

No. 720,751.

PATENTED FEB. 17, 1903.

A. P. STEELE.  
BRICK CUTTING AND DELIVERING APPARATUS.

APPLICATION FILED FEB. 5, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

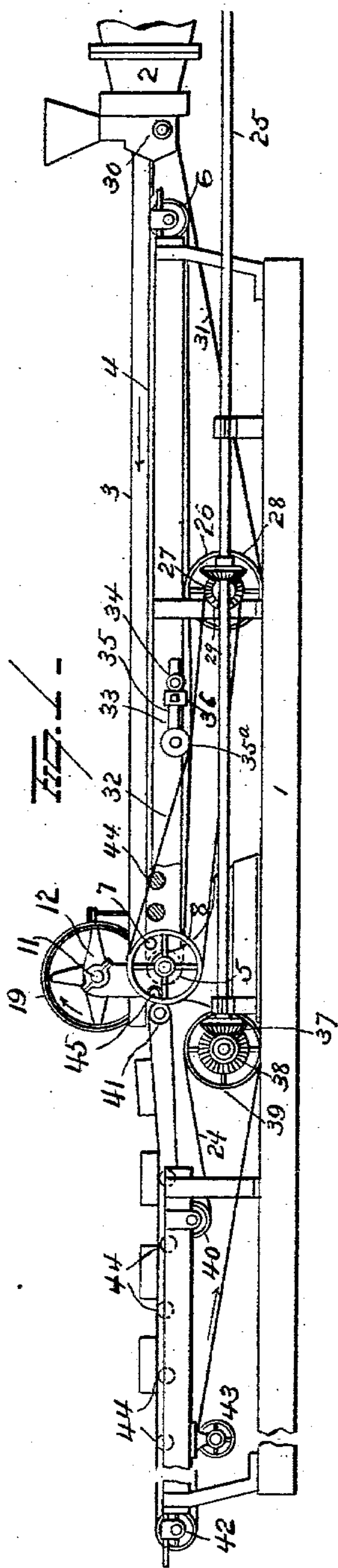


Fig. 1.

Fig. 2.

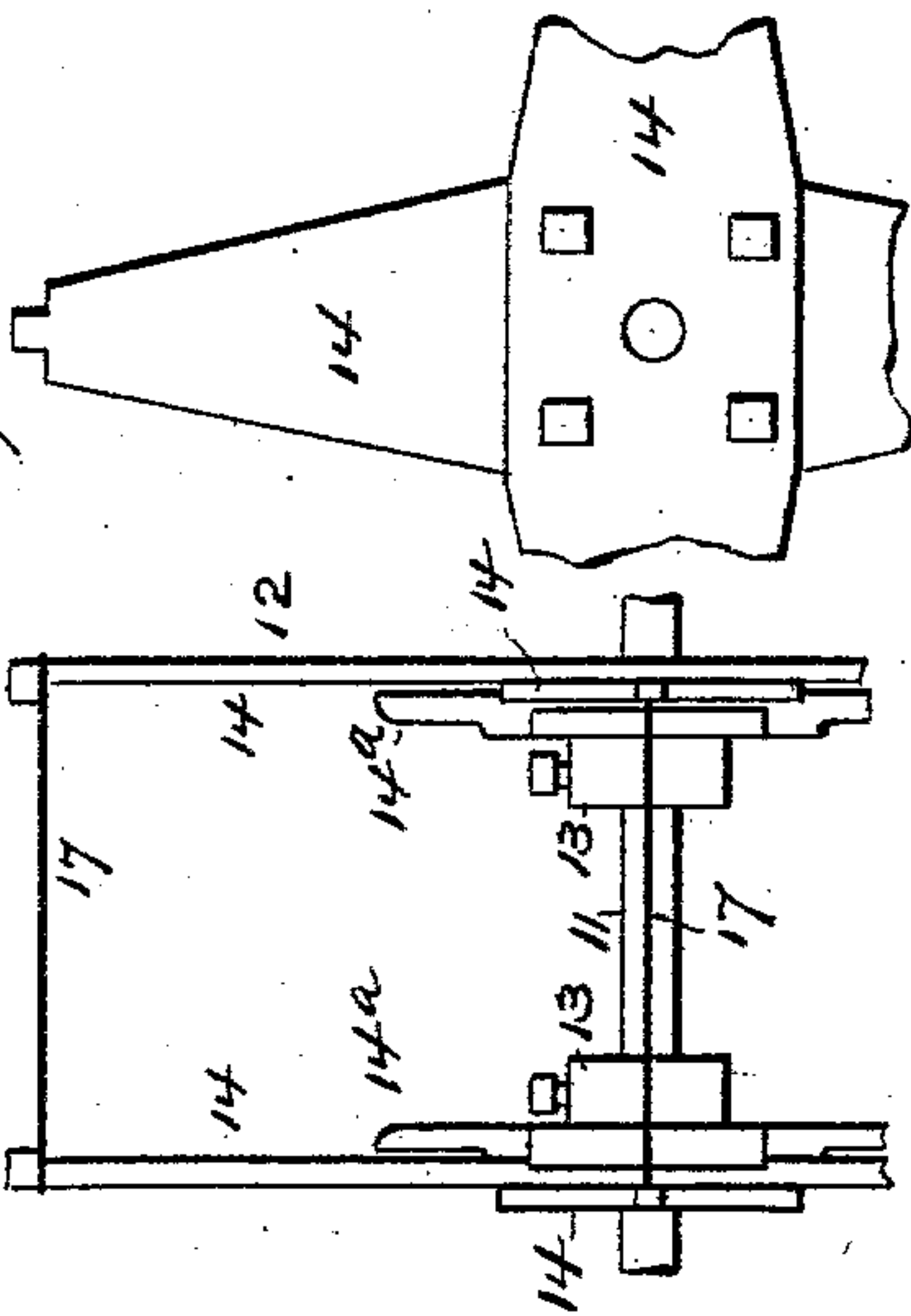


Fig. 3.

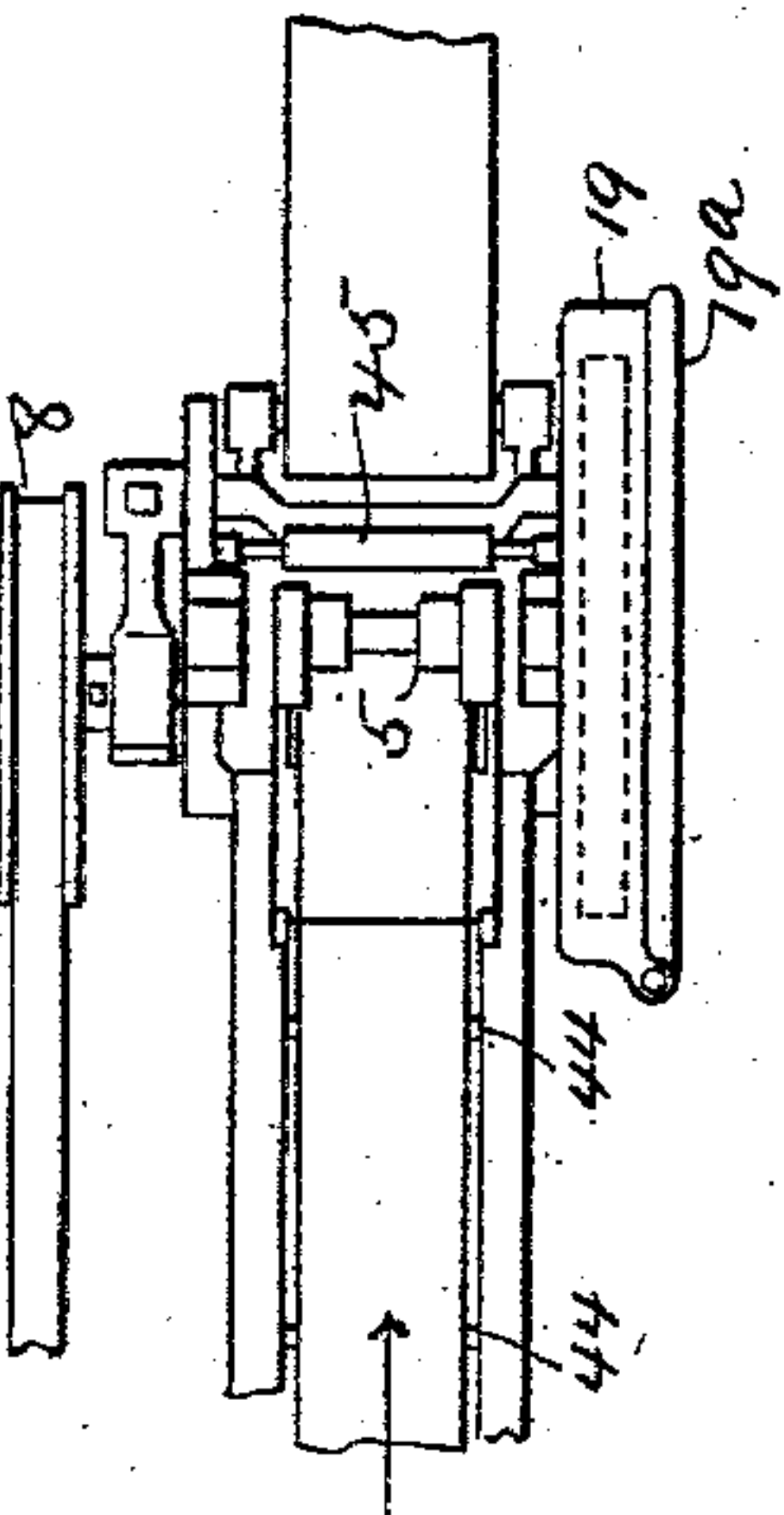


Fig. 4.

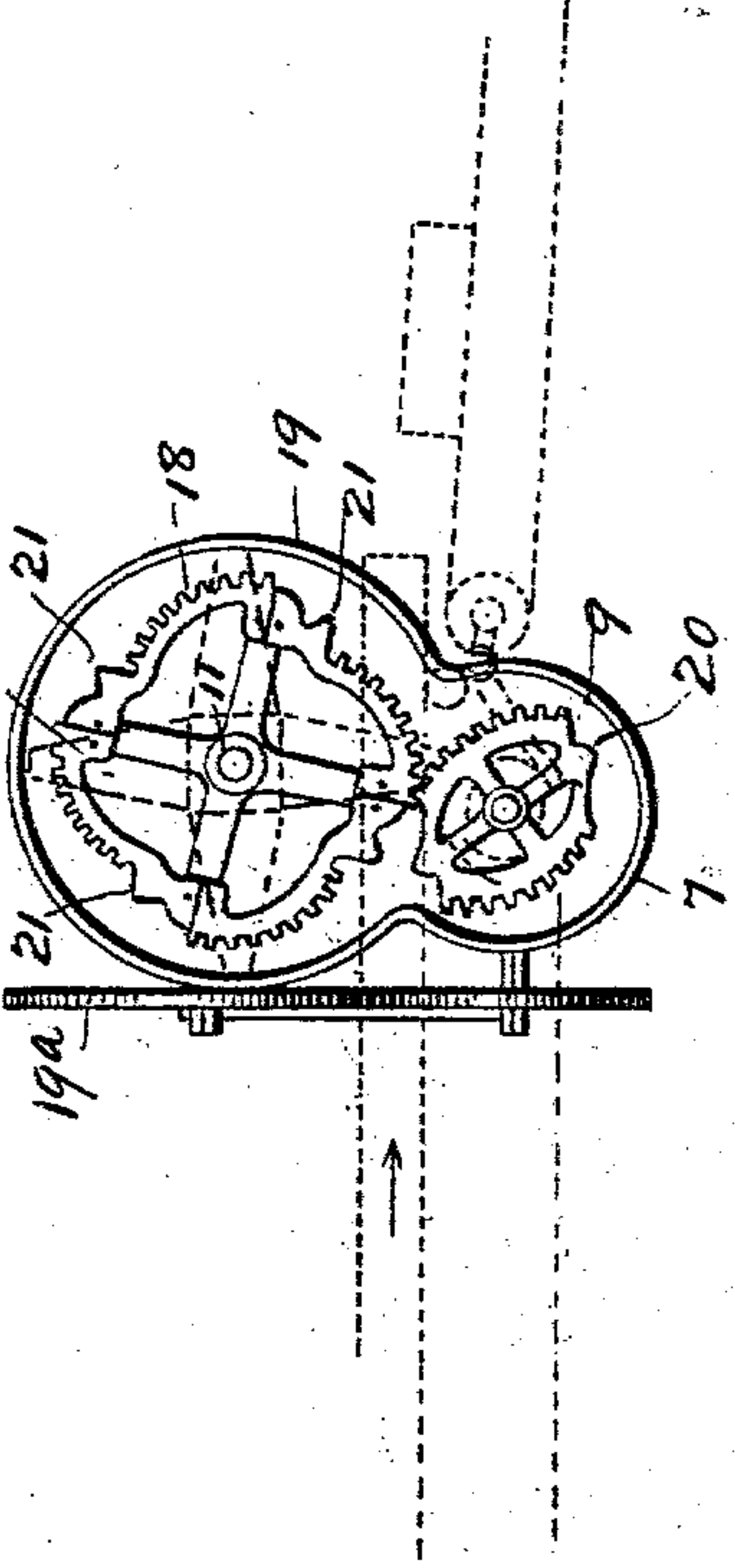


Fig. 5.

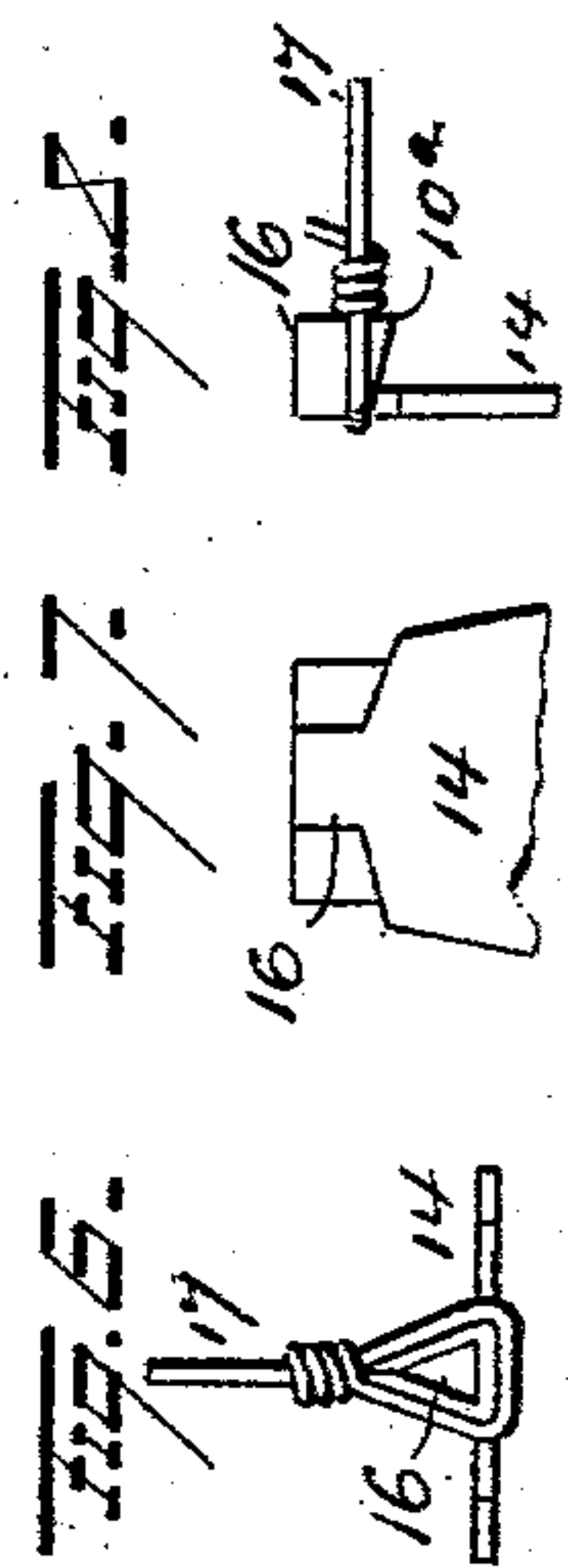


Fig. 6.

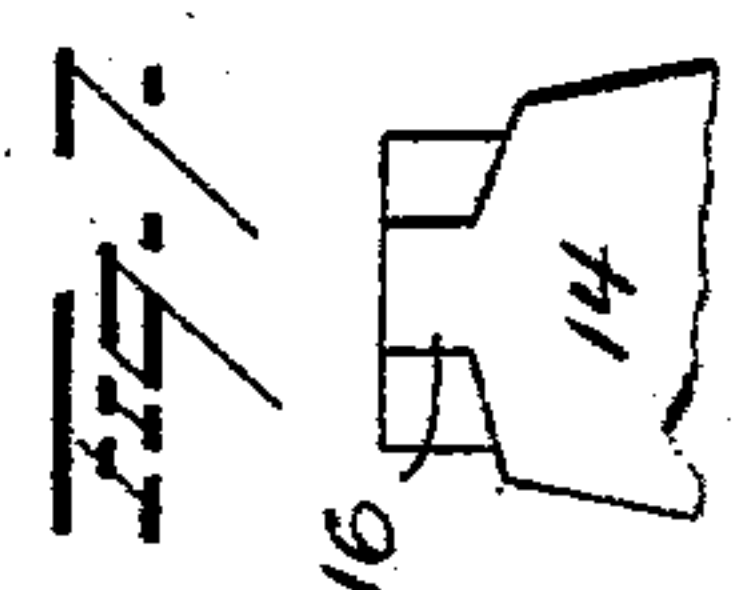


Fig. 7.

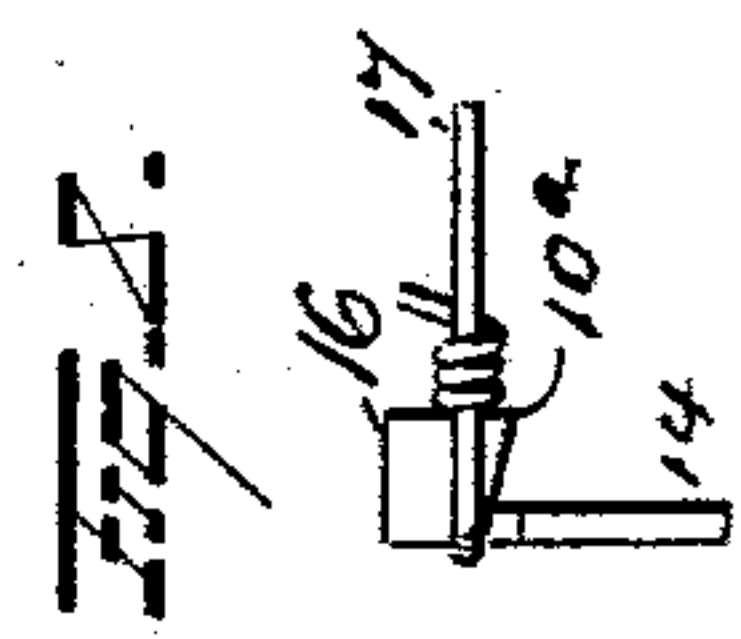


Fig. 8.

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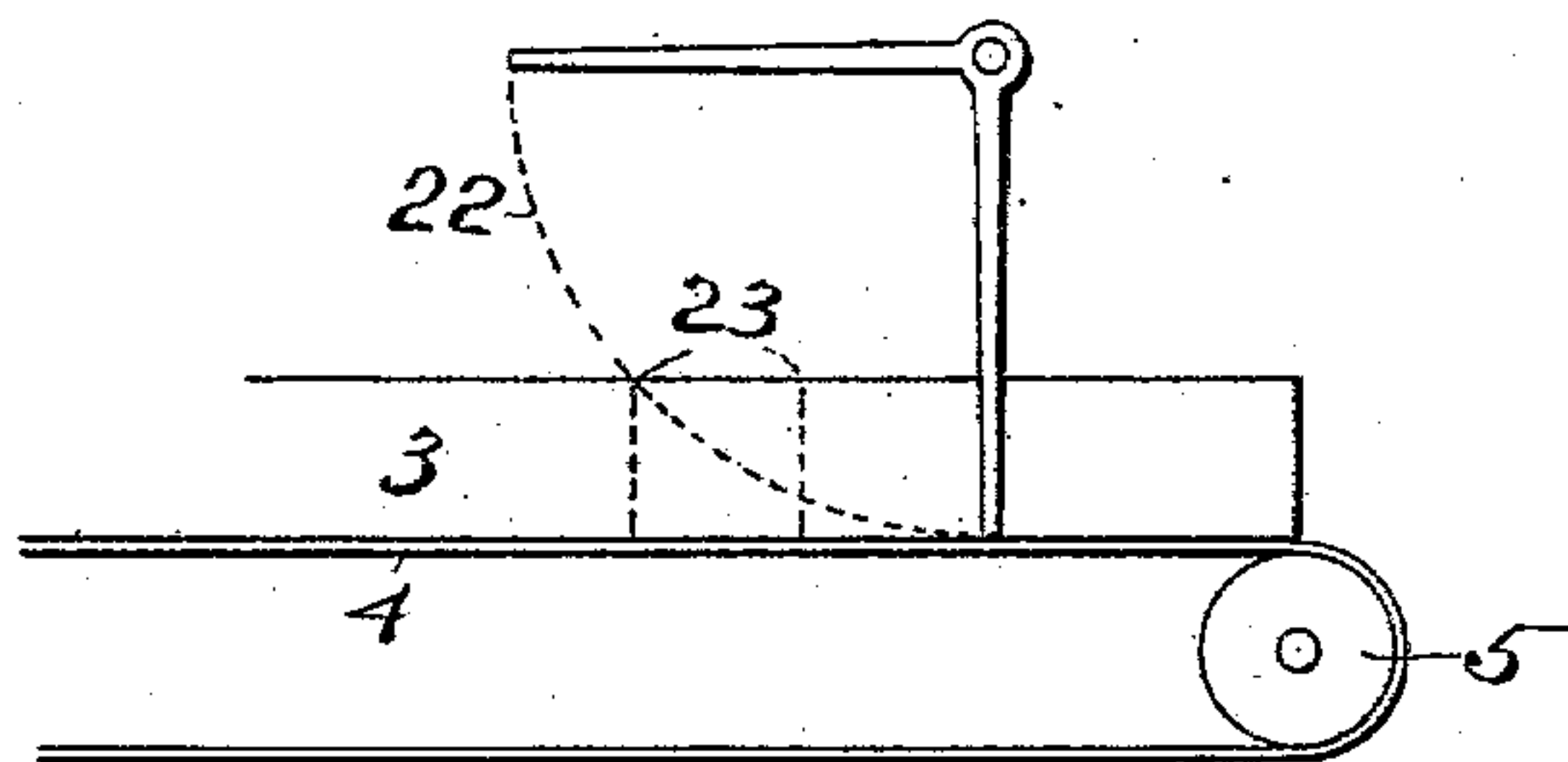
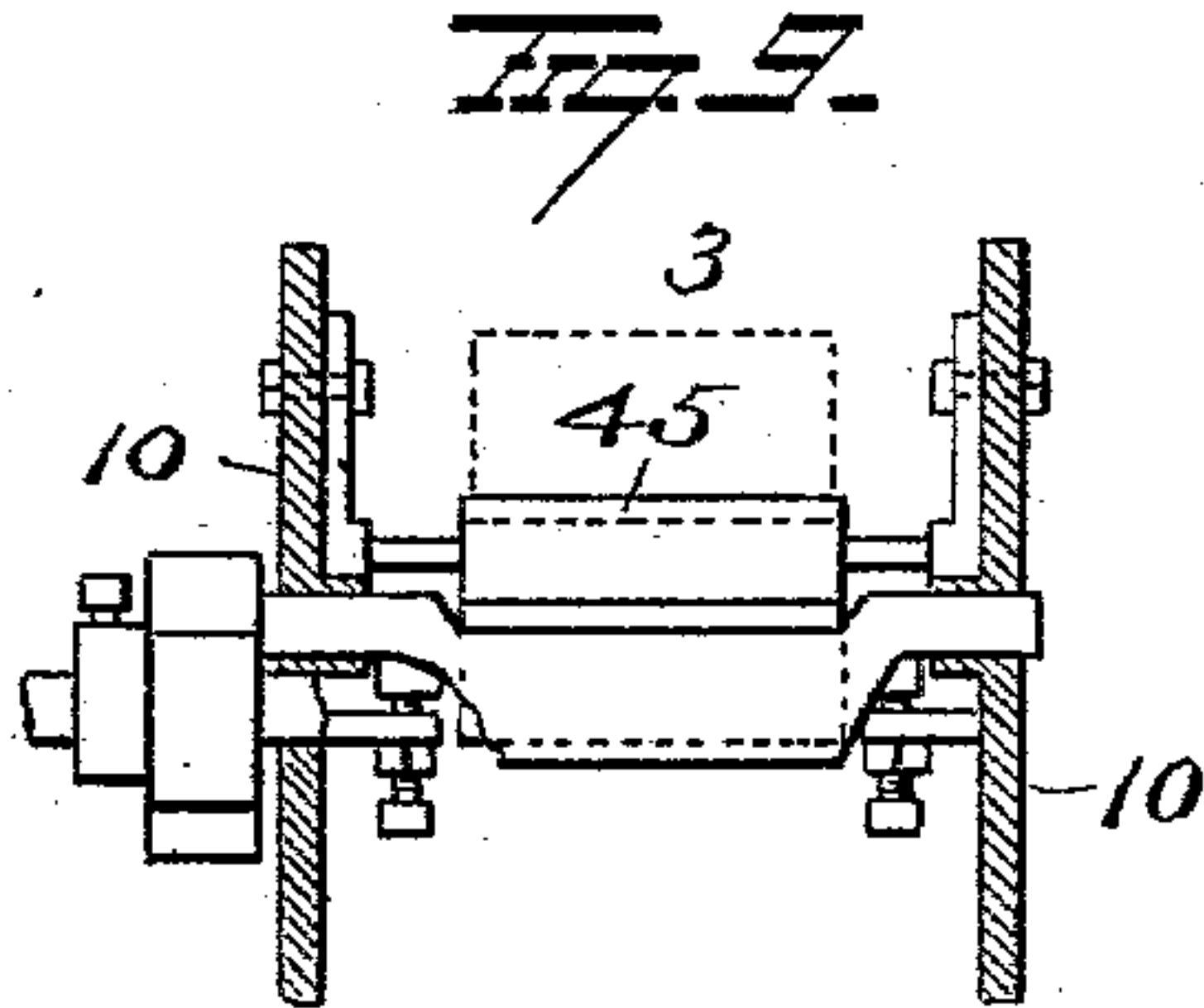
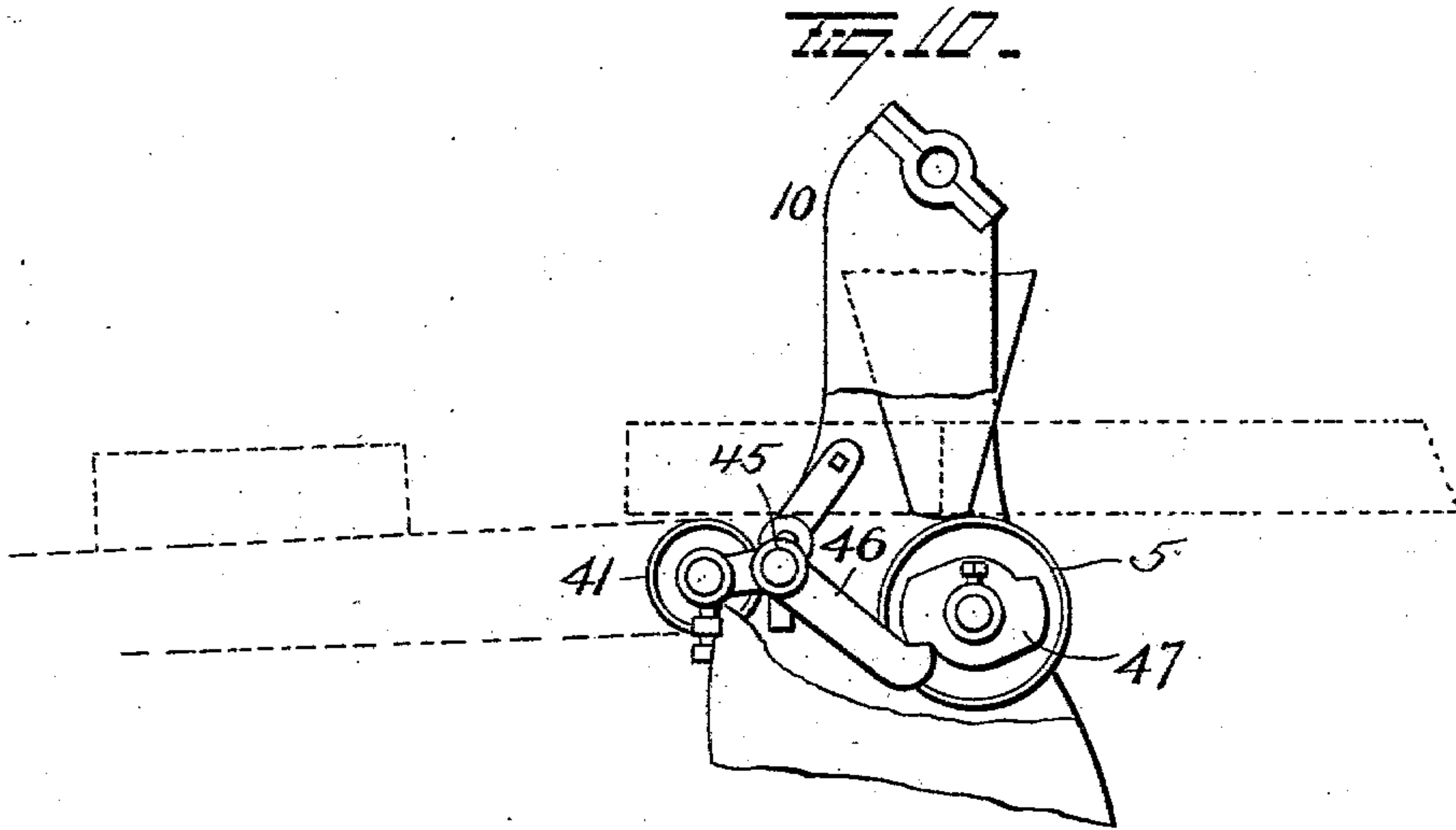
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WITNESSES  
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# UNITED STATES PATENT OFFICE.

ALEXIS PRESTON STEELE, OF STATESVILLE, NORTH CAROLINA.

## BRICK CUTTING AND DELIVERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 720,751, dated February 17, 1903.

Application filed February 5, 1902. Serial No. 92,737. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXIS PRESTON STEELE, a resident of Statesville, in the county of Iredell and State of North Carolina, have invented certain new and useful Improvements in Brick Cutting and Delivering Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved brick cutting and delivering machine, the object of the invention being to provide improvements of this character which will continuously sever a bar into brick lengths and so construct and operate the cutter as to insure the cutting of the bar at a perfect right angle or any angle or curve desired.

A further object is to provide improved conveying mechanism for rapidly taking the bricks away from the cutter, permitting the escape of the cutter, and for convenience in handling the bricks.

A further object is to provide an improved cutter for a machine of this character and provide irregular gearing or other improved mechanism to operate the same.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation, partly broken away, illustrating my improvements. Fig. 2 is a plan view of a portion thereof. Fig. 3 is an enlarged view illustrating the gearing. Figs. 4, 5, 6, 7, 8, 9, and 10 are enlarged views illustrating various details of construction, and Fig. 11 is a diagrammatic view.

1 represents the bed-plate and frame of the cutting-table, at one end of which a feed-spout 2 is located and adapted to feed the clay in the form of a continuous bar (indicated by 3) of the width and thickness of the brick to be formed. The bar 3 is fed to a belt-conveyer 4 (which I term "measuring-belt") on rollers or pulleys 5 and 6, respectively, the former secured on a shaft 7 near the center of the frame, as shown, supported in suitable bearings and projecting at each

end beyond the frame to receive at one end the pulley 8 and double-end cam 47 and at its other end drive-gear 9.

On the frame and on opposite sides thereof standards 10 are located and are provided at their upper ends (which project above measuring-belt 4) with aligned bearings for a shaft 11, on which my improved cutting-reel 12 is secured, and consists of collars 13, secured on the shaft 11 by set-screws and flanged at their outer faces and recessed, as shown, to counterseat one of the pairs of spring-metal bars 14, arranged across each other and secured together and to the flanged ends of the collars by bolts, as shown, forming at each side four radial spring-arms, and radial braces 14<sup>a</sup> are made integral with the flanged portion of collars 13 to limit the inward spring movement of arms 14. These arms 14 preferably taper toward their outer ends and are slit diagonally, as shown in Fig. 7, bent upon the dotted lines in said figure, forming triangular spring-lugs 16, as shown in Figs. 6 and 8, around which the respective ends of wires 17 are passed and twisted upon themselves to secure the ends of the wires therein, and owing to the construction of said lugs 16 (their inner ends 10<sup>a</sup> being sharp and at the same time projecting radially inside of the initial position of the wires when resting on shoulders and under tension the wire is compelled to assume a definite position) a uniform and non-varying position of the wires is assured. These wires extend across the reel from the ends of arms 14, on one side thereof, to the arms on the opposite side, as shown in Fig. 4, and form cutting mediums to sever the bar 3 into brick lengths when operated by the drive-gear 9 on shaft 7 meshing with driven gear 18 on shaft 11, and when the reel is revolved the wires will cross the path of the bar of clay and at one place a little below the same. These gears 9 and 18 are preferably inclosed in a housing 19 to shield them from dust and dirt and having a suitable door 19<sup>a</sup> to facilitate access to the gears for the purpose of lubricating, cleaning, or otherwise giving them attention.

The driven gear 18 is of appreciably greater diameter than drive-gear 9, and said gears are of the peculiar irregular shape shown for the purpose of varying the speed of the cut-



ting-reel 12 to insure the cutting of the bar 3 at an exact right angle, the gear 18 being preferably composed of four sections secured together and to the central bearing by bolts or other desired means.

The drive-gear 9 is of two segments, having greatest diameter at one end and inclining to smallest diameter at its other end, and vice versa, and the two segments at their meeting ends are notched, as shown at 20, to receive correspondingly-shaped teeth 21 on the driven gear 18, which latter is composed of four segments ranging from smallest to largest diameter at their respective ends, and each segment is constructed to exactly mesh with the segments of the drive-gear 9. Hence one complete revolution of the latter revolves the driven gear but one-half revolution, and the gears are constructed so that one-half turn of the drive-gear 9, and consequent quarter-turn of driven gear 18, will correspond to one brick length, and as the drive-gear 9 is on the same shaft 7 as roller 5, carrying conveyer 4, the movements of the conveyer and gears must be simultaneous, and as the conveyer is moved by the bar of clay thereon it will be seen that this motion is communicated to pulley 8, shaft 7, and gears 9 and 18 to the cutting-reel, so that the operation of the cutter is dependent on the movement of the bar, and therefore the bricks must necessarily be cut into even or uniform lengths, and the pulley 8 and the gears are preferably of just the proper sizes so that a complete revolution of the pulley will just compensate for two bricks, and a half-revolution for one brick. This proportion may of course be changed as desired; but I prefer that shown and described.

The peculiar varying diameters of gears is necessary to insure the straight cut of the bricks, as the cutting-wires 17 move in the arc of a circle, and consequently a greater distance than the bar 3 on platform 4, as indicated by diagrammatic view Fig. 11, in which the dotted line 22 indicates the arc through which the cutting-wire moves and the dotted lines 23 divide the distance through which the bar 3 passes from the time it is engaged by the cutting-wire to the point where the brick is completely severed, and it will be plainly seen that the distance through which the wire 17 moves between dotted lines 23 is much greater than the last half of the cut. Hence a much greater speed must be imparted to the reel during this first part of the cut to move through the horizontal plane at the same speed as the bar 3, and by constructing the gears as above explained this is effectually accomplished, and the wire (while the speed of the reel is varied from greatest to least from the time the wire first begins its cut to the completion of the cut) will move horizontally at the same speed as the bar until completely cut, thus insuring a perfect right-angle cut.

When the cut is completed, the gears are

designed to revolve through an arc of three or four teeth of still gradually-diminishing diameter on the part of gear 9 and increase of gear 18. This, together with the distance that the wire goes below the bar of clay, will cause the wire to lag perceptibly behind the moving bar. This will give the delivery mechanism time to separate the brick from the bar, so the wire can come through. Then the notched end 20 of gear 9 receives the tooth 21 of gear 18, and by reason of the increased diameter of gear 9 and corresponding decrease in diameter of gear 18 the wire is enabled to move and gain what was lost in speed due to the aforesaid causes and will come up in front of the advancing bar.

Should it be desired to cut the brick on edge or through a distance of more than three and one-half inches, the teeth 21 of gear 18 and notch 20 of gear 9 are of such form that their sliding contact (which is the action of two cams working together) when coming in mesh will control the reel and wires as desired to make cut until the smaller teeth come into mesh.

The drive-shaft 25 of the machine is supported in suitable bearings and has secured thereon between its ends a beveled gear 26, meshing with a bevel-gear 27 on a transverse shaft carrying a large pulley 28 and a small pulley 29, the former connected with the sanding-roller 30 by a belt 31 and the pulley 29 connected by a belt 32 with the pulley 8, so as to provide auxiliary power to assist in running the gearing and cutting mechanism, as well as the double cams and parts operated thereby, as the power required to operate these parts might cause the bar of clay to swell, and this auxiliary power is only to aid the bar of clay to run these several operating mechanisms. It will be observed that the sanding-roller 30 and the shaft 7 are driven by belts which receive their motion from the same source, and the various pulleys over which said belts pass are so proportioned relatively to each other that the speed positively imparted to the conveyer 4 will be the same as the speed imparted to the conveyer by the bar of clay. I provide a belt-tightener 33, which consists of a bar or lever 35, fulcrumed near or at one end on a pintle 34, projecting from one side of the frame, and said lever provided at one end with a roller 35<sup>a</sup>, held against the belt by a weight 36, adjustable on the lever to regulate the tension on the belt.

A bevel-gear 37 is secured on the end of shaft 25 and meshes with a bevel-gear 38 on a lateral shaft carrying a roller or pulley 39 for operating the delivery-belt 24, which passes around the same. This delivery-belt 24 after passing around roller or pulley 39 extends forward around a roller or pulley 40, thence again back around a roller or pulley 41, (in close proximity to the end of measuring-belt 4,) then forward again and around a roller or pulley 42 at the end of the table, from which pulley the belt passes over an



idler 43 to the pulley 39, and similar idle rollers 44 are provided for supporting the weight on this belt throughout a greater portion of its length, and similar idle rollers are located beneath the measuring-belt 4, in proximity to the cutting mechanism, to prevent sagging of the belt.

Between the measuring and delivery belts is stationed an idle roller 45, mounted to revolve in suitable journals for the purpose of supporting the part of bar projecting beyond measuring-belt until completely severed and carried off by the delivery-belt when raised to receive the same.

The pulley or roller 41 is journaled in the end of levers 46, fulcrumed between their ends on the frame, and the free ends of said levers are in the path of double-end cam 47, secured on shaft 7 and properly disposed so that when said shaft revolves the cams will operate to raise the pulley or roller 41 and belt 24 thereon to receive a cut brick and then fall with the brick upon the delivery-belt, and the latter being in an approximately horizontal position, and as said belt 24 is geared to run at a greater speed than belt 4 the bricks will be spaced apart.

The operation of my improvements is as follows: The bar of clay or other brick material is carried by measuring-belt 4 to the cutting mechanism, which latter, operated by irregular gears 9 and 18, as above explained, serves to revolve the reel 12 and force the wires 17 through the bar 3 and cut the same into brick lengths. The spring-arms 14 of said reel are permitted sufficient play to compensate for ordinary obstructions met by the wires in passing through the bar; but should an obstruction be met which cannot be severed or displaced by the wire the strengthening-arms 14<sup>a</sup> will limit the movement of the spring-arms 14 and compel the wire 17 to break, thus preventing injury to the reel and only resulting in a short delay in the operation of the machine, long enough to place a new wire in position. The bricks after being cut are taken by delivery-belt 24, from which they are removed at convenient places, the receiving end of this belt being raised and permitted to fall, as heretofore clearly set forth.

A great many changes might be resorted to in the general form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I would have it understood that I do not limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a brick-cutting machine, the combination of a reel mounted to revolve and carrying several wires to cut a horizontally-moving bar into brick lengths, and irregular gears substantially as shown and described, for operating said reel.

2. In a brick-cutting machine, the combination of a reel supported above a horizontally-moving bar, wires carried by said reel, and adapted to be moved through the bar to cut the same into brick lengths, a driven gear on said reel-shaft composed of four segments of gradually increasing or diminishing diameter from end to end, a drive-gear meshing with said driven gear and composed of two segments of gradually increasing or diminishing diameter to correspond with the segments of the driven gear, and means for operating said drive-shaft.

3. In a brick-cutting machine, the combination of a reel, wires carried by said reel adapted to be moved through a moving bar of clay to cut the same into brick lengths, a driven gear revoluble with the reel and comprising a series of segments of gradually increasing or diminishing diameter from end to end, a drive-gear also composed of a series of segments of gradually increasing or diminishing diameter to mesh with the segments of the driven gear and means for operating the drive-shaft.

4. As a brick-cutting apparatus, a reel composed of flanged collars, spring-arms secured on said flanged collars and cutting-wires secured to the ends of said spring-arms.

5. As a brick-cutting apparatus, a reel composed of radial arms slit and bent into triangular lugs at their ends, to receive the wires substantially as and for the purpose set forth.

6. A cutting apparatus, consisting of a reel composed of parallel radial arms slit and bent into lugs, wires secured at their ends around said lugs, and brace-arms on said reel to limit the spring movement of the spring-arms.

7. In a brick-cutting apparatus, the combination with an endless belt on which a bar of brick material is fed, of a revolving cutter mounted above the bar and adapted to cut the same into brick lengths, a drive-shaft, variable-speed gearing between said drive-shaft and the shaft of the cutter and an oil-tight casing inclosing said gearing.

8. In a brick cutting and delivering apparatus, the combination with a measuring-belt on which the bar of brick material is fed, of a cutter near the discharge end of said measuring-belt to cut the bar into brick lengths, a delivering-belt adapted to run at greater speed than the measuring-belt, and means for moving one end of said delivering-belt vertically to take the cut bricks from the measuring-belt.

9. In a brick cutting and delivering apparatus, the combination with a measuring-belt on which a bar of brick material is fed, and a cutter adapted to cut said bar into brick lengths, of a delivering-belt, and means for



raising said delivering-belt to receive and take the cut bricks from measuring-belt as fast as said bricks are cut and rapidly take them to a point of discharge.

- 5 10. In a brick cutting and delivering apparatus, the combination with a measuring-belt on which a bar of brick material is fed, and cutting mechanism above said measuring-belt adapted to cut the bar into brick lengths, 10 of a delivery-belt, a roller or pulley adapted to support the receiving end of said belt in close proximity to the measuring-belt, levers supporting said roller or pulley and pivoted between their ends, and a cam or cams on 15 the driving-shaft of the measuring-belt, adapted to engage said lever or levers and elevate the end of the delivery-belt and take the bricks from the measuring-belt, substantially as and for the purpose set forth.
- 20 11. In a brick cutting and delivering apparatus, the combination of a cutting-reel having cutting-wires at the periphery of said reel, a gear on said reel-shaft, a gear on a driving-shaft meshing therewith, and said gears 25 shaped substantially as shown and described to continue the decrease in speed of the reel after a brick is cut and then materially increase the speed of the reel to permit the wire to escape the advancing bar.
- 30 12. In a brick cutting and delivering apparatus, the combination of a cutting-reel having cutting-wires at the periphery of said reel, a gear on said reel-shaft, a gear on a drive-shaft meshing therewith and both of 35 said gears composed of segments of increasing and diminishing diameters, the cam en-

gagement between the segments to operate substantially as set forth.

13. In a brick cutting, separating and delivering apparatus, the combination with a 40 cutting-reel, of a pair of toothed gearing to transmit motion to said reel, the radius of the driving-gear decreasing while the radius of the driven gear increases in relative proportion, during the action of the reel in cutting 45 the bar.

14. In a brick-cutting apparatus, the combination with a conveyer, of means for feeding a bar to be cut onto said conveyer and moving the latter to turn a shaft, a cutting- 50 reel to cut the bar into brick lengths, gearing between said reel and shaft operated by the bar moving the conveyer, a pulley on said shaft, a pulley positively driven, a belt connecting said pulleys to communicate an aux- 55 iliary power to the shaft and overcome the strain on the conveyer and prevent slipping, and a belt-tightener or tension device substantially as shown, for said belt.

15. The combination of mechanism on 60 which a bar of brick material is fed, means for cutting the bar into brick lengths, a delivering-belt, and means for lifting one end of said delivering-belt to take the bricks.

In testimony whereof I have signed this 65 specification in the presence of two subscribing witnesses.

ALEXIS PRESTON STEELE.

Witnesses:

J. H. ROCKWELL,  
F. A. DUNLAP.