

No. 897,596.

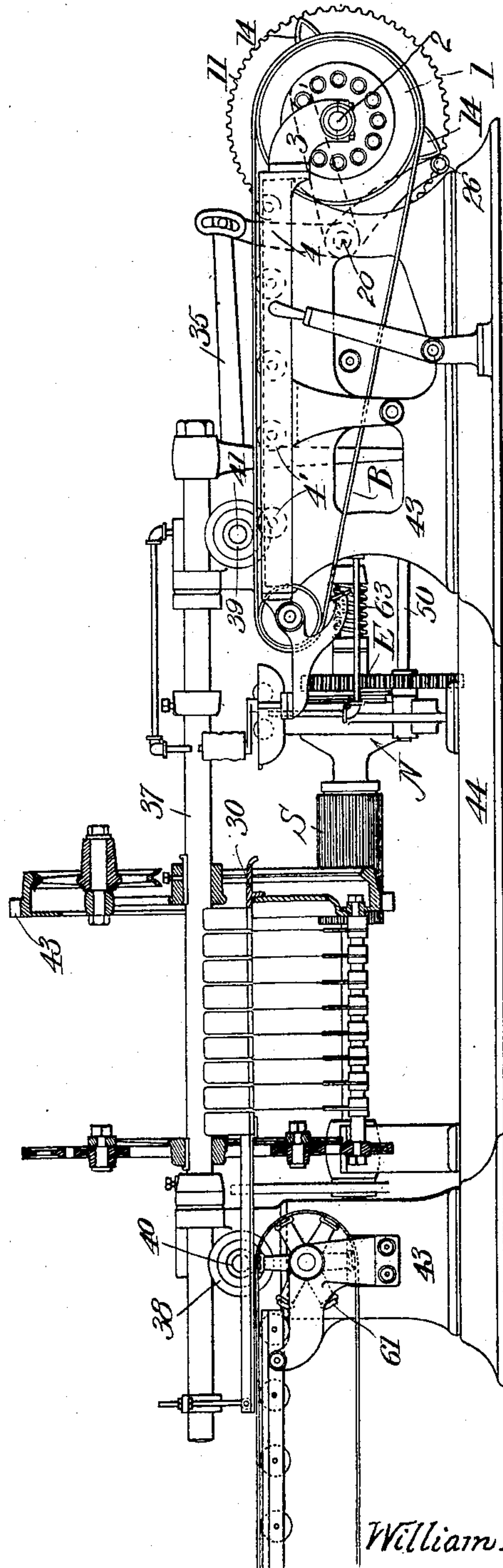
PATENTED SEPT. 1, 1908.

W. R. CUNNINGHAM.
BRICK AND TILE CUTTING MACHINE.

APPLICATION FILED AUG. 27, 1907.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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C. H. Fowler

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William R. Cunningham,

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6 SHEETS—SHEET 2.

Fig. 3.

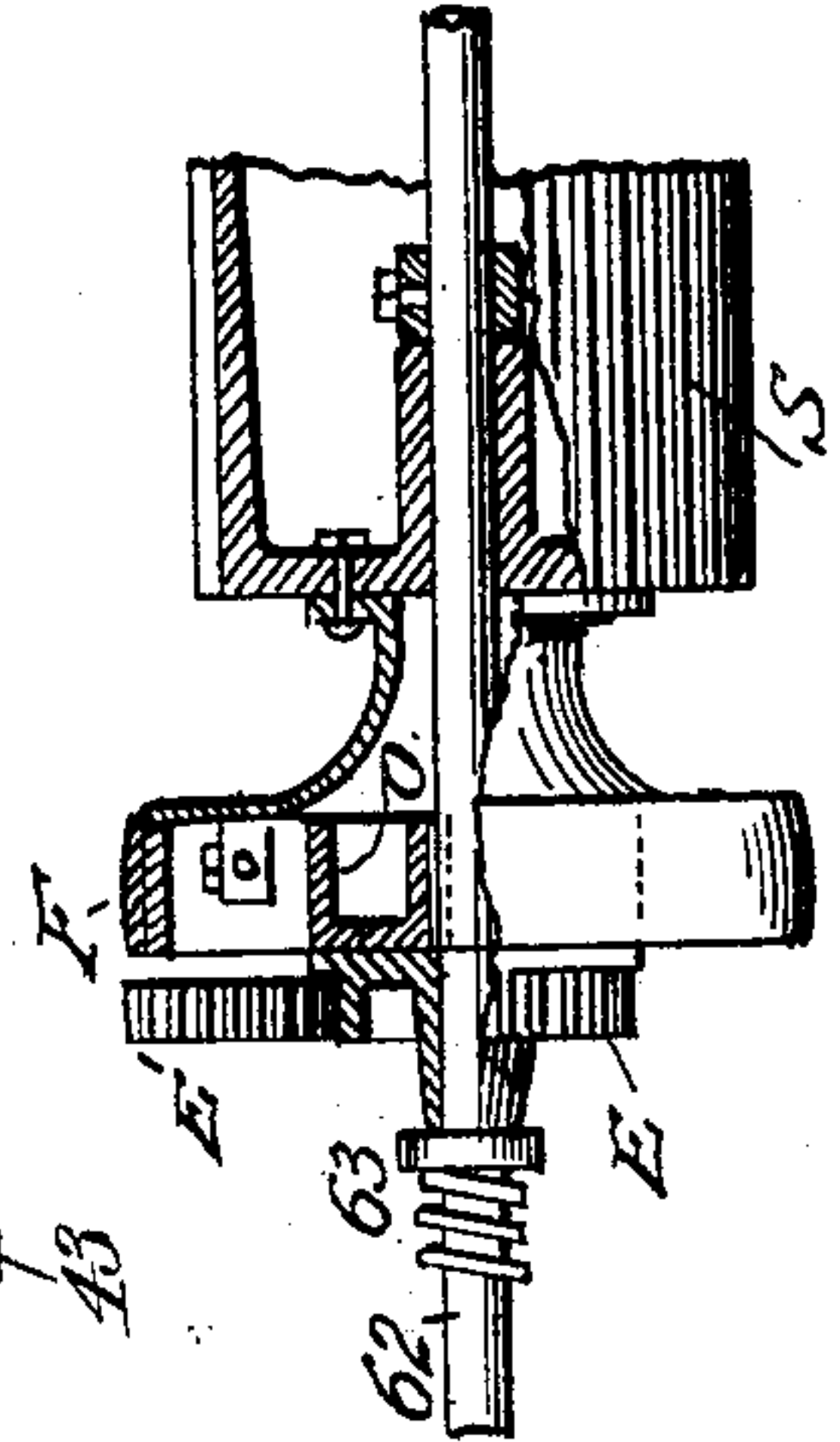
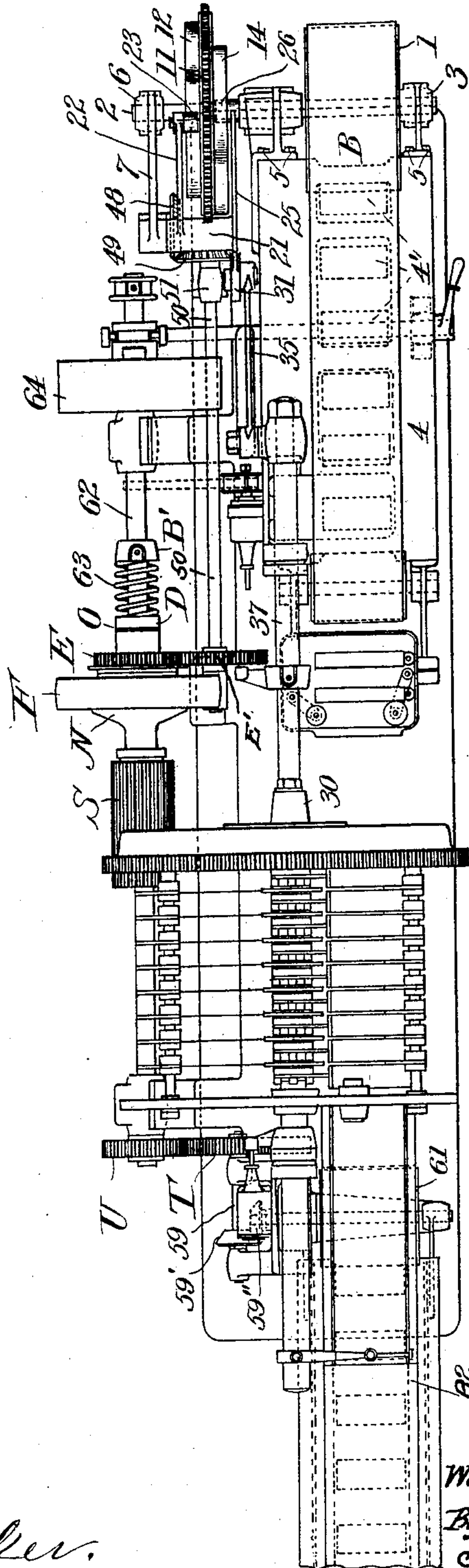


Fig. 9.

Witnesses

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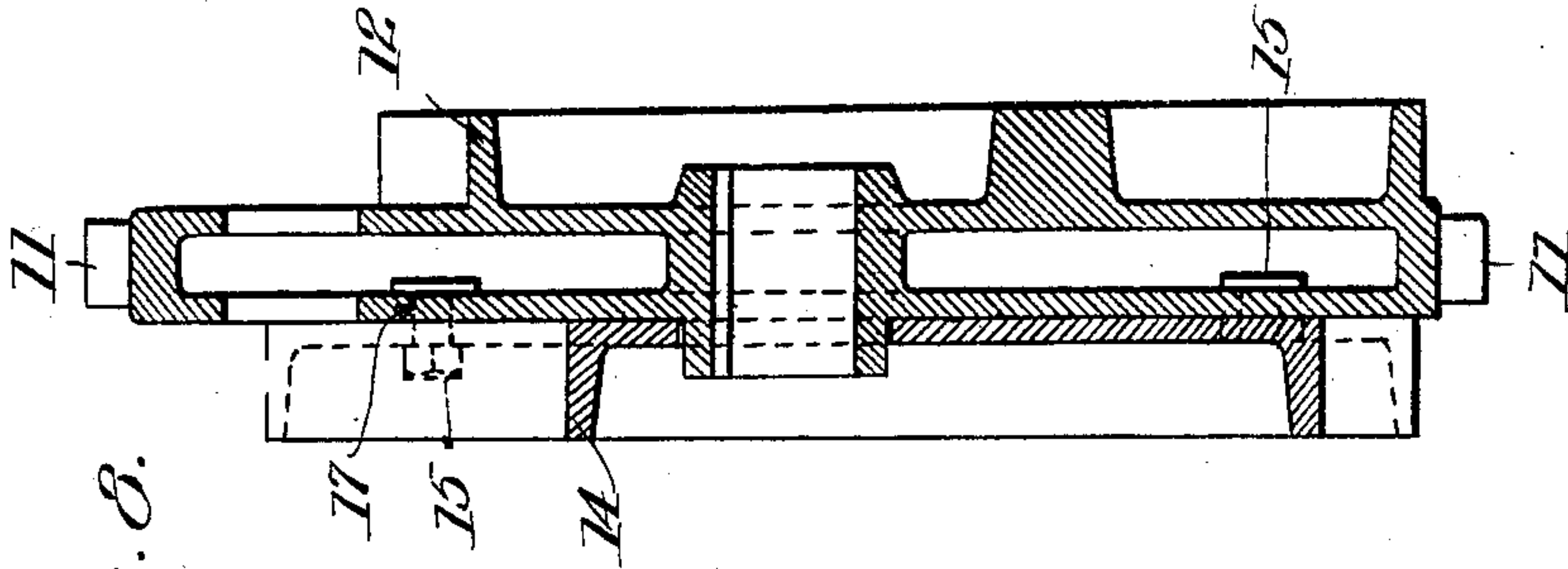


Fig. 8.

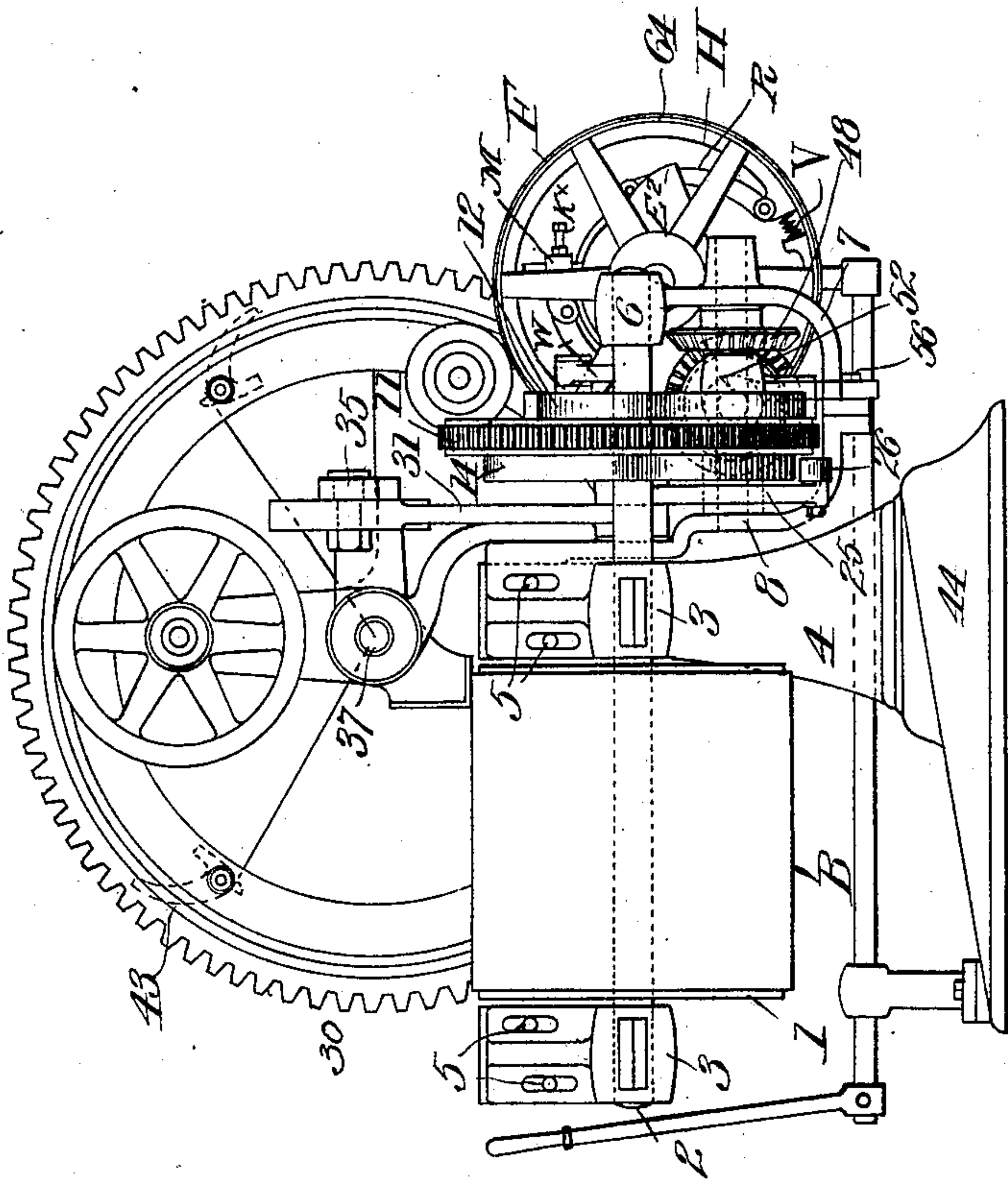


Fig. 2.

Witnesses

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5 SHEETS—SHEET 4.

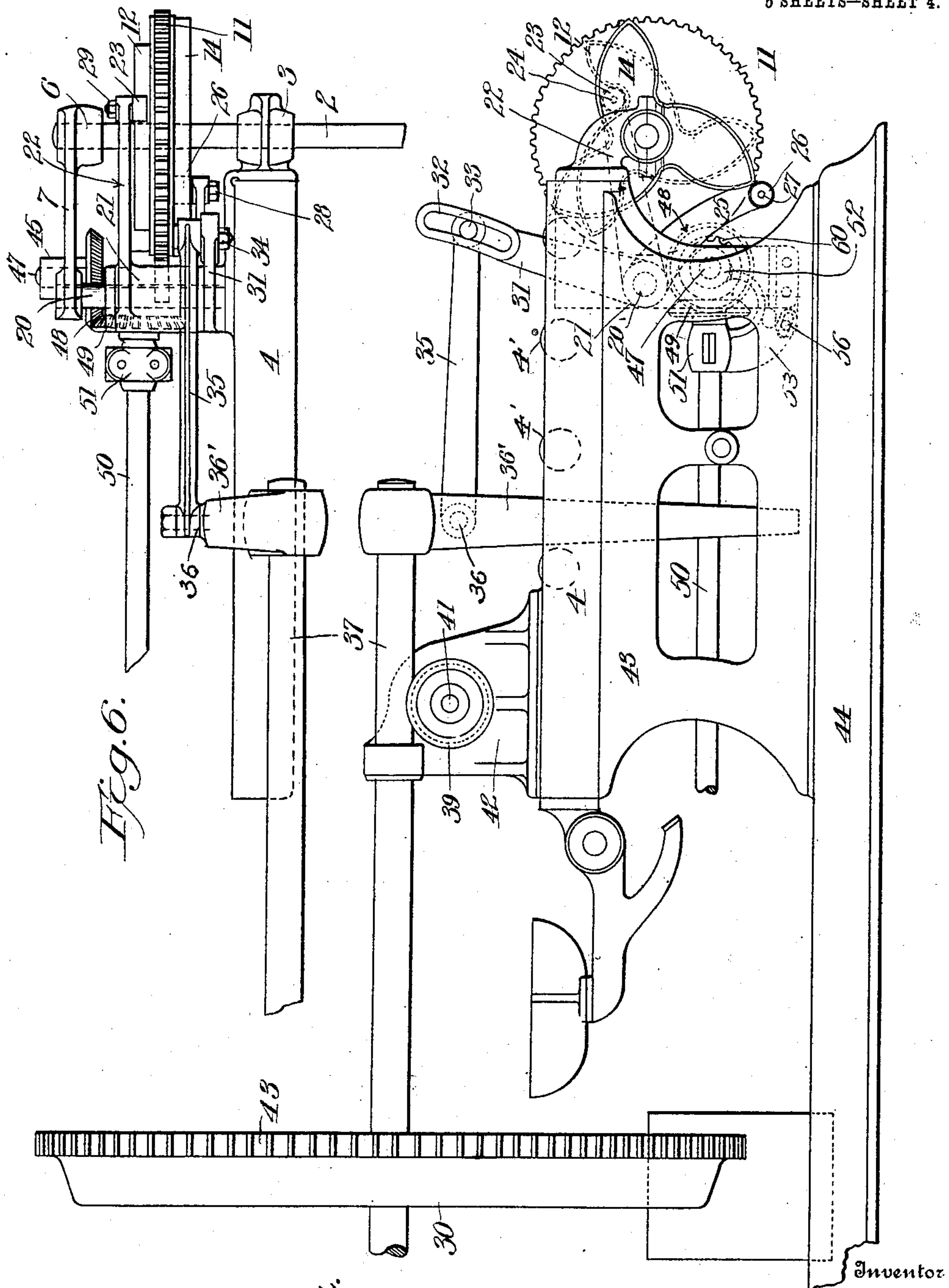


Fig. 6.

Fig. 4.

Witnesses
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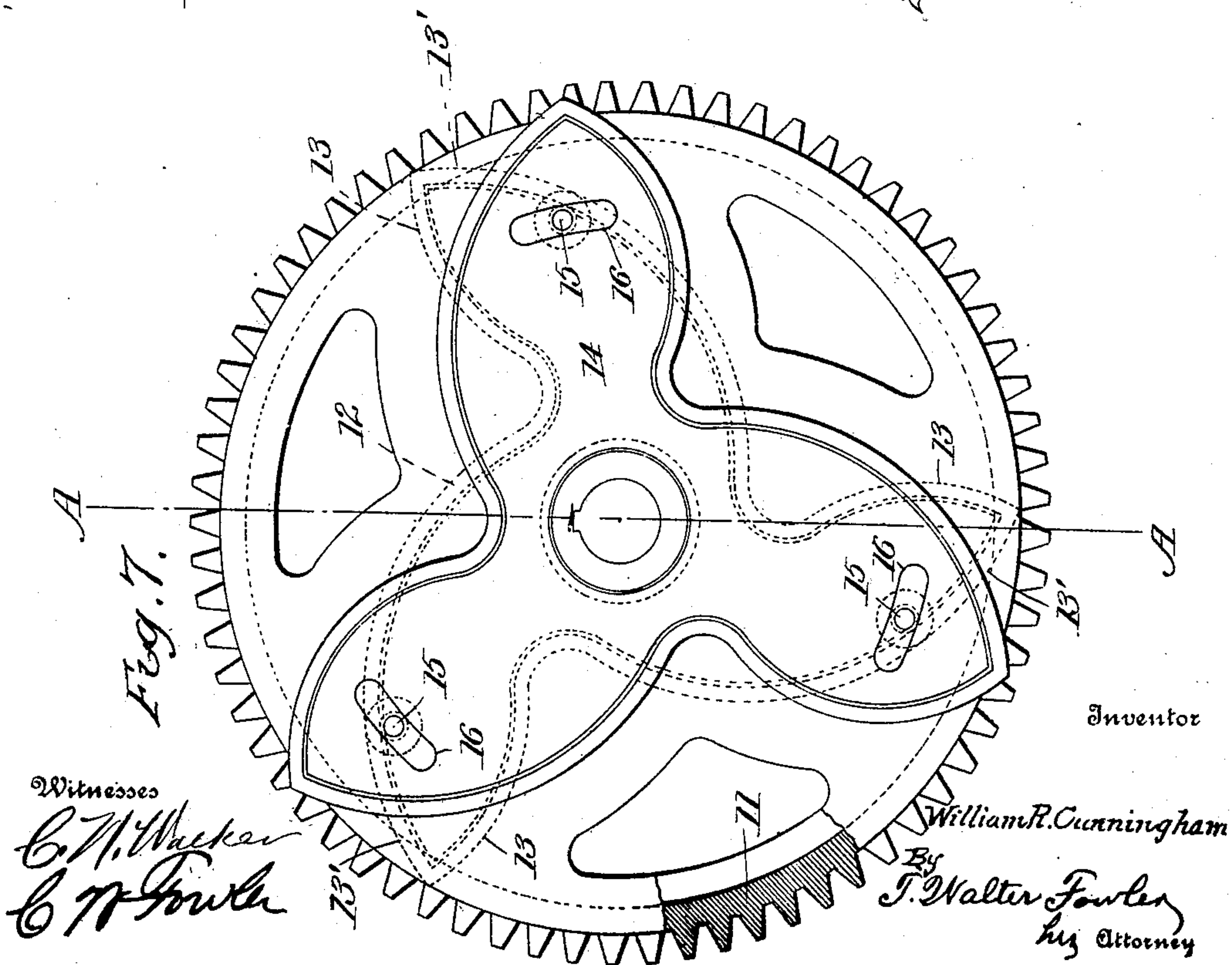
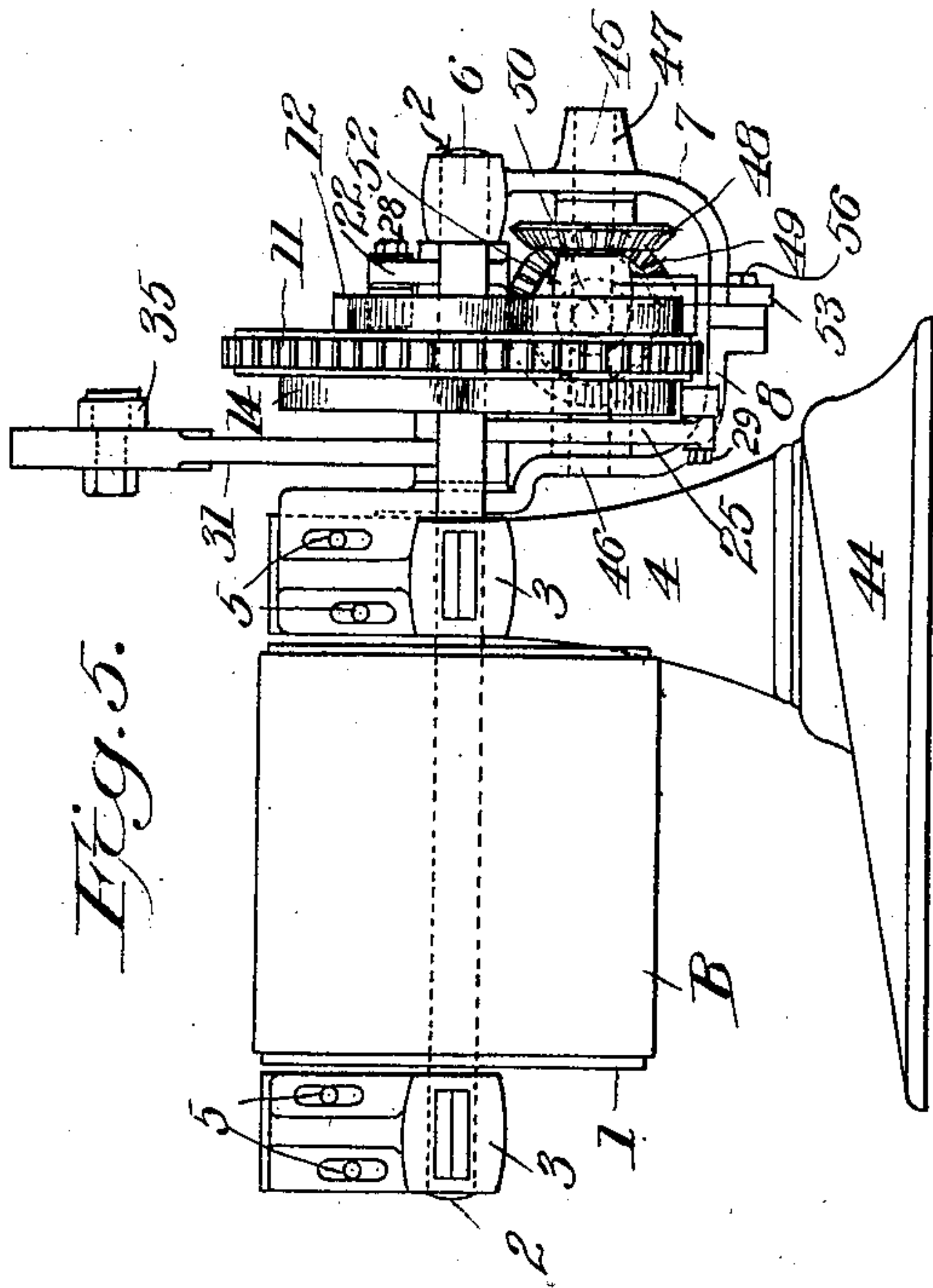
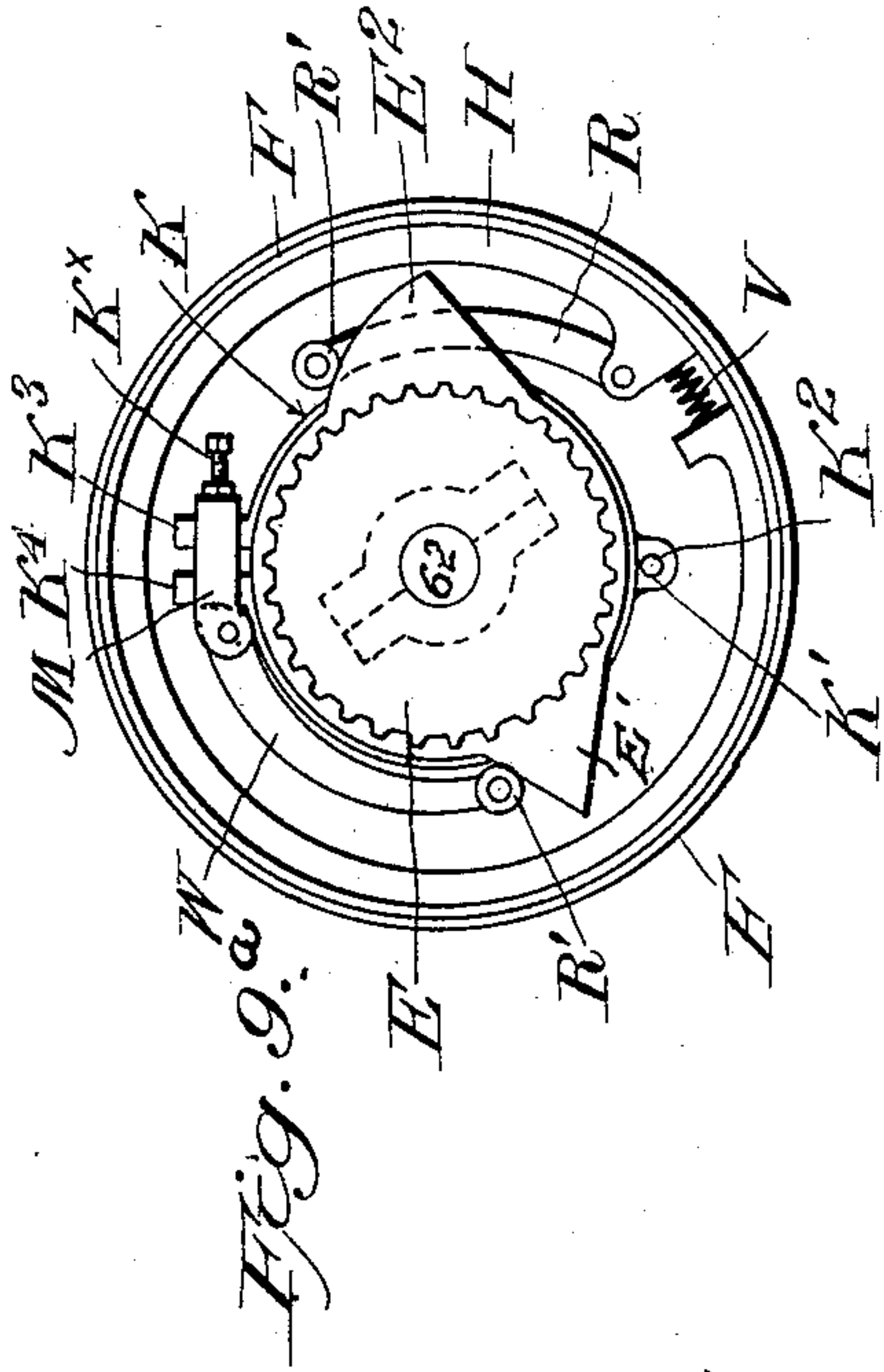
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5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

WILLIAM R. CUNNINGHAM, OF BUCYRUS, OHIO, ASSIGNOR TO THE AMERICAN CLAY MACHINERY COMPANY, OF BUCYRUS, OHIO, A CORPORATION.

BRICK AND TILE CUTTING MACHINE.

No. 897,596.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Application filed August 27, 1907. Serial No. 390,271.

To all whom it may concern:

Be it known that I, WILLIAM R. CUNNINGHAM, a citizen of the United States, residing at Bucyrus, in the county of Crawford and State of Ohio, have invented new and useful Improvements in Brick and Tile Cutting Machines, of which the following is a specification.

My invention relates to certain new and useful improvements in machines designed to cut a bar or bars of clay into uniform thicknesses or lengths as the same issues from the die of a brick machine. The particular class of machines, herein illustrated is of the rotary automatic type where a reel carrying cutting-wires has a variable continuous motion, as distinguished from those machines wherein the reel comes to rest after the cutting wires pass through the bar of clay.

My invention consists of the parts and the constructions, arrangements and combinations of parts which I will hereinafter describe and point out in the claims.

In the accompanying drawings, forming part of this specification and in which similar reference characters indicate like parts in the several views:—Figure 1, represents a side elevation with a portion of reel, gear, and track cut-away and the separating table broken off. Fig. 2, is an end elevation of Fig. 1. Fig. 3, is a top plan view. Fig. 4, is an enlarged side elevation of the receiving end of the machine. Fig. 5, is an end elevation of Fig. 4. Fig. 6, is a partial plan view of Fig. 4. Fig. 7, is an enlarged view of the cam-gear. Fig. 8, is a sectional view of the line A—A of Fig. 7. Fig. 9, is a part section and part elevation of the governor. Fig. 9^a is an end view of the governor.

The present invention has particular relation to a means for causing the cutting-wire reel to travel horizontally in exact register with the moving bar of clay, said machine having many of the leading characteristics of my former reissued patent No. 12,392, dated October 3, 1905, although the construction of said patented machine has been changed in many respects as the following description will show.

In the present invention the measuring drum, 1, has a diameter which is the proper size to feed out the length of bar of clay that is necessary to be cut into brick or tile sizes.

The circumference of the drum, 1, is sufficient, in this case, to feed out clay necessary to make three, what I call "cuts". In other words and by way of illustration, it would require fifteen inches (15") of clay to make six (6) bricks, two-and-one-half inches (2 $\frac{1}{2}$ ") thick, therefore the drum 1, may, and preferably should, have sufficient circumference to measure forty-five inches (45"), or three "cuts". Manifestly however many of the parts hereinafter described are applicable to other sizes of drums and to other constructions of machines therefore I do not wish to be understood as limiting my invention to any particular machine or part thereof, where the novel features have a more general application.

The aforesaid measuring drum, 1, is mounted on a shaft 2, which is supported in suitable bearings, 3, adjustably secured to the frame, 4, by bolts, 5, or equivalent fastening means. As shown in Fig. 5, a suitable housing member, 7, is formed or provided with a bearing, 6, in which one end of the shaft, 2, is mounted, said housing member being bolted to a flanged-plate, 8, also in the nature of a housing member and which is in turn bolted to the frame, 4, of the machine.

Between the parts 7 and 8, of the housing and keyed or otherwise fixed to the shaft 2, is a gear wheel, 11, having formed rigid with one side thereof, a cam 12, which in the particular style shown, comprises three arms each of which has its opposite edges formed with curved faces or cam-surfaces, 13, 13', converging to a point at the outer ends. In practice, the shape of the cam is such that one of the said faces, 13, will cause the carriage of the machine, which I will hereinafter describe, to travel in exact register with the travel of the bar of clay.

On the opposite side of the gear 11, from the aforesaid cam 12, is a second or similar cam, 14, which is secured to the gear by suitable bolts, 15, or otherwise, this second cam being formed with slots or elongated holes 16, made concentric with the axis of the gear and adapted to receive bolts, 15, which pass through said slots and screw into holes tapped into the gear 11, as shown at 17, this described arrangement affording means of adjusting the said cam, 14, about its axis. While the shape given the cam 12, is such as to cause the carriage of the machine to travel

in register with the travel of the bar of clay, the shape given the other cam, 14, is such that it returns said carriage after the cutting wires, with which the carriage is supplied, have severed the column or bar of clay; by making one of the cams, 14, adjustable as before pointed out, any lost motion or wear incident to the running of the machine, may be taken up.

In suitable bearings which form part of the members, 7 and 8, of the housing is mounted a shaft, 20, on which is a three-armed rocker having a hub, 21. One of the arms 22, of said rocker is attached to the hub, 21, and carries at its outer end a roller, 23, mounted on a pin, 24. Another arm, 25, of the rocker is also fixed to the hub, 21, and has a roller, 26, in its outer end revoluble on a pin, 27, said pins being suitably held to the respective arms, 22 and 25, by means of suitable nuts, 28 and 29.

Having reference to Fig. 4, it will be noticed that the position of the aforesaid roller, 23, is above the center line of the shaft, 2, on which the measuring drum is mounted, and that the other roller, 26, is disposed below the center line of said shaft. Fig. 4 also shows the position of these two arms in relation to their operating cams and shows that the position of these parts is such that they are ready to start the carriage, 30, to travel in a horizontal direction in unison with the moving bar of clay. Owing to the peculiar shape of the cams, 13 and 14, the rollers, 23 and 26, travel in contact with all parts of the cams, and take up all lost motion, which is desirable in this kind of a machine.

In order that the object of using a double cam with one arm of the rocker above and the other arm below the center line of the shaft on which the measuring drum is mounted, may be understood, I desire to state that such an arrangement brings the roller that starts the carriage to travel with the bar of clay as close to the center of the shaft 2, as is possible, and on the return stroke to bring the roller, 26, as close to the center of the shaft 2, as possible, in order to overcome the inertia of starting the carriage at the end of the stroke, and to give the measuring drum as much leverage on the cam as possible. This is important for the reason that the bar of clay can be and often is distorted by shocks and jars and my aim is to overcome as many of these imperfections in the bar of clay as possible, and therefore I have, in the present instance, designed the operating cams in the manner shown and described, using two cams instead of one, for in using one cam, roller and arm, at one end of the travel of the carriage it would cause the roller to be in a position as shown by the roller, 26, or close to the outer circumference of the measuring drum, which would cause a sudden shock upon the bar of clay and have the tendency to distort the latter. The object,

therefore, in designing the cams in the manner before stated is to overcome the foregoing objections.

Referring to the three-armed rocker, the third arm, 31, thereof extends upwardly over the hub 21, and has its upper end slotted at 32 to receive a wrist-pin, 33, secured by a suitable nut, 34, said wrist-pin carrying one end of the connecting-rod, 35, the other end of said rod being carried by a wrist-pin, 36, screwed or otherwise fitted or secured into an arm, 36', mounted on the horizontally-disposed carriage shaft, 37, said shaft being supported at opposite portions by grooved rollers, 38 and 39, mounted on pins, 40 and 41, secured to hangers, 42, bolted to the top of the aforesaid frame, 4, which frame is in turn bolted to a suitable distance piece, 43, which forms a rigid support between the frame, 4, and the base, 44, of the machine, to which base the said distance-piece is bolted.

The housing-members, 7 and 8, are also constructed with journal bearings, 45, 46, for the ends of the transverse shaft, 47, which shaft carries the miter-gear, 48, which meshes with a corresponding gear, 49, mounted on the governor shaft, 50, which has one end suitably supported in the bearing, 51. This bearing is constructed with an extended downwardly and upwardly curved portion which extends under the gear, 49, and in front of the same and is supported on the transverse shaft 47, by the bearing portion, 52. The projecting curved portion of the bearing 51, is also provided with a downwardly extending flange or portion, 53, having an elongated hole, through which a bolt, 56, passes to secure the bearing, 51, to the housing-members, 7 and 8, before described. The object of this specific construction will be hereinafter stated.

As shown in Figs. 4 and 5, where the flanged member, 8, of the housing is bolted to the frame, 4, the holes for the securing bolts are elongated to enable the vertical members or hangers 7 and 8, of the housing, and the shaft, 2, measuring drum, 1, and cam gear 11 to be vertically adjusted to bring the top of said drum on a level with the top of the frame or table, 4. This frame or table, is provided with the usual series of rollers, 4', over which is designed to travel the customary belt or apron, B which belt receives the bar of clay, and passes over the drum, 1, at the receiving end of the machine, and over a second drum, at the opposite end of the frame 4.

The transverse shaft, 47, has mounted upon it a spur-pinion, 60, whose teeth intermesh with the teeth of the cam-gear, 11, and thereby completes the circuit between the shaft, 50, and the movable carriage, 30.

The main driving-pulley, 64, Fig. 3, is appropriately keyed on the shaft, 62, which is itself journaled in suitable bearings bolted to the base of the main-frame. On the inner

end of the shaft, 62, is fixed a spur-pinion, U, which is in mesh with the spur-gear wheel, T, mounted on a longitudinal shaft, 59, having a miter-gear, 59', which meshes with a similar gear, 59², on the shaft of the pulley, 61, around which the off-bearing belt, 82, passes, as in my aforesaid prior patent.

Loosely mounted on the shaft, 62, is the elongated pinion, S, to the end of which is appropriately bolted, a plate-flange, N, and to this is bolted a split or expansible ring, H, having a spring, V, located between its separate or split ends. By bolting one end of this split-ring the remaining portion of said ring is capable of being expanded into contact with the contiguous inner wall or surface of a stationary brake-band, F, as in said former patent. To the aforesaid flange, N, is also secured a second split-ring, K, which lies interior to the ring, H, and is provided with a centrally-disposed lug, K', through which passes a bolt, K², by which said second ring is secured in place, said lug being located on the ring midway between or opposite to the point where the ring is split or severed. The split ends of the second ring, K, are formed or provided with the lugs or projections, K³, K⁴, which are designed to be embraced by a stirrup, M, of appropriate construction, said stirrup having a forked or open end within which is pivotally mounted a curved lever, W, the short arm of which operates against the lug, K⁴, while the longer arm extends within the range of action of a suitable cam surface. The position of the lever, W, may be adjusted when desired by means of a set-screw, K^x, mounted in the opposite end of the stirrup. A curved lever-arm R is disposed on the opposite side of the cam-gear E and has one end pivoted in the fixed end of the split-ring H and the opposite end extending into the range of action of the cam, E², said levers, W and R, extending in opposite directions, as shown.

In machines of this type it is very essential that the governor shaft, 50, the carriage 30, and the measuring drum 1, should be connected so that when the bar of clay moves out on the belt that passes over the measuring drum 1, all of these parts will move in correct register with the variable travel of the bar of clay.

The governor shaft 50, is controlled by a governor which is preferably of the type shown in my former reissued patent, No., 12,392, dated October 3, 1905, said governor comprising the stationary friction band, F, and a friction driver O, in the form of a flanged-disk having a plain flat face provided with a frictional surface, which may be of leather or other appropriate material. Opposing the friction-driver O, is the corresponding face of a gear E, which is formed rigid with a disk having at one side the cam E², said gear being loosely mounted on the

shaft, 62, and said disk, which in fact is a part of the gear, having its face opposing the friction-surface of the driver O, and adapted to be pressed thereagainst by means of a spring 63, coiled around the shaft, 62, and confined between a wearing collar and spring seat D and an adjusting collar B' whose position on the shaft may be fixed by means of a set-screw. This arrangement affords means for regulating the tension of the spring, 63, and the pressure of the friction-surface of the cam gear against the opposing friction driver O. The cam disk of gear E is, as before stated, provided with cam or incline, E', and the long arm of the aforesaid lever, W, extends into the range of action of said cam or incline, whereby said lever is operated to contract the split-ring K when the incline rides under the end of the lever, W, which lever may have a laterally-projecting pin or projection, R'. The other cam, E², of the cam-disk is also designed to ride under the end of the lever, R, or a pin, R', therein to expand the split-ring H against the inner surface of the stationary ring, F. Connected to the governor in substantially the manner disclosed in my aforesaid reissued patent, is the usual elongated pinion S, which is designed to mesh with and drive the large gear, 43, of the reel, it being understood that this reel is provided with appropriate cutting-wires which operate through the spaced platens and push-boards in the manner so well known in this art that a detailed description of these features seems unnecessary for an adequate disclosure of the present invention. The machine will also have the usual off-bearing belt or apron at its discharge end, and will be supplied with such other adjunctive features as such machines usually employ, but which form no part of the present invention.

It will be understood that the governor-shaft, 50, operates and controls the rotary movements of the reel. The time required to adjust the governor to bring the cutting-wires into action at the proper moment makes it necessary to employ a flexible connection at some point in the circuit between the reel and the moving bar of clay. In the present case the carriage travels uniformly with the traveling bar of clay for the reason that said bar of clay is supported by the belt which passes over the measuring drum which drum is mounted on the shaft, 2, which carries the cam gear, 11, and the cams 12 and 14, which latter operates the arm, 31, of the rocker, which in turn operates the carriage 30, which is attached to the shaft, 37, through the arm 36' and connecting rod, 35, as in my aforesaid prior patent.

The reel with its cutting wires revolves independent of the horizontal travel of the carriage, 30, therefore, if the wires should come to rest and while the carriage, 30, is traveling

in a horizontal direction and the reel should commence to revolve again, it will be noticed that the wires will remain in correct register with the moving bar of clay.

5 The general operation of this machine may be briefly stated as follows: The bar of clay issues from the usual forming-die of the brick machine, (not shown), and is received upon the measuring belt or apron which, as
10 before stated, passes over the measuring drum and is supported on the usual series of rollers in the frame, 4. Power being applied to the driving band-pulley, or otherwise, the governor-shaft is driven through the friction gear, E, and a companion gear, E', fixed to
15 the governor-shaft, 50. The friction gear, E, is pressed against the leather washer and said washer is in like manner pressed against a live friction member, (as the friction disk,
20 O) keyed to the shaft, 62, by the spring, 63, on said shaft 62, which shaft is driven directly by the band-pulley. As the bar of clay moves out on the measuring belt, it permits the governor to revolve the shaft 50,
25 miter-gears, 49 and 48, which revolve the spur-pinion 60. This pinion revolves the cam-gear 11 and cams 12 and 14, which operate the rocker-arm 31, and cause the carriage to travel in a horizontal direction.
30 While the carriage is thus traveling in a horizontal direction the governor causes the reel to revolve in register with the traveling bar of clay, thus insuring the accurate cutting of the bar of clay into suitable lengths.

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

1. In a brick and tile cutting machine, the combination with a support frame work, a
40 measuring drum mounted thereon, a measuring belt upon which the bar of clay is received, a longitudinally reciprocal member, and a cutting-reel carriage carried in unison therewith, of means for moving said member
45 horizontally in register with the travel of the bar of clay, said means comprising a gear-wheel on the axis of the drum, a cam fixed to the side of said gear-wheel and comprising a plurality of connected arms having opposite
50 faces forming a continuous cam surface with low points terminating contiguous to the axis of the drum and with high points extending towards the periphery of the drum, and a rocker-member having a plurality of arms,
55 one of said arms having its outer end arranged above the axis of the drum, and substantially close to the axis of the said drum and engaged by a low point of the cam surface when the cutting-reel carriage is about to start on
60 its horizontal travel in unison with the travel of the column of clay, said cam-surface being so shaped as to maintain a continuous contact with the rocker-arm during the travel of the carriage.

65 2. In a brick and tile cutting machine, the

combination with a supporting frame-work, a measuring-drum mounted thereon, a horizontally traveling belt upon which the bar of clay is received, a longitudinally reciprocal member, and a cutting-reel carriage carried
70 in unison therewith, of means for moving said member and carriage horizontally in register with the travel of the bar of clay, said means comprising a gear-wheel on the axis of the drum, a cam fixed to the side of said gear-
75 wheel and comprising a plurality of connected arms having opposite faces forming a continuous cam surface with low points terminating contiguous to the axis of the drum and with high points extending toward the pe-
80 riphery of said drum, and a rocker-member having a plurality of arms, one of said arms connecting with said longitudinally reciprocating member and another arm having an
85 outer portion disposed below the axis of the drum so that on the return reciprocal movement of the said member, said second arm may be engaged by a low portion of the cam near the axis of the drum and thereby over-
90 come the inertia of starting the carriage on its return movement, said cam-surface being so fashioned as to maintain a continuous contact with said second rocker-arm during its passage thereby.

3. In a brick and tile cutting machine, the
95 combination with a supporting frame-work, a measuring-drum mounted thereon, a horizontally traveling belt upon which the bar of clay is received, a longitudinally reciprocating member, and a cutting-reel carriage car-
100 ried in unison therewith, of means for moving said member and carriage horizontally in register with the travel of the bar of clay, said means comprising a gear-wheel on the axis of the drum, corresponding cams on opposite
105 sides of the gear wheel and reversely-arranged relative to each other, each of said cams comprising a plurality of connected arms having opposite faces forming a con-
110 tinuous cam surface with low points located contiguous to the axis of the drum and with high points extending towards the periphery of the drum, and a three-arm rocker-member adjacent to the gear-wheel having one arm
115 connected to said reciprocating member and having the outer ends of the other arms in constant contact with said cam-surface and arranged respectively above and below the axis of the drum so that in starting to move
120 the carriage in either direction one of said arms will engage the low part of its cam near the axis of the drum and the inertia due to starting the carriage will be overcome.

4. In a brick and tile cutting machine, the combination with a supporting frame-work,
125 a measuring-drum mounted thereon, a horizontally traveling belt upon which the bar of clay is received, a longitudinally reciprocating member, and a cutting-reel carriage carried in unison therewith, of means for moving
130

said member and carriage horizontally in register with the travel of the bar of clay, said means comprising a gear-wheel on the axis of the drum, corresponding cams on opposite sides of the gear-wheel and reversely-arranged relative to each other, each of said cams comprising a plurality of connected arms having opposite faces forming a continuous cam-surface with low points located contiguous to the axis of the drum and with high points extending towards the periphery of said drum, and a rocker-member having a plurality of arms the outer ends of which are maintained in constant contact with said cam-surface, said member being connected with said reciprocating member, and one of said cams being axially-adjustable relative to the other cam.

5. In a brick and tile cutting machine, the combination with a supporting frame-work, a measuring-drum mounted thereon, a horizontally traveling belt upon which the bar of clay is received, a longitudinally reciprocating member, and a cutting-reel carriage carried in unison therewith, of means for moving said member and carriage horizontally in register with the travel of the bar of clay, said means comprising a gear-wheel on the axis of the drum, corresponding cams on opposite sides of the gear-wheel and reversely arranged relative to each other, each of said cams comprising a plurality of connected arms having opposite faces forming a continuous cam surface with low points located contiguous to the axis of the drum and with high points extending towards the periphery of said drum, one of said cams having slots arranged concentric with the axis of the drum whereby it may be turned about said axis and adjusted to take up wear or lost motion, and a rocker-member having a plurality of arms, one of said arms being connected with said reciprocating member and the outer ends of other arms being constantly engaged by said cam-surface.

6. In a brick and tile cutting machine, the combination of a supporting frame-work, a transverse shaft journaled across one end thereof, and provided with a measuring-drum, an endless belt upon which the bar of clay is received, complementary clay-cutting mechanism, including a reel-carriage, and a revoluble reel having cutting appliances, means including a gear-wheel and corresponding cams fixed thereto on opposite sides thereof, said cams comprising a plurality of connected members whose opposite faces coöperate to form a continuous cam-surface with low points disposed near the axis of the drum and with high points extending towards the periphery of said drum, and rocker-arms and connections with said reciprocal member for causing the carriage to travel horizontally in register with the moving bar of clay, certain of said arms be-

ing constantly engaged by said cam-surface governing-mechanism for causing the cutting-appliances to revolve in register with and by the travel of the bar of clay, said appliances arranged to remain in correct register with the moving bar of clay after coming to rest, and connected gearing between the governing mechanism and the gear on the drum shaft.

7. In a brick and tile cutting machine, the combination with the supporting frame-work, the measuring-drum and belt, a reciprocal carriage and a revoluble reel carried thereby, a governing-mechanism for controlling the operation of the reel, said mechanism comprising a governor-shaft extending horizontally along the machine, a shaft journaled transversely across the receiving end of the machine, miter-gears between said transverse shaft and the governor-shaft, a vertically-adjustable housing having bearings for the transverse shaft, a bearing for the governor-shaft having a member extending to and journaled on the transverse shaft, said extending portion having a flange or extension provided with a slot, and means securing said slotted flange to said housing.

8. In a brick and tile cutting machine, the combination with the supporting frame-work, the measuring-drum and belt, a reciprocal carriage and a revoluble reel carried thereby, a governing-mechanism for controlling the operation of the reel, said mechanism comprising a governor-shaft extending horizontally along the machine, a shaft journaled transversely across the receiving end of the machine, miter-gears between said transverse shaft and the governor-shaft, a vertically adjustable housing formed of flanged sections secured together, one adjustably secured to the frame-work and the other having a bearing for an end of the drum shaft, and means for reciprocating said reciprocal member, said means comprising a gear pinion on said transverse shaft, a large gear on the drum shaft engaged by said pinion, oppositely arranged cams fixed to opposite sides of the large gear and revoluble therewith and having continuous cam surfaces, and rocker arms constantly engaged by the cams to move the reel carriage back and forth in unison with the travel of the bar of clay.

9. In a brick and tile cutting machine, the combination, of a clay-measuring drum, a revoluble reel having cutting appliances, a traveling belt or apron upon which the bar of clay is received and by which it is delivered to the cutting-wire reel, and mechanism for causing the reel to travel horizontally in register with the moving bar of clay, said mechanism comprising a wheel on the axis of the measuring-drum and corresponding cams on opposite sides of said wheel and reversely-arranged relative to each other, each

of said cams having its lowest point proximate to the axis of the drum and thence extending towards the periphery of said drum, and a rocker-member having a plurality of
5 arms mounted on a common axis, each of said arms engaged by one of said cams, and both of the cams being always in contact with their respective rocker arms.

10 10. In a brick and tile cutting machine, the combination with a supporting framework, a measuring-drum mounted thereon, and a measuring belt upon which the bar of clay is received, of a longitudinally reciprocal member, and means for imparting reciprocal
15 movement to said member, said means including a gear on the axis of the measuring drum, oppositely arranged cams fixed to opposite sides of the gear, and a rocker member

having a plurality of arms mounted on a common axis, one of said arms having its
20 outer portion arranged above the axis of the drum and another of said arms having its outer portion arranged below the axis of the said drum, each of said arms being engaged
25 by one of said cams, and means connecting said rocker with the said reciprocal member, complementary cutting appliances movable with said reciprocal member, and means for rotating the cutting appliances.

In testimony whereof I have hereunto set
30 my hand in presence of two subscribing witnesses.

WILLIAM R. CUNNINGHAM.

Witnesses:

SAMUEL E. AUCK,
G. McMICHAEL.