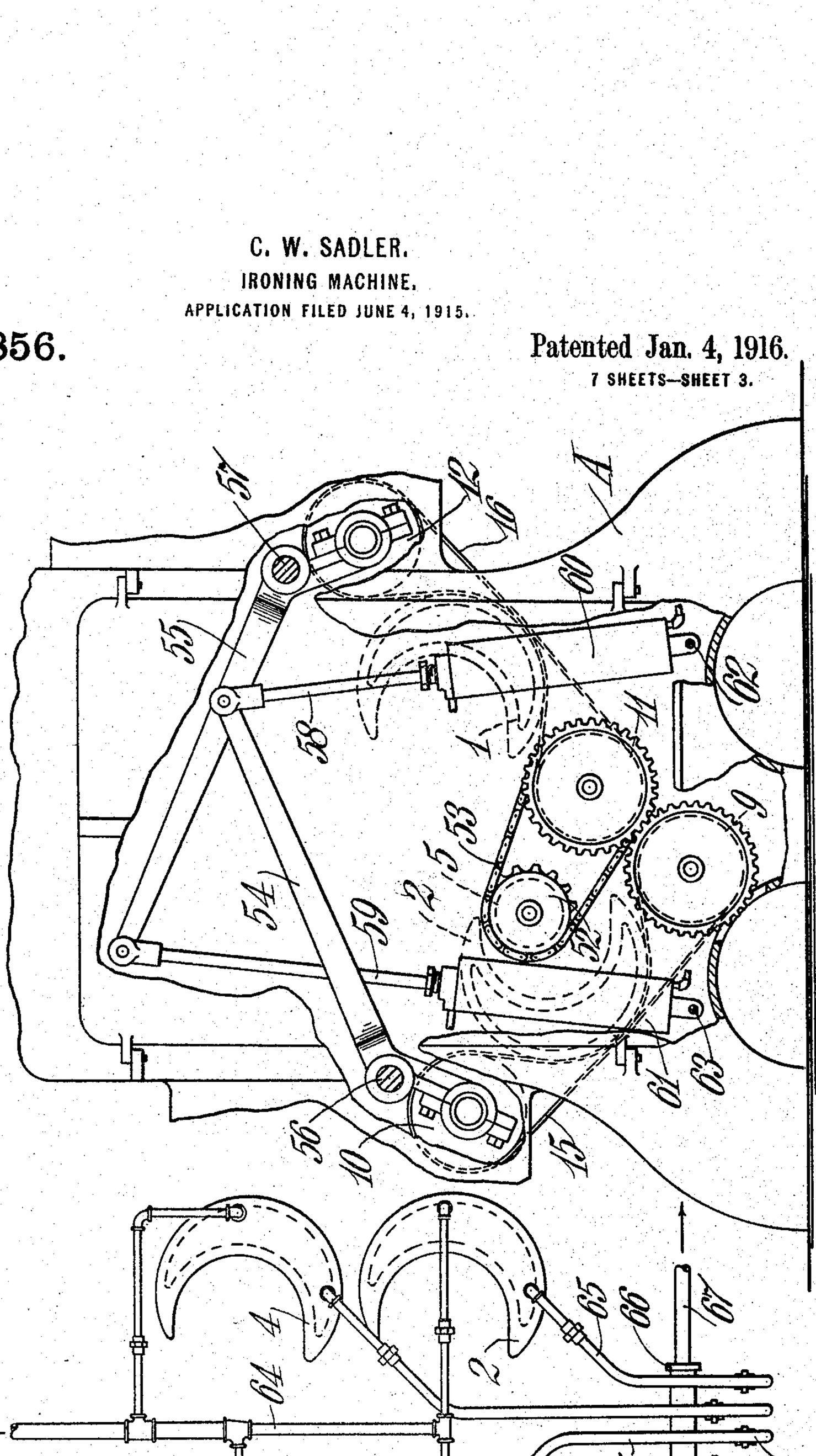

Fig. 4.

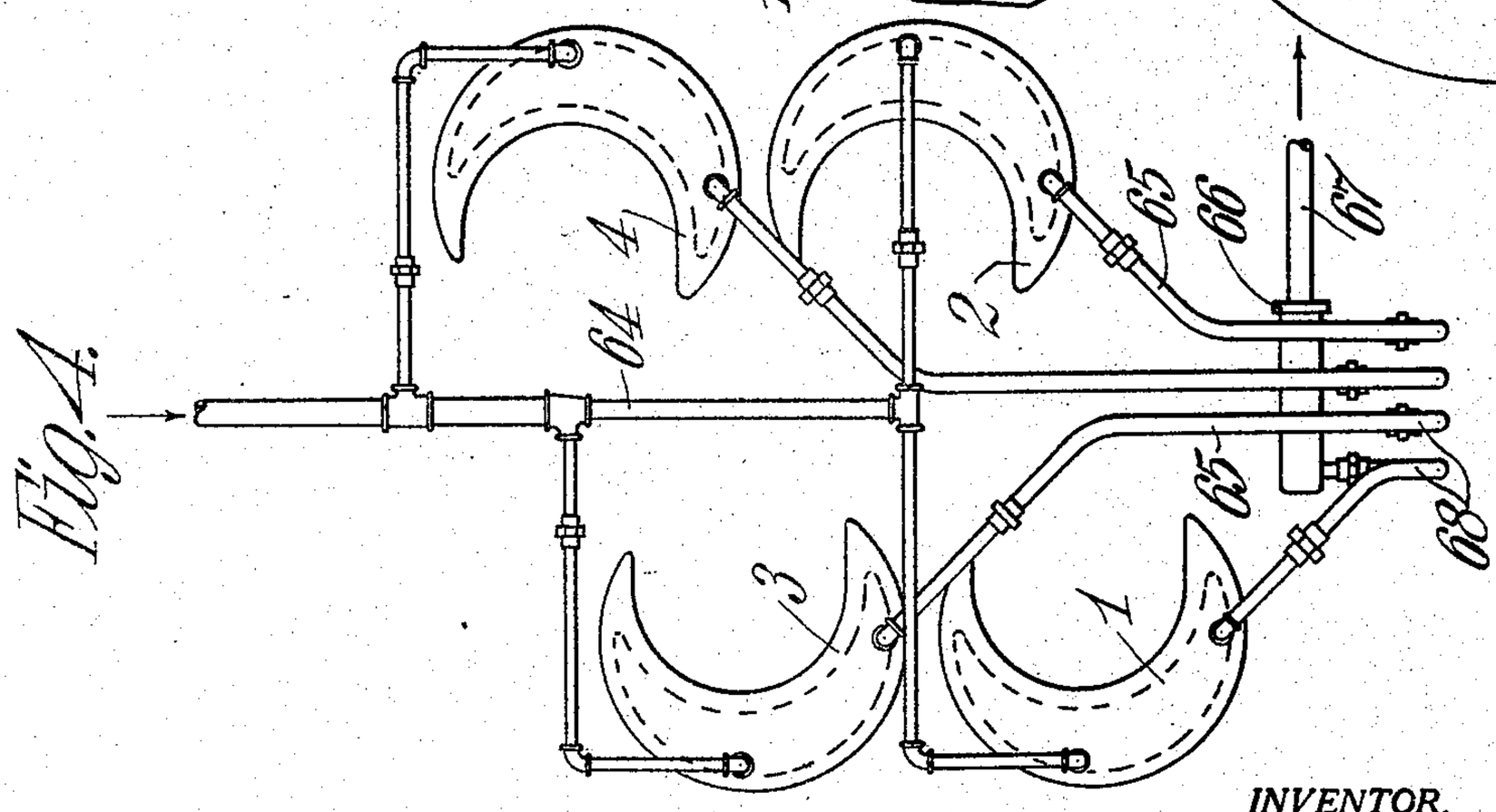

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Fig. 6.

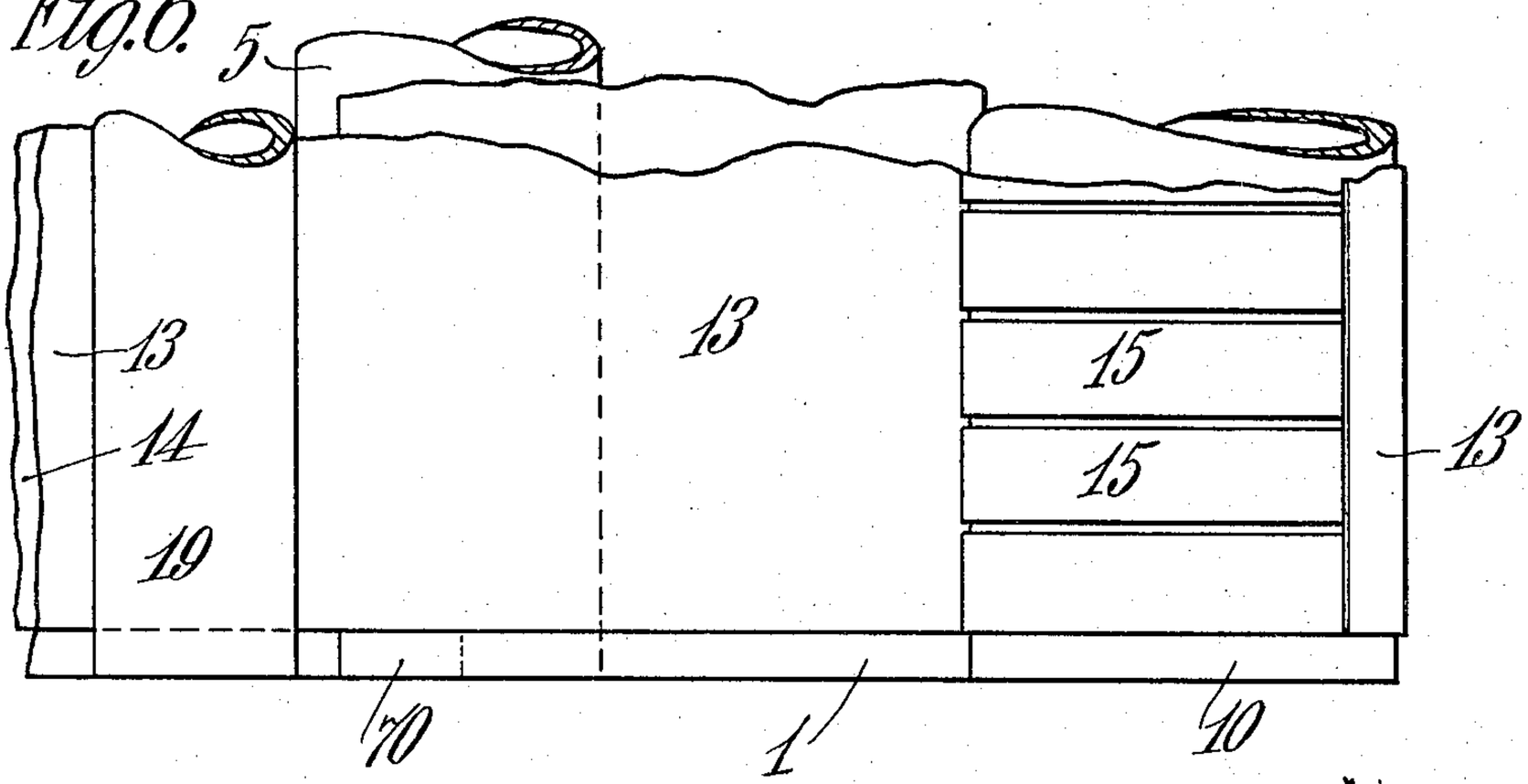
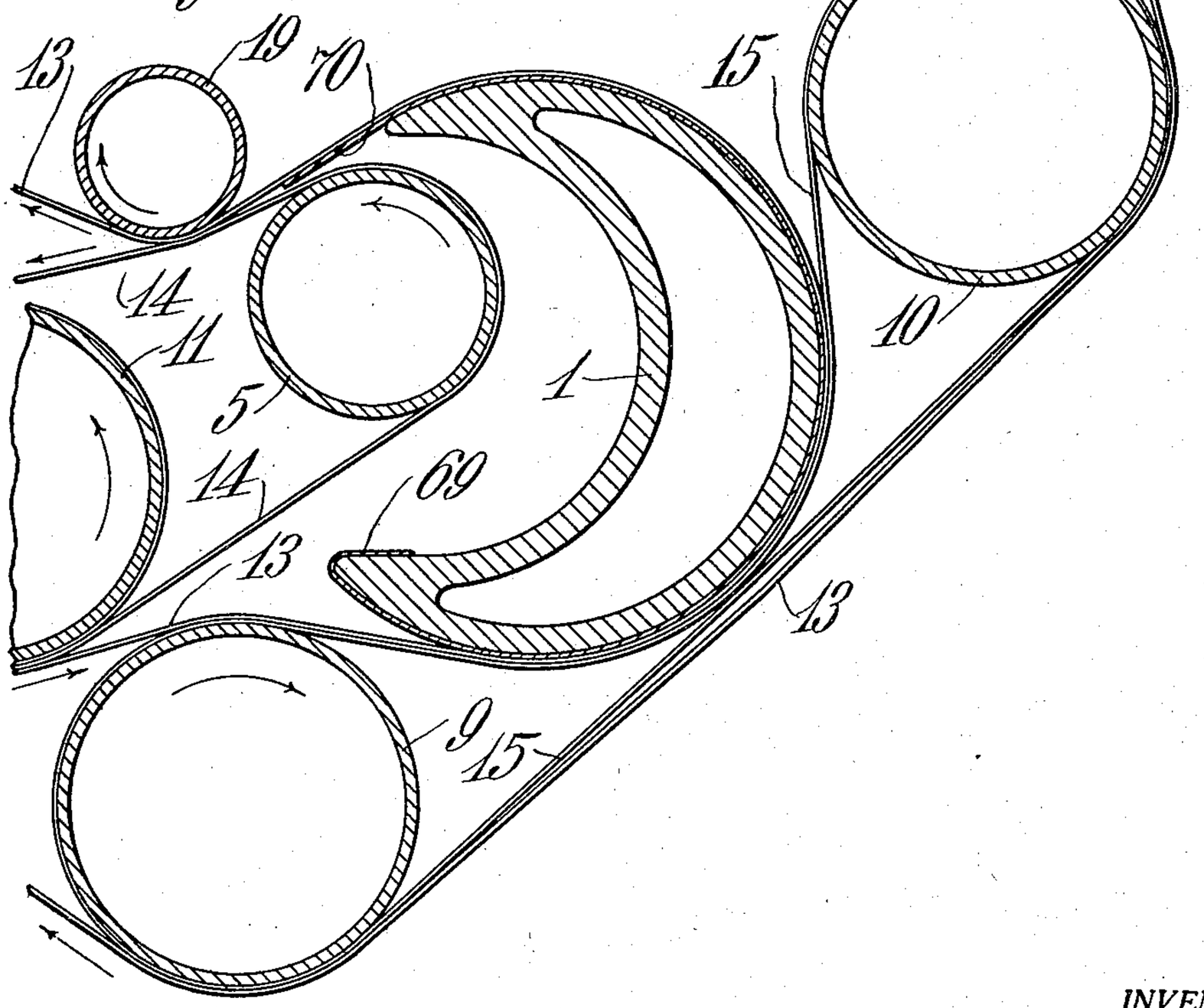


Fig. 5.



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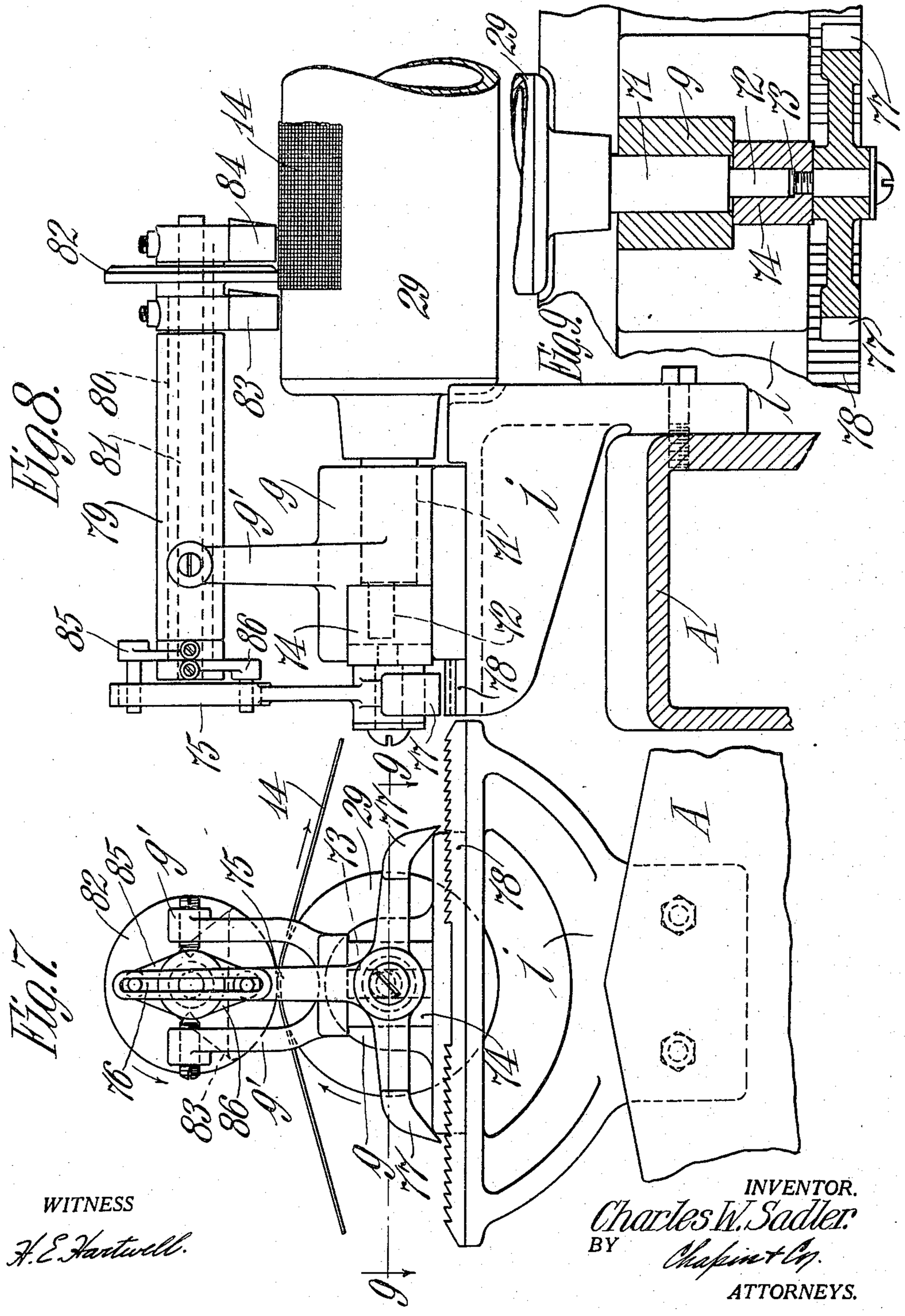

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7 SHEETS—SHEET 6.

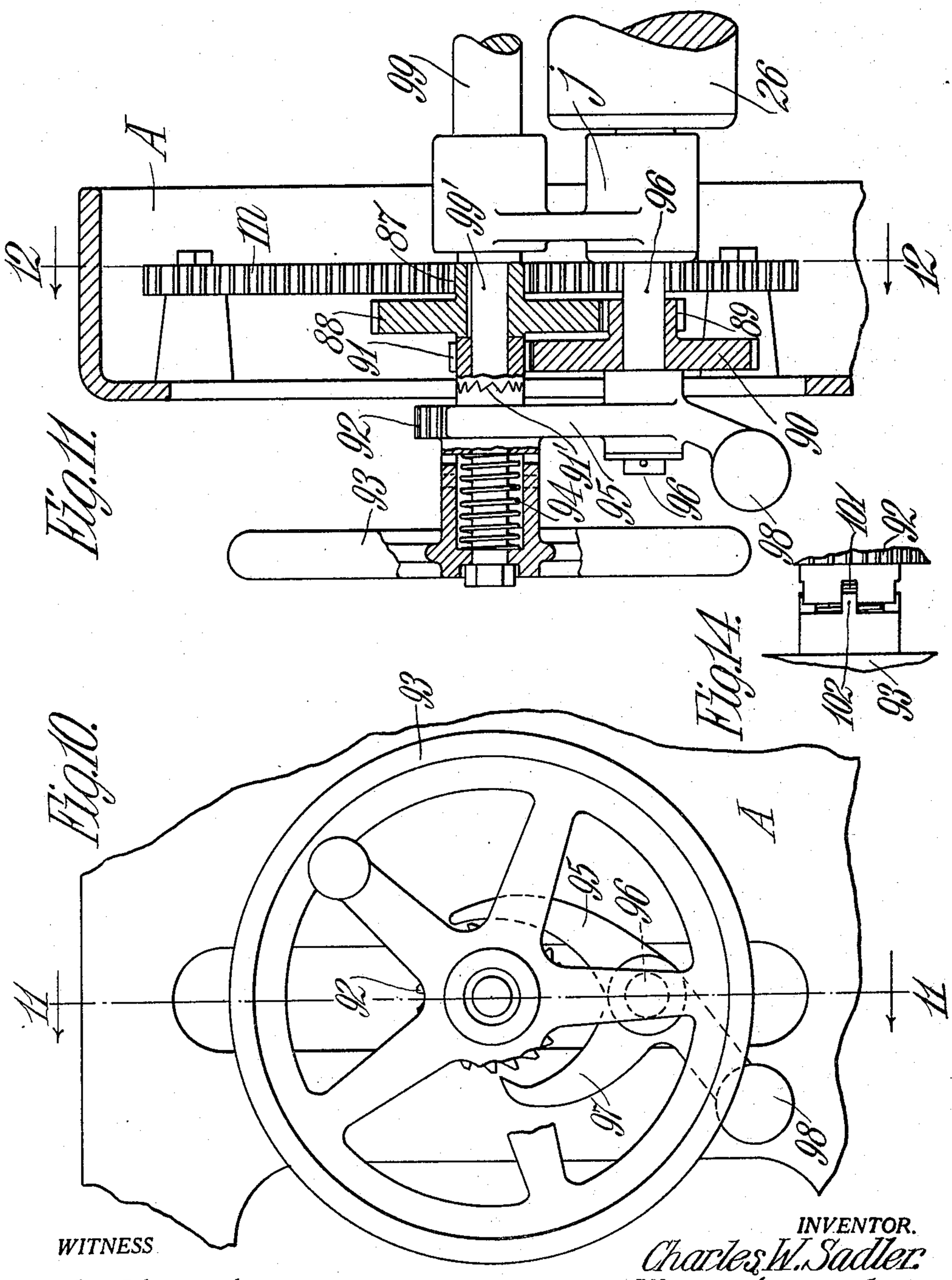

Fig. 11.

Fig. 14.

Fig. 10.

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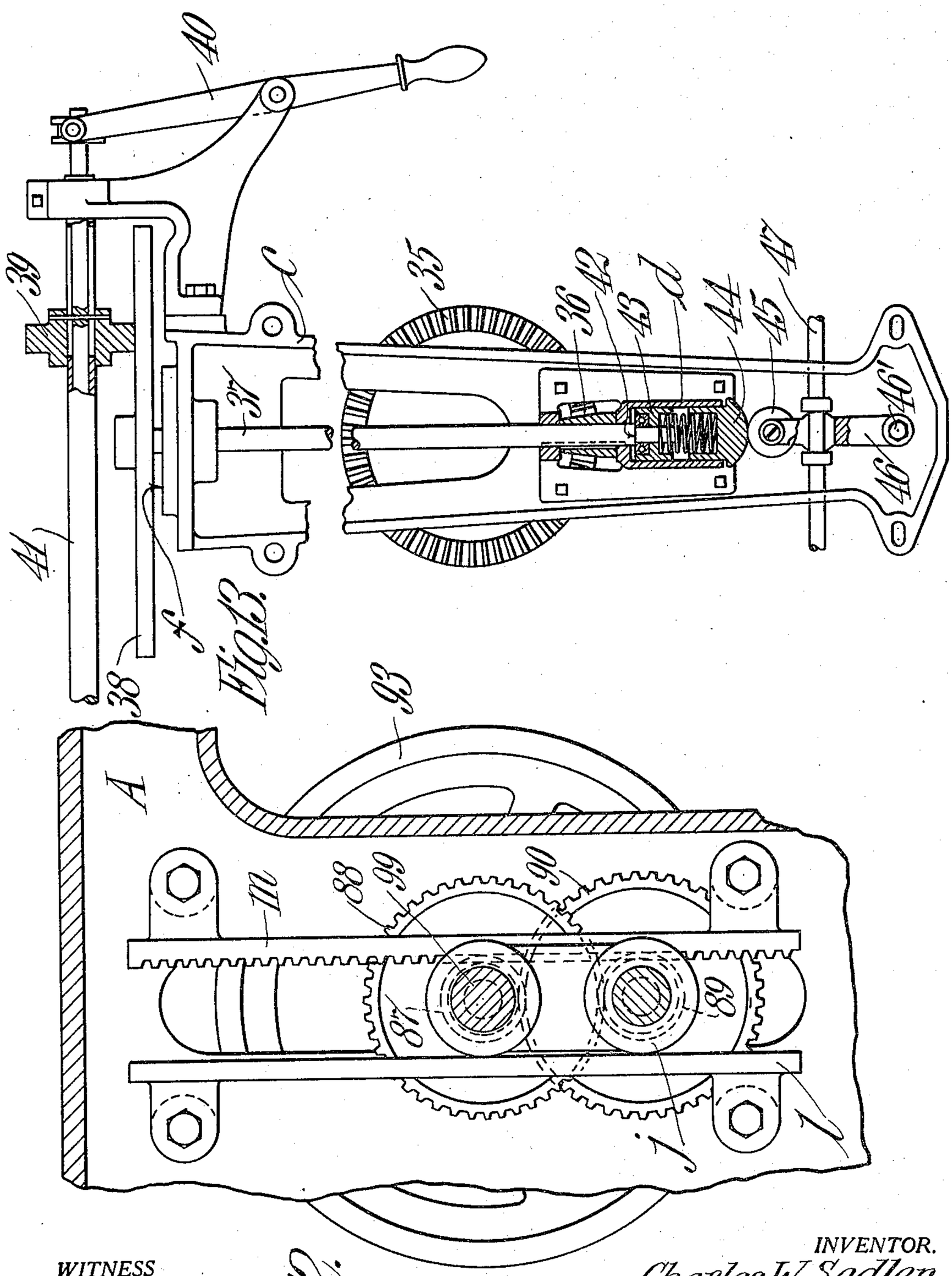
7 SHEETS—SHEET 7.



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UNITED STATES PATENT OFFICE.

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IRONING-MACHINE.

1,166,856. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed June 4, 1915. Serial No. 32,073.

To all whom it may concern:

Be it known that I, CHARLES W. SADLER, a citizen of the United States of America, residing in Windsor Locks, county of Hartford, and State of Connecticut, have invented certain new and useful Improvements in Ironing-Machines, of which the following is a specification.

This invention relates to improvements in ironing machines and has for an object to provide improved means for ironing goods alternately on opposite sides several times, whereby the ironing is caused more nearly to approach the work of a hand iron.

Another object is to provide yieldable means to force the goods against the ironing members, whereby goods with buttons may be ironed without breakage of the latter and little or no attention on the part of the operator.

A further object is to provide a plurality of traveling tapes, axially spaced one from the other and means to force the tapes against the ironing chest with the goods therebetween, whereby goods of varying thickness placed side by side may be properly ironed, as one tape may yield independently of another.

Another object is to provide in an ironing machine improved steam traps in the heating system for the ironing members, which are arranged to insure equal heating of each member.

Another object is to provide in an ironing machine improved automatic means for guiding the aprons and insuring proper alinement thereof on the rolls.

Another object is to provide improved tension rolls with devices to regulate the same.

Other objects are to provide a compact machine of large capacity for the floor space occupied and to generally improve and simplify the structure.

With these objects in view, a single preferred embodiment of my invention is shown, for the purposes of illustration, in the accompanying drawings, in which:

Figure 1 is a front elevational view of the machine with certain parts broken away to reveal the driving mechanism; Fig. 2 is a sectional elevation taken longitudinally through the machine; Fig. 3 is a partial rear elevational view of the machine with certain parts broken away; Fig. 4 is a diagrammatical view of the heating connections for the ironing chests; Fig. 5 is a partial sectional elevation on an enlarged scale showing clearly the arrangement of a single ironing chest and the pressure rolls therefor; Fig. 6 is a plan view of Fig. 5; Fig. 7 is a front elevational view of the apron guiding device; Fig. 8 is a side elevational view of Fig. 7; Fig. 9 is a sectional plan view taken on the line 9—9 of Fig 7 and looking in the direction of the arrows; Fig. 10 is an elevational view of a device for raising and lowering the tension rolls; Fig. 11 is a sectional elevation taken on the line 11—11 of Fig. 10 and looking in the direction of the arrows; Fig. 12 is a sectional view taken on the line 12—12 of Fig. 11 and looking in the direction of the arrows; Fig. 13 is a front elevational view illustrating the driving mechanism; and Fig. 14 is a detail view to be later described.

Referring to these drawings: A represents the frame of the machine, which is provided with bearings and supports for the various rolls and ironing chests hereinafter to be described. Fixed in the frame A are a plurality of hollow ironing chests 1, 2, 3, and 4 which are substantially crescent shaped in cross section. All of the chests are alike in structure and are preferably arranged in two vertical rows, the chests in one row being staggered with relation to the chests in the other row, all as clearly shown in Fig. 2. While I have illustrated four of these ironing chests, it is to be understood that any desired number may be used, as six or eight, the additional chests being placed over chests 3 and 4 and arranged in a similar manner.

Adjacent each ironing chest is an apron driving roll as indicated at 5, 6, 7, and 8 and each of these rolls is rotatably mounted in the frames A and positively driven in a manner to be described. On the lower side of chest 1 is a roll 9 which is rotatably mounted in the frame A and driven in a manner to be described. On the other side of chest 1 is a similar roll 10 which is movably mounted and arranged to be subjected to pressure by mechanism to be described. The rolls 9 and 10, hereinafter called pressure rolls, carry a plurality of narrow tapes 15 (see Fig. 6) and these tapes are arranged to contact with a large part of the peripheral surface of the chest 1.

11 and 12 represent other pressure rolls which carry tapes 16 bearing against chest

2 in a manner similar to that already described.

13 and 14 represent endless aprons upon and between which goods to be ironed travel through the machine. These aprons are suitably supported and guided around the ironing chests and pressure rolls by idler rolls 17 to 33 inclusive and are driven by the rolls 5, 6, 7, and 8.

All of the rolls described are preferably made hollow as shown with the exception of rolls 26 and 31 which are solid rolls. The latter act as tension rolls for the aprons 13 and 14 respectively.

The connections for operating the apron driving rolls 5, 6, 7, and 8 will now be described and particular reference is made to Figs. 1 and 13. Each of these rolls bears at one end thereof a spur gear as shown in Fig. 1 and these four gears intermesh one with another forming a gear train. One of the train, the gear on roll 7, is driven by a pinion 34, and fixed to the latter is a bevel gear 35 which meshes with a bevel pinion 36. This pinion 36 is slidably keyed to a shaft 37 and fixed to the latter is a disk 38.

39 is a friction driving wheel bearing upon disk 36 and being movable radially thereon by the lever 40 in an obvious manner. The wheel 39 is slidably mounted on shaft 41 to turn therewith and the latter may be driven in any suitable manner for example by the motor *e* shown in Fig. 1.

The shaft 37 is mounted in a frame *c* removably secured to frame A as shown in Fig. 1. Near the lower end of shaft 37 is a shoulder 42 resting against a bearing 43 which is slidable in a fixed casing *d*. Also slidable in the latter is a part 44 and between parts 44 and bearing 43 is a coiled spring. The lower end of part 44 is rounded and is supported by a roll 45 mounted in an arm 46 pivoted at 46′. Thus, with the parts in the relative positions shown in Fig. 13 the shaft 37 and disk 38 are forced upwardly against friction wheel 39 by spring pressure. When, however, the roll 45 is moved to one side, the part 44, bearing 43 and shaft 37 drop allowing disk 38 to engage with a surface *f* on the upper part of frame *c*. This surface *f* acts as a brake and quickly stops the rotation of all the driving rolls.

The arm 46 is forked as indicated in Fig. 13 to receive a rod 47 and the latter is extended on either side of arm 46 to levers 48 one at the feed and one at the delivery end of the machine. These levers 48 are operable by hand, when desired, and are also operable automatically to prevent injury to the operator, when feeding goods to the machine.

49 represents a board which extends downwardly adjacent the rolls 18 and 33 and is pivotally mounted at 50. This board 49 has a bell crank extension which is connected by a link 51 to the lever 48. A slot in link 51 permits slight movements of the board 49 without operation to the lever 48. When, however, board 49 is moved to any great extent, as in the case of an operator's hand passing within dangerous proximity to the rolls 18 and 33, the lever 48 is moved and roll 45 is carried to one side. Thus the disk 38 is disconnected from the wheel 39 and is quickly braked by the surface *f* to stop the machine.

The manner of driving the pressure rolls 9 and 11 and the manner of subjecting the tapes 15 and 16 to pressure will now be described and particular reference is made to Fig. 3. The roll 5 has been described as driven by the gear shown in Fig. 1 by suitable connections and upon the opposite end of roll 5 is a sprocket 52 which drives by a chain 53 a sprocket on the pressure roll 11. The latter also has mounted thereon a gear which meshes with a similar gear on the end of roll 9 as clearly shown in Fig. 3. The rolls 10 and 12 are loosely mounted in the ends of bell crank levers 54 and 55 which are pivotally connected at 56 and 57 to the frame A. The other extremities of levers 54 and 55 are connected to piston rods 58 and 59 which are movable in cylinders 60 and 61. The latter are pivotally mounted at 62 and 63 and may be actuated by any suitable means to move levers 54 and 55 for example by steam pressure.

Each of the ironing chests 1, 2, 3, and 4 hereinbefore described are heated preferably by live steam and Fig. 4 shows in diagrammatical form the layout of the heating system. Steam enters from the upper end of the machine by a pipe 64 and is distributed by the smaller branch pipes to each of the chests 1, 2, 3, and 4. Each of these chests is also connected near the lower portions with independent drip pipes 65 which each lead to a common manifold 66 and thence to a return pipe 67. Each pipe 65 has formed therein a V-shaped trap 68 and all these traps are arranged at the same level. These traps 68 are arranged to drain all of the chests equally and prevent the possibility of live steam in one chest while the others are filled with water of condensation. Thus, this arrangement insures the heating of each ironing chest to an equal degree.

Each ironing chest is covered with a thin sheet of non-rustable material, such as indicated at 69 in Fig. 5 in connection with chest 1, which forms a smooth working surface. This sheet 69 is suitably secured to the chest and at the upper and delivery end thereof is extended beyond the chest forming a spring finger 70. The latter acts to hold the goods being ironed to one apron, such as 13, until they have traveled a sufficient distance to be safely transferred to the other apron, such

pawl 97 is forced from engagement with the ratchet teeth and the roll 26 drops by gravity upon the apron 14. The weight of the roll and the speed with which it falls quickly puts the necessary tension upon the apron. However, in falling the gear train is turning at a very high speed and it is desirable to prevent the ratchet 92 and hand wheel 93 from so doing. This is accomplished by the peculiar shape of the tooth connection 91′ and the yieldable engagement between the members 91 and 92 due to the spring 94 which permits the member 91 to snap past the member 92 in one direction without turning the latter and the wheel 93. The connection 101–102 is constructed to permit limited axial movement between the hand wheel 93 and the ratchet 92.

The ironing operation will now be described with particular reference to Figs. 2 and 5. Goods to be ironed are laid upon the apron 13 over a feed board *a*, carried over roll 18 and thereafter between aprons 13 and 14 which travel outside the tapes 16 and partially around rolls 12 and 11. The aprons 13 and 14 separate between the pressure rolls 9 and 11 and the goods to be ironed are carried by apron 13 against the chest 1. The tapes 15 travel with the apron 16 and yieldingly force the latter and the goods against the chest. In passing around chest 1 the goods are ironed on one side while still moist and, as they leave the chest, are transferred from apron 13 to apron 14, the fingers 70 assisting in the transfer as already described. The apron 14 passes around the drive roll 5 in under idler roll 19 and carries the goods, with the unironed face up, against the chest 2. The tapes 16 act in a similar manner to force the goods against the chest with a yielding pressure. As the apron 14 and goods leave chest 2 the goods are transferred to apron 13, the latter being carried upwardly and over roll 6 and under roll 20. The apron 13 carries the goods around chest 3 while the apron 14 passes over roll 7 to meet apron 13 as it leaves the chest. Similarly the goods are again transferred to apron 14 to be carried around chest 4 and this operation may be carried on indefinitely, the goods having alternate faces presented to each chest. By the time the goods leave chest 4 they are practically dry and have been ironed twice on each side. They are then carried by apron 13 over rolls 23 and 24 and allowed to drop on a delivery table *b*. The apron 13 returns by rolls 25 tension roll 26 roll 27, pressure rolls 10 and 9 and roll 17 to the starting point. The apron 14 returns over rolls 28, 29 and 30, tension roll 31 and rolls 32 and 33 to the feeding table *a*.

Thus I have provided an improved ironing machine in which the goods are ironed alternately on opposite sides and in which the goods are forced against the ironing members in a yieldable manner.

It is well known that many modifications may be made in the structure herein described without departing from the scope of my invention which is defined in the appended claims.

What I claim is:

1. An ironing machine comprising in combination, a plurality of crescent shaped ironing members, feeding and guiding aprons passing around said members, said aprons arranged to feed articles to said members and from one member to another, means to cause a relative movement between the aprons and said members together with a device comprising a plurality of belts arranged yieldingly to independently force said aprons against said members, pressure rollers over which the belts pass, and means comprising, cylinders, pistons therein, and connecting means between the rollers and pistons.

2. An ironing machine comprising in combination, a plurality of parallel rows of stationary ironing members, an independent apron for each of said rows, means to drive said aprons, together with means for causing the article being ironed to be transferred from the first member of one row to the first member of the second row and thence to the second member of the first row to the second member of the second row and so on through the entire machine, all constructed and arranged so that the article is engaged alternately on opposite sides by said members.

3. An ironing machine, comprising, a plurality of rows of stationary ironing members, means to heat said members, an apron for each of said rows each arranged to carry the goods to be ironed around the members in one row and to transfer the goods to the apron for the other row, means to drive said aprons, a series of traveling tapes for each of said rows, means to drive said tapes and means to force said tapes yieldingly against the apron and the goods to be ironed, all constructed and arranged so that goods of varying thickness may be ironed simultaneously and goods with buttons may be ironed without breaking the buttons.

4. An ironing machine, comprising a plurality of ironing members, feeding aprons arranged to convey articles to be ironed to and around each of said members, means to drive said aprons to cause a relative movement between the articles and said members, yieldable means comprising a plurality of independent belts traveling with said aprons to force the latter and the goods against some of said members, and means to place tension on said aprons, said aprons arranged alternately to present opposite sides of the articles to be ironed to said members.

as 14. The aprons 13 and 14 are liable in their course of travel through the machine to run to one side or the other of the rolls and require frequent straightening. Figs. 7 and 8 show a device for automatically straightening the apron whenever it runs to one side. In the machine this device is applied to the rolls 23 and 29 for automatically guiding the aprons 13 and 14 respectively. A description of one of these devices will suffice since both are exactly alike.

The roll 29 (see Fig. 7) is mounted at one end in a swivel bracket *h* (see Fig. 1) and at the other in a bearing *g* which is slidably mounted in a bracket *i* secured to frame A. The stub shaft for the roll 29 is indicated at 71 and formed on the end thereof is an eccentrically located pin 72. This pin rides in a vertical slot 73 formed in a block 74 which is slidable relative to the bearing *g*. As the roll 29 is turning continuously, the block 74 is given a reciprocatory movement of small amplitude. Pivotally connected to the block, as shown in Fig. 9, is an arm 75 which extends vertically upward and has a slot 76 therein. On either side of its pivotal connection arm 75 is formed with integral pawl extensions 77. Below the latter and fixed to the bracket *i* is a plate 78 which has, on each side of its central portion, oppositely disposed ratchet teeth. Pivotally supported by an integral arm *g'* of the bearing *g* is a sleeve 79 and rotatably mounted within the latter is a sleeve 80 and a shaft 81. Loosely mounted on shaft 81 is an idler roll 82 which bears upon one edge of the apron 14. On either side of the roll 82 are segments 83 and 84 which are fixed to sleeve 80 and shaft 81 respectively. Fixed to sleeve 80 and shaft 81 at their other ends are cranks 85 and 86 respectively which each have crank pins riding in the slot 76 in arm 75.

The roll 82, when in engagement with the apron 14 will hold the segment 84 away from the apron and the segment 83 away from the roll 29. In operation, if the apron 14 travels to the right, the roll 82 will drop upon the roll 29 allowing the segment 84 to contact with the apron 14 which traveling continuously, turns the segment 84 and thus the crank 85. The latter will turn arm 75 to the left, as viewed in Fig. 7, and allow the left hand pawl 77 to engage the ratchet teeth on plate 78. Thereafter, the block 74 will, due to its reciprocatory movement, slide the bearing *g* to the right by small increments. As the apron 14 straightens upon the roll 29, the roll 82 will ride back upon the apron and withdraw the pawl 77 from the ratchet teeth. If the apron moves to the left, as seen in Fig. 8, the segment 84 will be engaged to turn crank 86 which operates in a like manner in coöperation with the reciprocatory block 74 to shift bearing *g* to the left, as viewed in Fig. 7. Thus the apron may be automatically guided upon the roll.

The means for raising and lowering the tension rolls 26 and 31 will now be described. These rolls are solid and are arranged by their weight to place the aprons 13 and 14, respectively under tension. It is necessary at times to diminish this tension and, when the machine is not in use, to entirely relieve the tension. This is accomplished by raising the rolls 26 and 31 by mechanism disclosed in Figs. 10, 11 and 12. The roll 26 is rotatably mounted at each end and in a bearing *j* and above the roll and mounted in the member *j* is a rod 99 which has fixed therein a pin extension 99'. Mounted on the pin 99' is a pinion 87 which meshes with a rack *m* suitably secured to the frame A as shown in Figs. 11 and 12. Also fixed to frame A and in parallel relation with rack *m* is a bar *l* which bears against one side of the bearing *j*. The rack *m* and bar *l* thus form vertical guideways for the roll 26. The mechanism just described is also provided on the other side of the machine so that, when the pinion 87 is turned to move shaft 99, a pinion on the other side of the machine is turned thereby so that both ends of the roll 26 may be lifted equally.

Fixed to the pinion 87 is a gear 88 which meshes with a pinion 89. The latter is loosely mounted on a pin 96 fixed to the bearing *j* and has fixed thereto a gear 90 which engages a pinion 91 loose on the pin 99'. The pinion 91 is movable by a ratchet 92 through the saw tooth connection 91' and the ratchet has formed in its hub portion slots 101 (see Fig. 14) which are engaged by projections 102 formed on the hub of a hand wheel 93. Thus by turning the latter the pinion 91 may be operated to lift roll 26 through the "back gear train" described. A spring 94 tends to force the members 91 and 92 together and, when these parts are so positioned, it is to be noted that the projections 102 enter only part way into the slots 101 (see Fig. 14). Pivotally mounted on the pin 96 is an arm 95 which extends upwardly and lies idly against the tips of several ratchet teeth 92. Integral with the arm 95 is a pawl arm 97 and a depending weighted arm 98. The latter operates to hold the pawl away from the ratchet teeth 92 and when the roll 26 is raised, the pawl 97 must be manually held against the ratchet 92. When, however, the roll has been raised, the pawl 97 will be held frictionally in position by the weight of the roll 26 so that the latter can not drop until the pawl 97 is released. In starting the machine, it is desirable to place the aprons 13 and 14 under tension as quickly as possible and this is accomplished as follows: Assuming that the roll 26 has been lifted to its uppermost position, the

5. An ironing machine comprising a plurality of stationary ironing members, feeding aprons arranged to convey articles to be ironed to and around each of said members, means to drive said aprons, independent yieldable means to force the aprons against said members with the articles therebetween and automatic means to guide and aline said aprons relative to said members.

6. An ironing machine comprising, a plurality of hollow ironing members, a lining for the outer periphery of each member, a portion of said lining being extended beyond said members to form fingers, an apron arranged to convey articles to be ironed to some of said members, another apron arranged to convey the articles to others of said members, and means to drive said aprons to cause a relative movement between the articles and said members, said aprons arranged alternately to present opposite sides of the articles to said members, said fingers arranged to hold the goods to one apron during a portion of their travel and to transfer them to the other apron, substantially as described.

7. An ironing machine comprising, a plurality of fixed hollow ironing members, aprons to convey articles to be ironed to said members, means to drive said aprons, a steam supply pipe, means to connect the latter to the interior of each of said members, whereby live steam may be forced therethrough, a discharge pipe, independent connections between each member and said pipe, and a U-shaped bend in each of said connections all constructed and arranged so that live steam cannot pass into said discharge pipe.

8. In an ironing machine of the kind described, a plurality of ironing members, aprons to convey articles to be ironed to said members, means to drive said aprons, means for placing a tension upon the aprons, comprising a roller around which the aprons pass, a hand wheel, a train of gears between the said wheel and the roller, a fixed rack engaged by one of the gears for eliminating the roller, a pawl to retain the roller elevated, and spring actuated teeth connection between the hand wheel and the roller to retard the descent of the roller when the pawl is released, as described.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."