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H. A. RIGGS.

BRICK CUTTING MACHINE.

No. 479,663. Patented July 26, 1892.

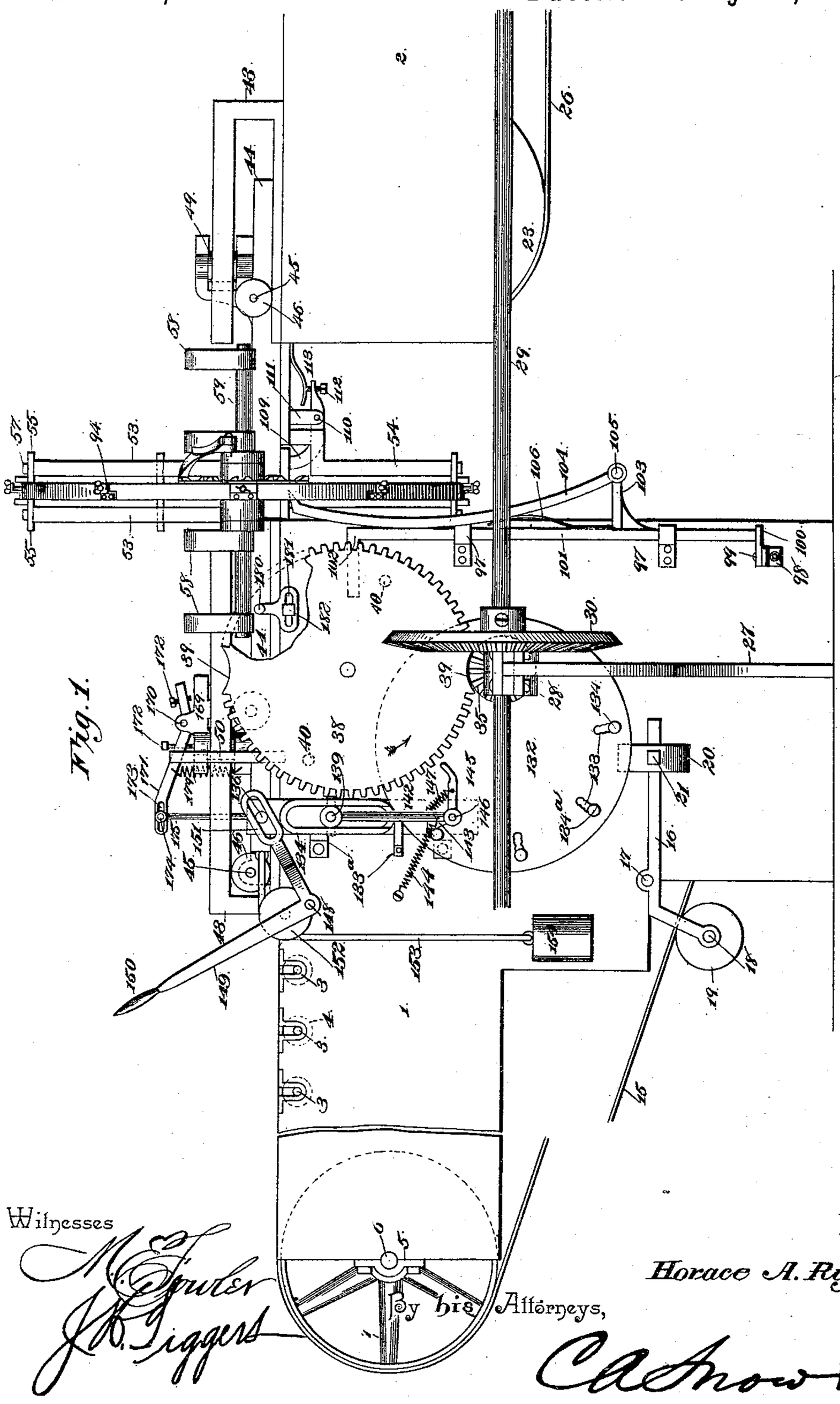

Fig. 1.

Witnesses
M. Snyder
J. B. Riggers

Inventor
Horace A. Riggs
By his Attorneys,
C. A. Snow & Co.

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H. A. RIGGS.

BRICK CUTTING MACHINE.

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Fig. 2.

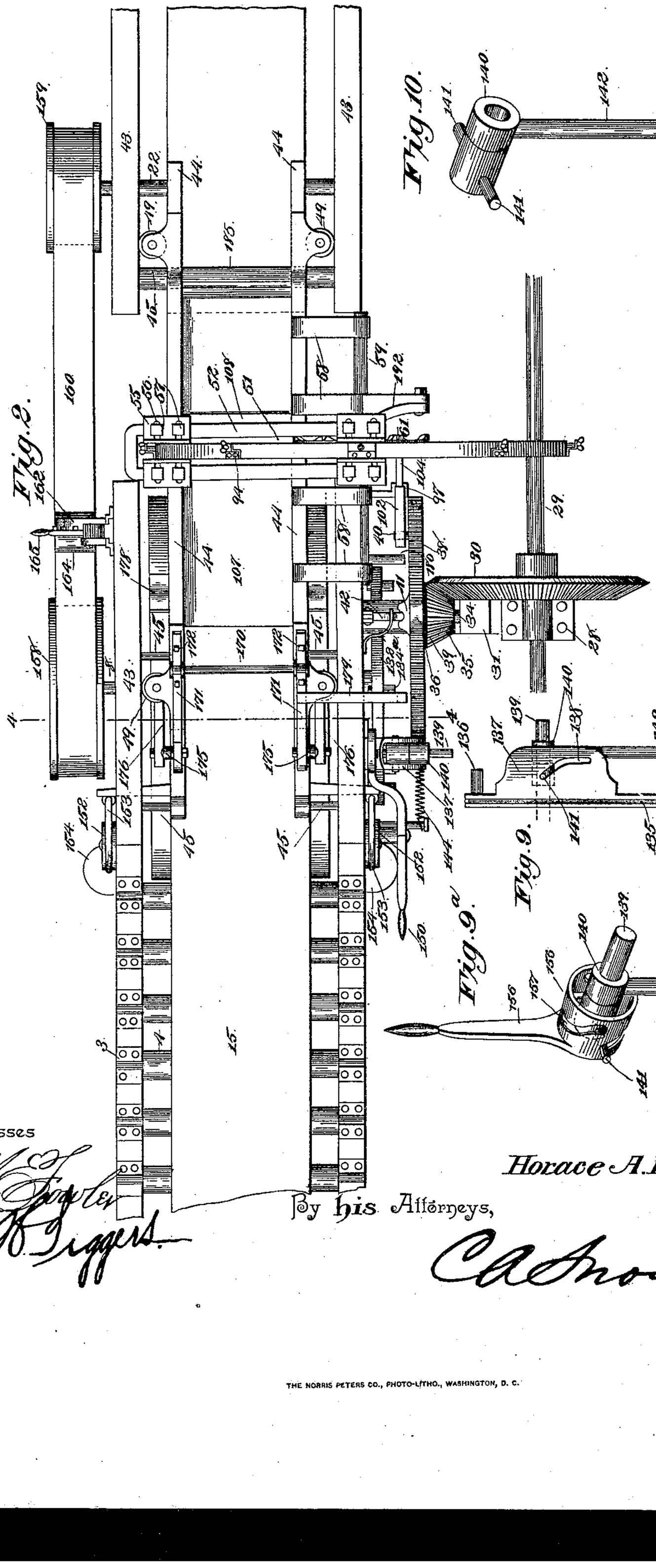

Fig. 10.

Fig. 9.

Fig. 9a.

Witnesses

M. Taylor

J. B. Diggers.

Inventor

Horace A. Riggs

By his Attorneys,

C. A. Snow & Co.

(No Model.) 7 Sheets—Sheet 3.

H. A. RIGGS.

BRICK CUTTING MACHINE.

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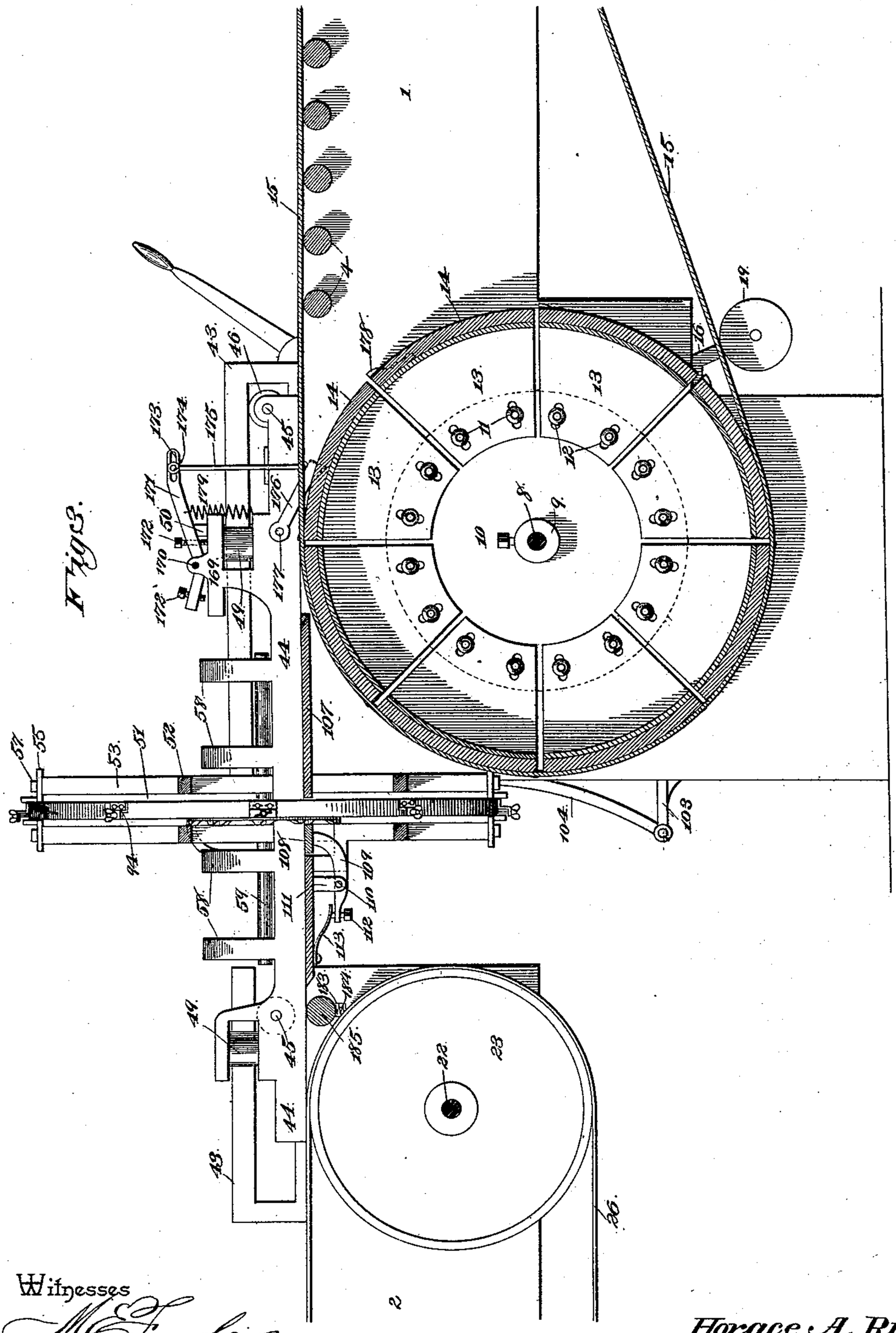
Fig. 3.



Witnesses
M. Fowler
J. B. Diggers

Inventor
Horace A. Riggs

By his Attorneys,
C. A. Snow & Co.

(No Model.) 7 Sheets—Sheet 4.

H. A. RIGGS.

BRICK CUTTING MACHINE.

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Fig. 5.

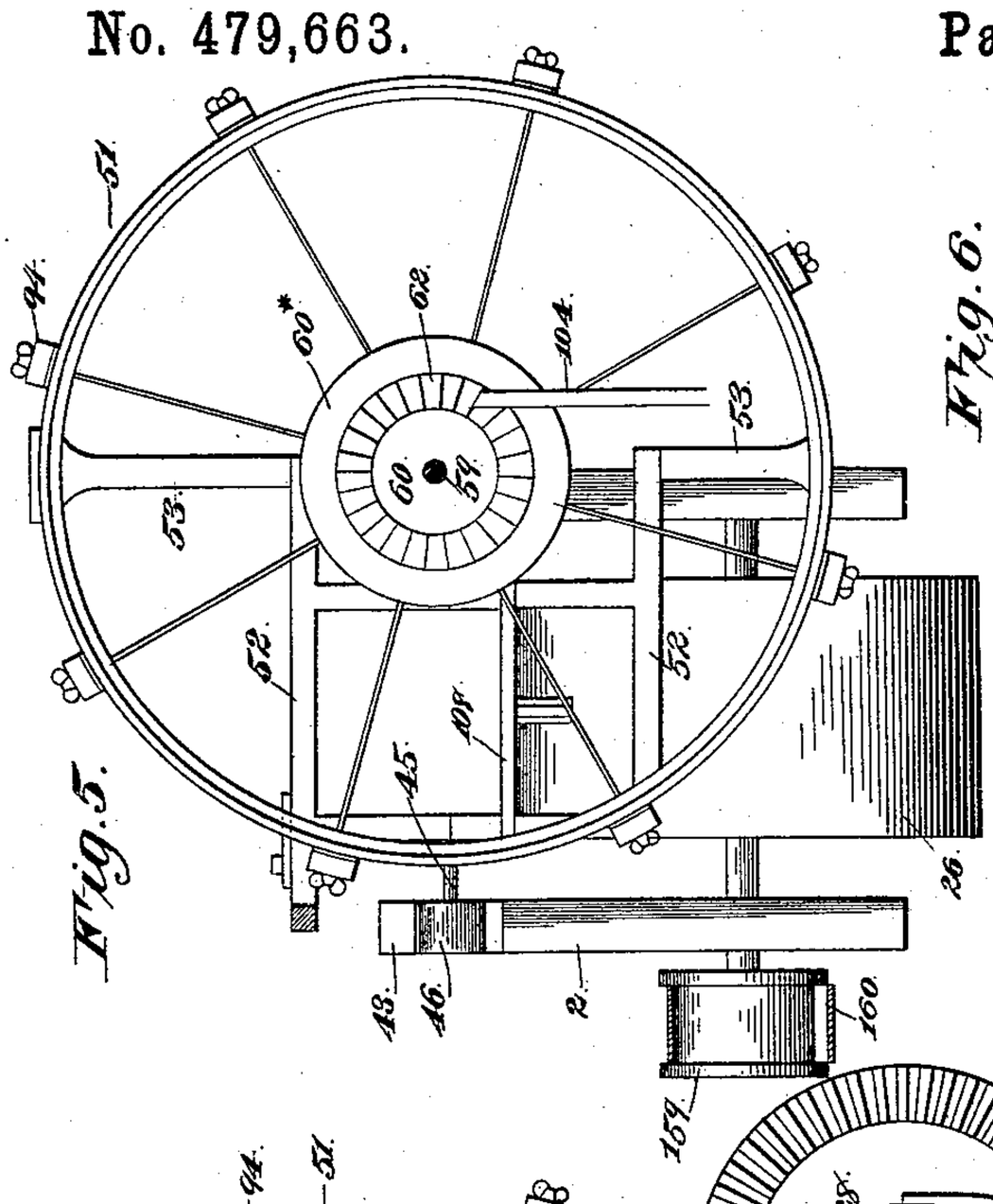


Fig. 6.

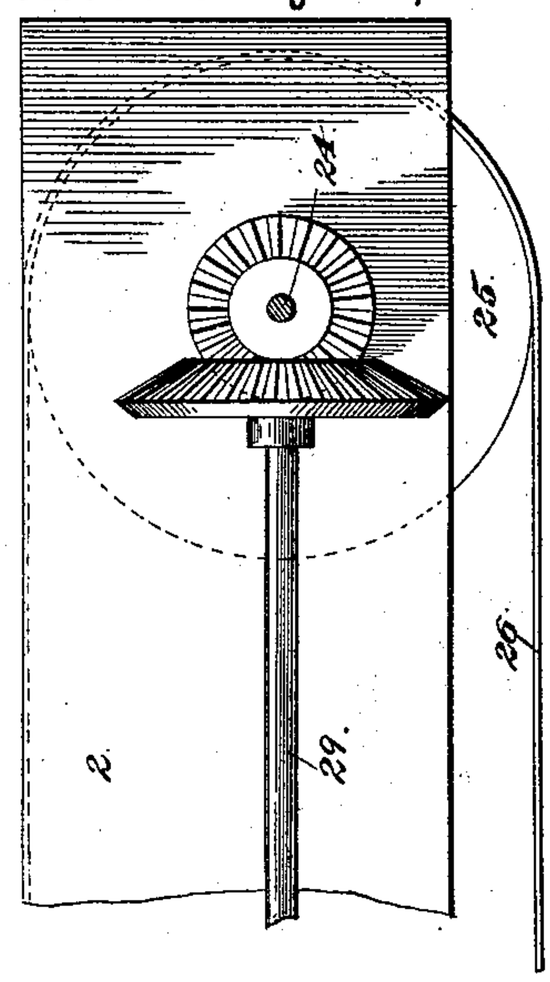
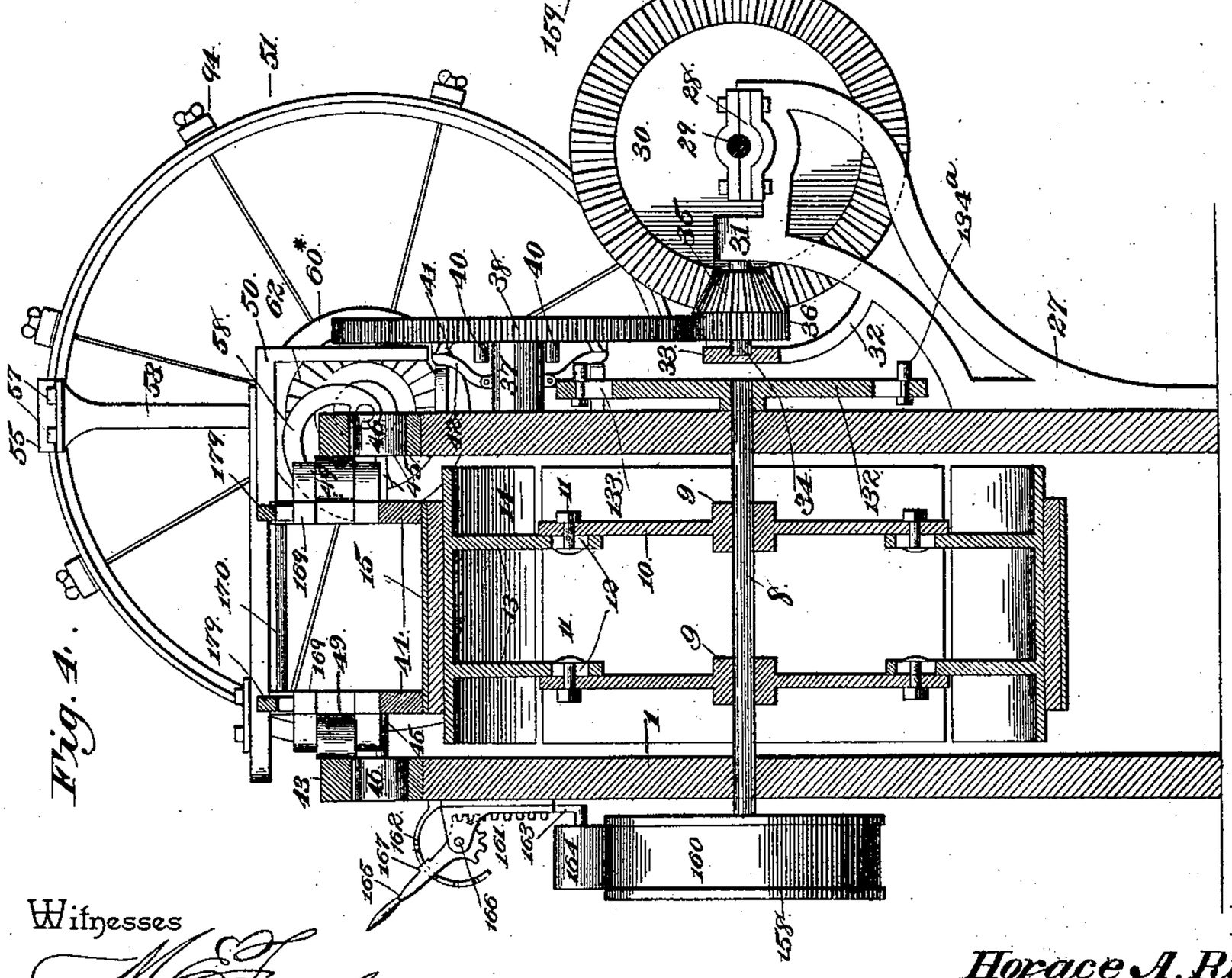


Fig. 4.



Witnesses

M. Egerter

J. H. Riggs.

Inventor

Horace A. Riggs

By his Attorneys,

C. A. Snow & Co.

(No Model.) 7 Sheets—Sheet 5.

H. A. RIGGS.

BRICK CUTTING MACHINE.

No. 479,663. Patented July 26, 1892.

Fig. 7.

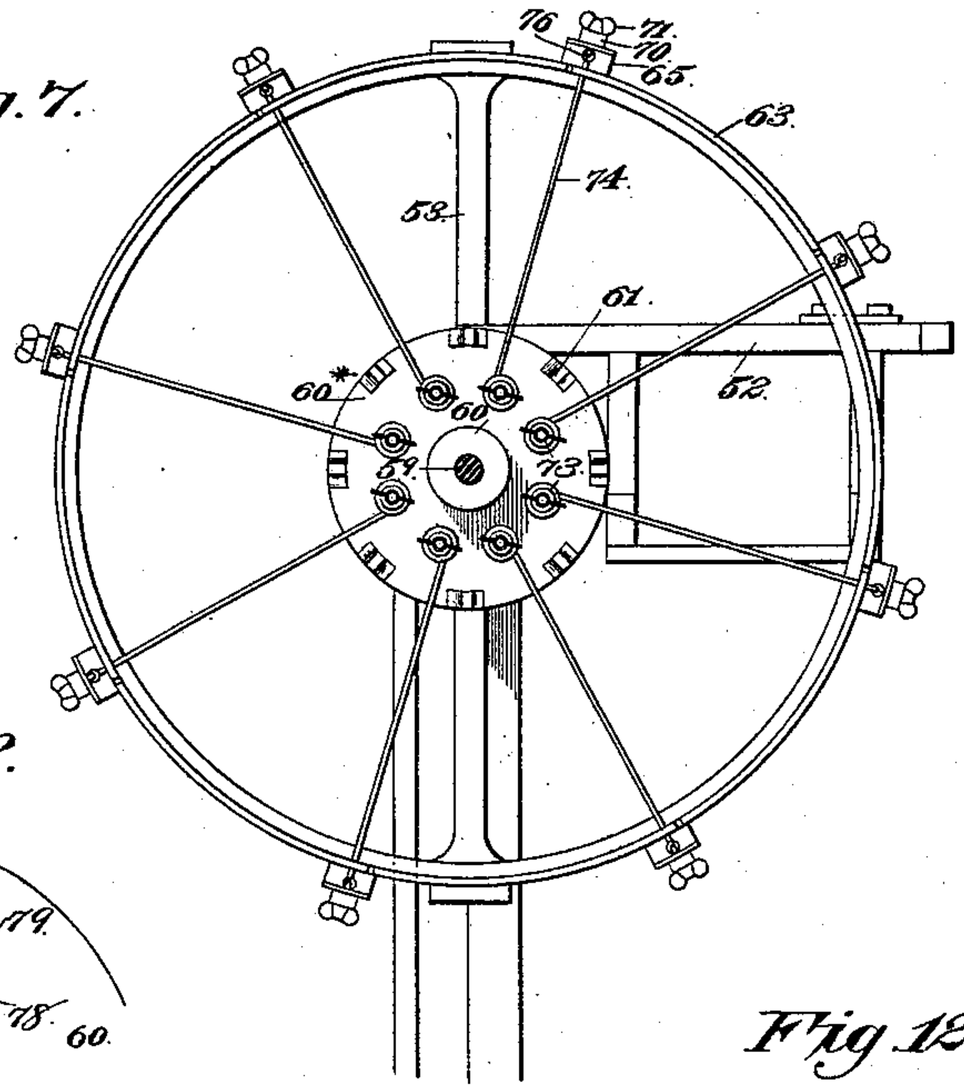


Fig. 11.

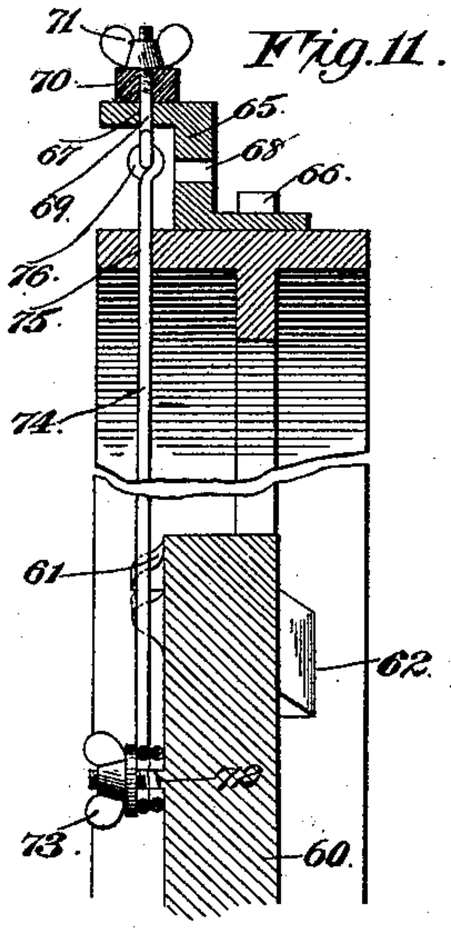


Fig. 13.

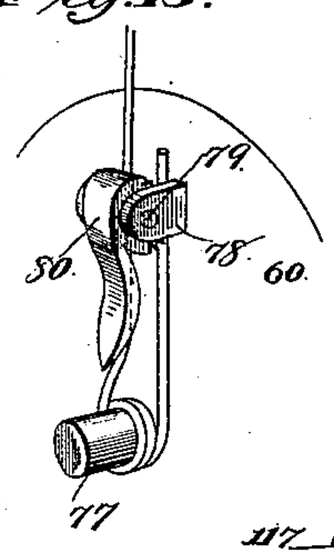


Fig. 12.

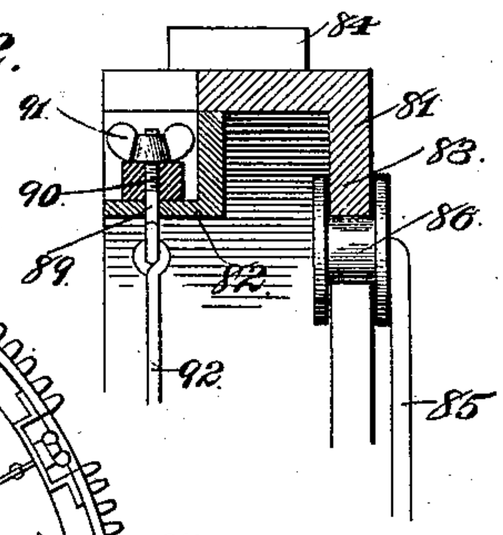


Fig. 8.

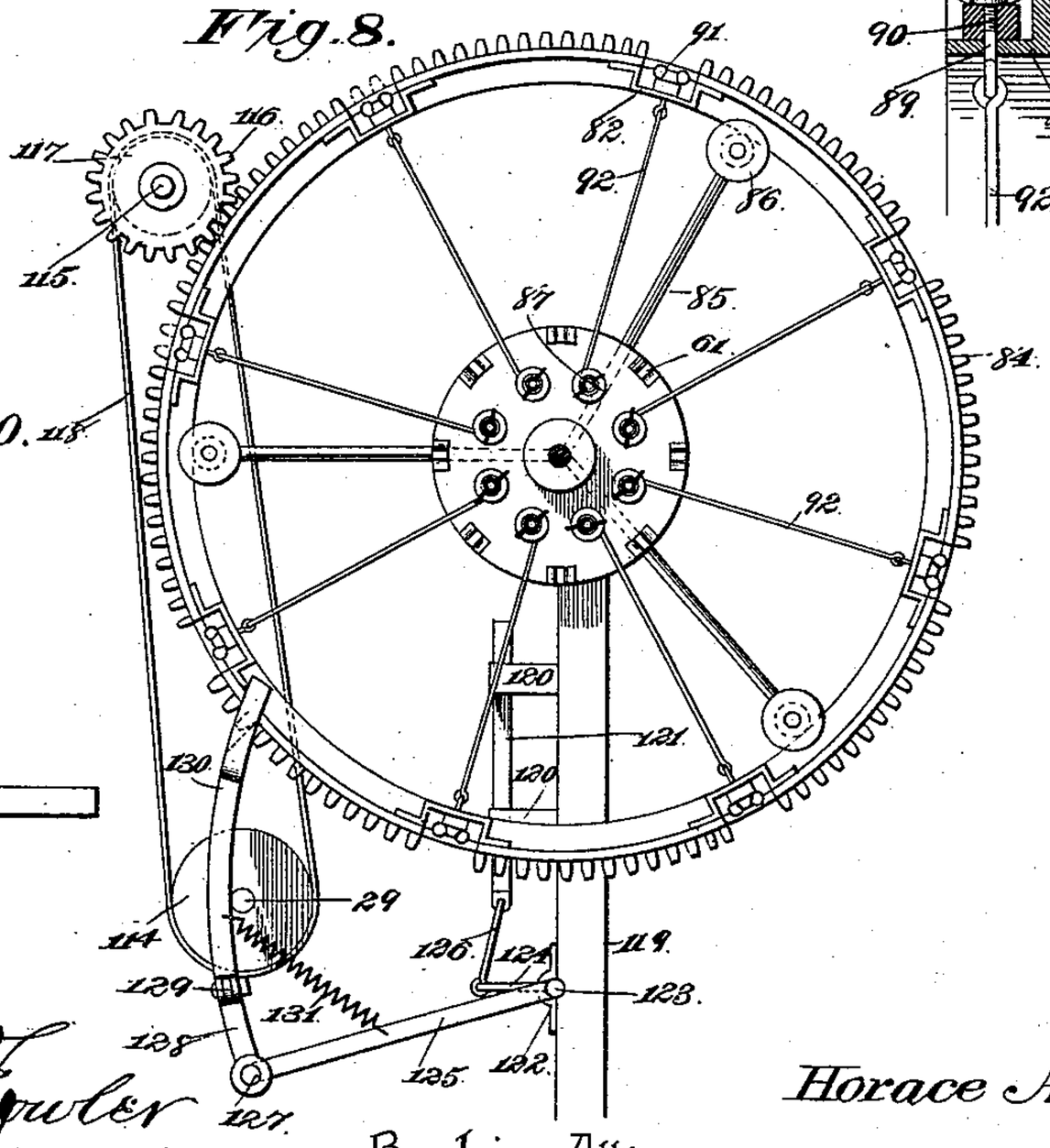
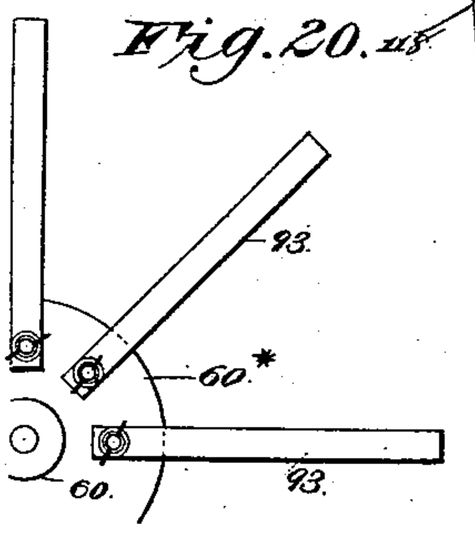


Fig. 20.



Witnesses

M. E. Fowler

J. B. Figgers.

Inventor

Horace A. Riggs

By his Attorneys,

C. A. Snow & Co.

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H. A. RIGGS.

BRICK CUTTING MACHINE.

No. 479,663. Patented July 26, 1892.

Fig. 14.

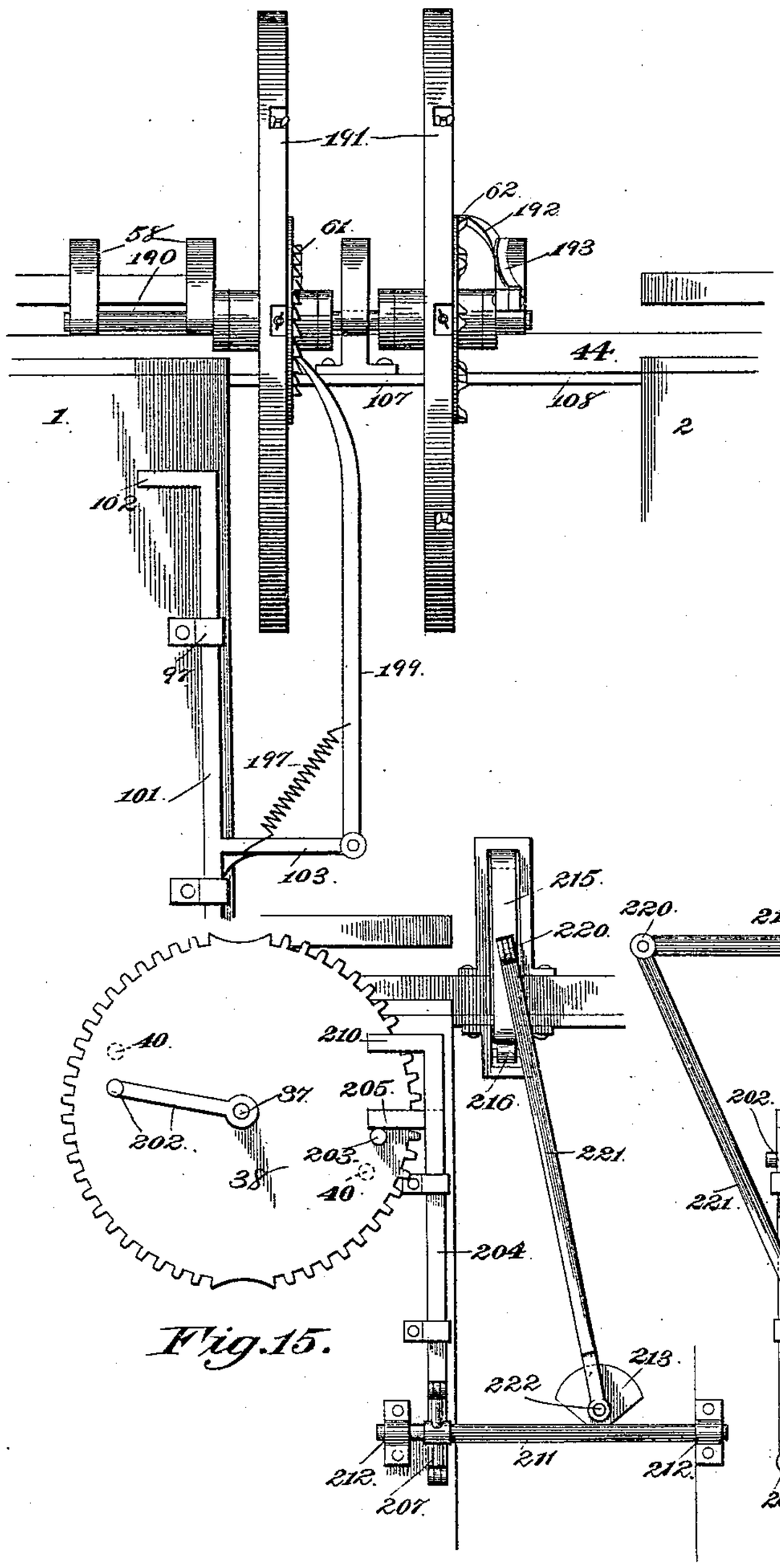


Fig. 15.

Fig. 17.

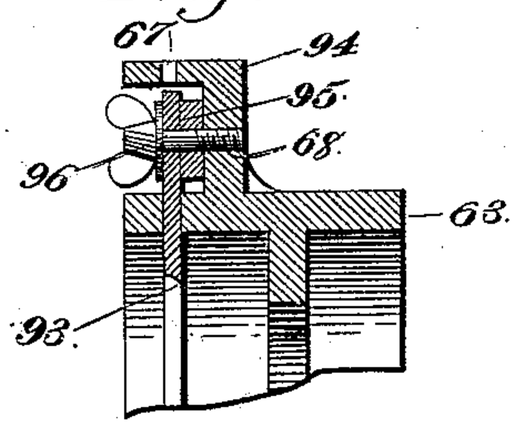


Fig. 18.

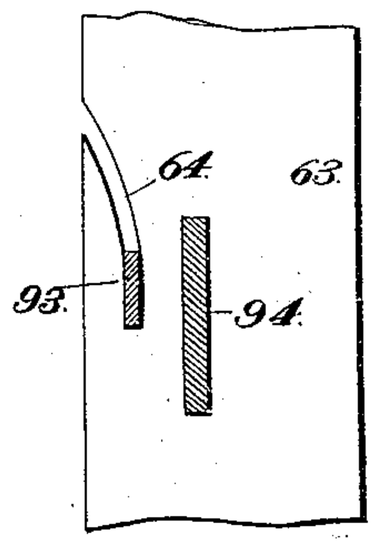
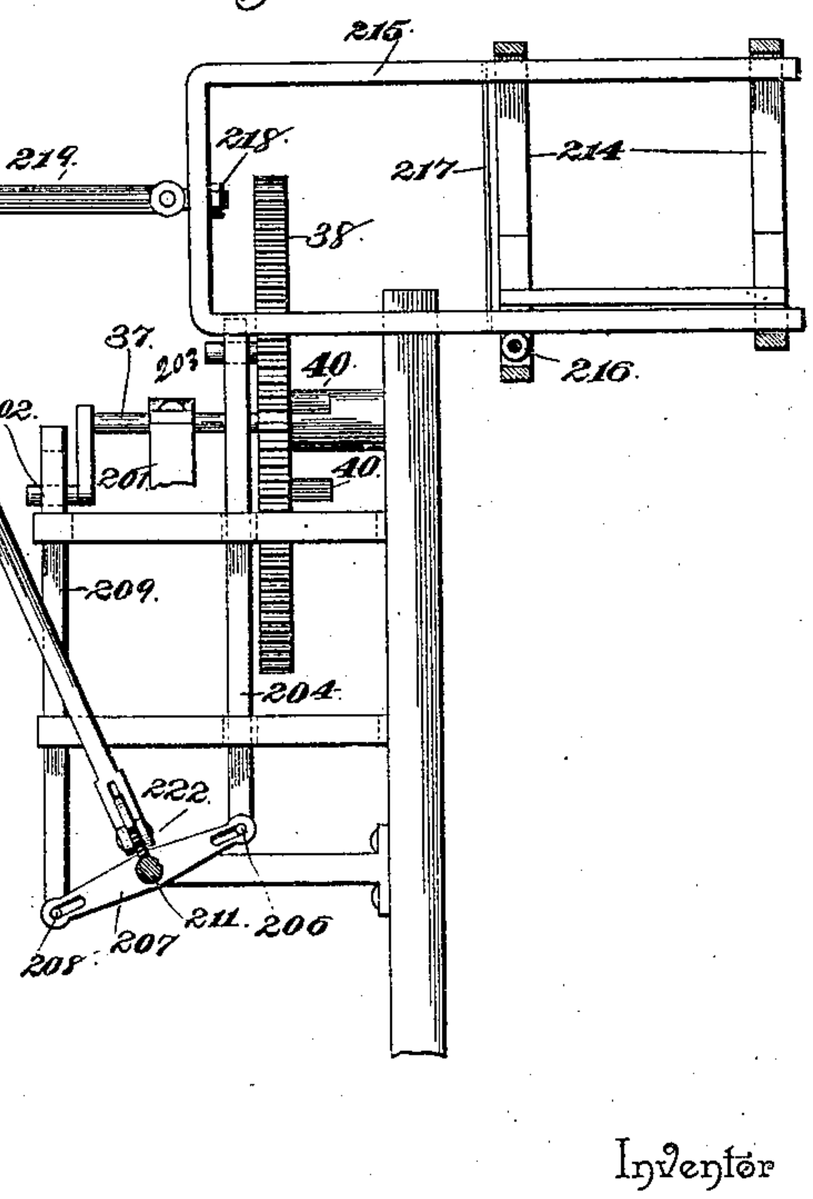


Fig. 16.



Witnesses
M. E. Fowler
J. B. Riggs.

Inventor
Horace A. Riggs

By his Attorneys,
C. A. Snow & Co.

(No Model.) 7 Sheets—Sheet 7.

H. A. RIGGS.

BRICK CUTTING MACHINE.

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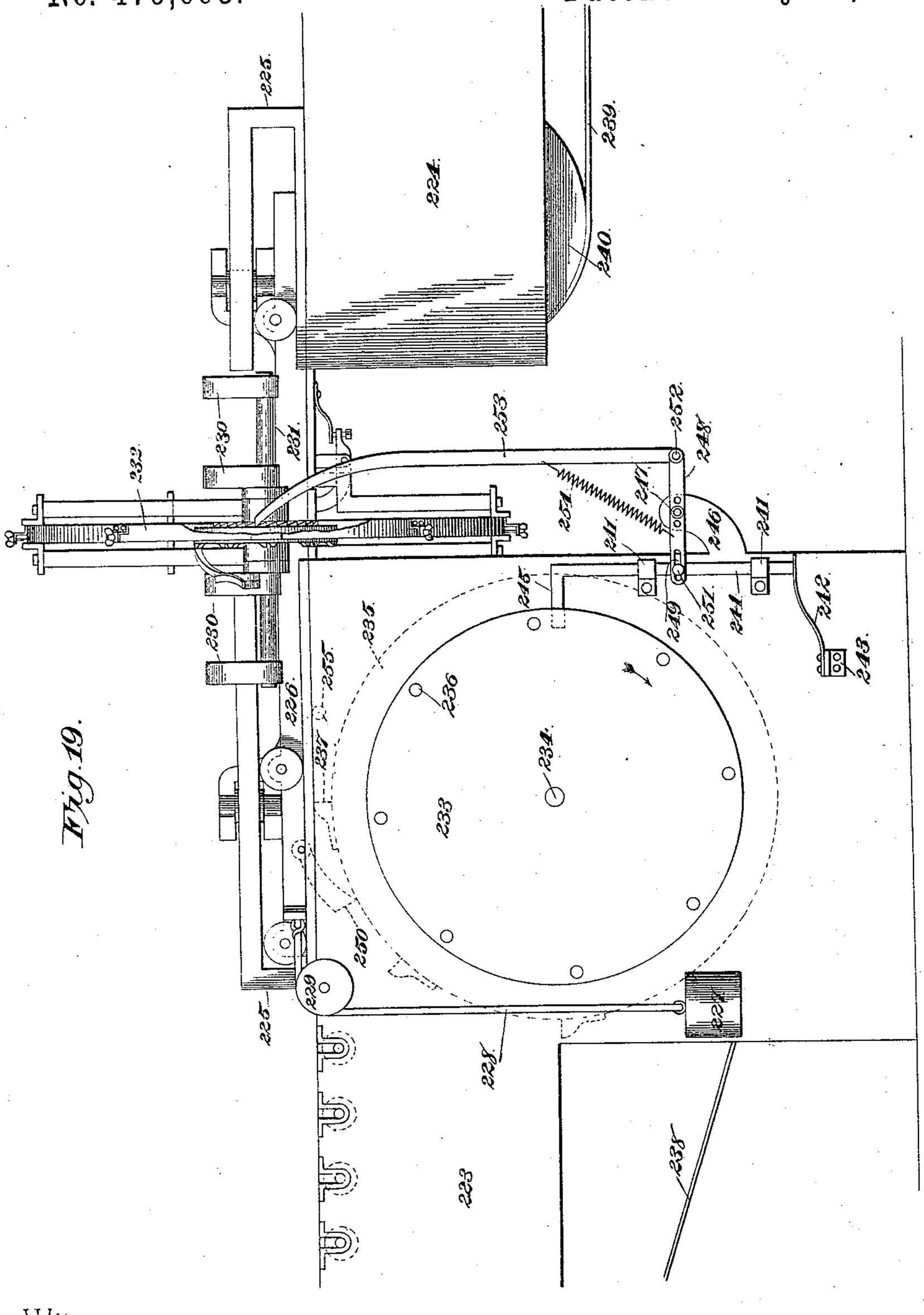

Fig. 19.

Witnesses
M. Fowler
J. B. Diggers.

Inventor
Horace A. Riggs
By his Attorneys,
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

HORACE A. RIGGS, OF PLYMOUTH, OHIO.

BRICK-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 479,663, dated July 26, 1892.

Application filed February 16, 1892. Serial No. 421,755. (No model.)

To all whom it may concern:

Be it known that I, HORACE A. RIGGS, a citizen of the United States, residing at Plymouth, in the county of Richland and State of Ohio, have invented a new and useful Brick-Cutting Machine, of which the following is a specification.

My invention relates to improvements in brick-cutting machines; and the objects and advantages of the same, together with the novel features thereof, will hereinafter appear, and be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation of a brick-machine constructed in accordance with my invention, the rear portion of the machine being broken away and shown in Fig. 6 of the drawings. Fig. 2 is a plan of the machine. Fig. 3 is a longitudinal section of Fig. 1, the view being taken reversely to that shown in Fig. 1. Fig. 4 is a transverse section on the line 4 4 of Fig. 2. Fig. 5 is a detail in elevation of the preferred form of brick-cutter. Fig. 6 is a view of the rear portion of the machine. Fig. 7 is a detail in elevation of the cutter, the view being taken opposite to that in Fig. 5. Fig. 8 is an elevation of a modified construction of cutter and mechanism for operating the same. Fig. 9 is a detail in elevation of the vertically-movable box employed for reciprocating the cutter-wheel operating the gear-operating arm. Fig. 9ª is a modified construction of the same. Fig. 10 is a detail in perspective of the gear-operating arm above mentioned. Fig. 11 is an enlarged section of a portion of the rim and hub of the preferred form of cutter, and illustrated in the main views of the drawings and also in detail in Figs. 5 and 7. Fig. 12 is a similar view of the modified construction of cutter shown in Fig. 8. Fig. 13 is a detail in perspective of a modified construction of tightening device for the cutting-wires of the cutter. Fig. 14 is a further modified construction of cutter, illustrating how two cutters may be employed and operated. Fig. 15 is a modified construction of cutter, the same being in this instance of the reciprocating pattern and operated by mechanism similar to that employed by me to operate the rotary cutter. Fig. 16 is an elevation of the construction shown in Fig. 15. Fig. 17 is a detail of the rim of the rotary cutter, showing steel blades in lieu of cutting-wires and illustrating how they may be connected at their outer ends to the rim. Fig. 18 is an outer plan view of a portion of the rim shown in Fig. 17. Fig. 19 is a modified construction of the machine, the same being somewhat simpler than my preferred form of the machine, though of a reduced capacity. Fig. 20 is a detail of cutter wherein the rim is omitted and simple steel blades employed.

Like numerals of reference indicate like parts in all the figures of the drawings.

In constructing the machine I employ in this instance what might be termed a "front feed frame or section" 1 and a "rear delivery frame or section" 2, each comprising opposite side walls suitably strengthened and braced in the manner desired by the builder and in his judgment deemed best. The front or feed end of the frame is of course, as is usual, to be located adjacent to the molding machine or mill, from which latter the clay is fed in the well-known manner in a column or columns.

In suitable bearings 3, (best shown in Fig. 1,) formed in the upper edges of the opposite side walls of the frame 1, a series of loose rolls 4 are journaled, the same being located between the ends of the section 1 and having their peripheries flush with the upper edges of the frame. A bearing 5 is located at the front edge of each of the side walls of the front frame or section, and in the bearings thus formed a transverse shaft 6 is located, said shaft carrying a pulley or band-wheel 7. Near the rear end of the frame 1 a main transverse shaft 8 is journaled, and the same between the side walls of the frame has fixed thereupon hubs 9 by means of set-screws. Each hub is provided with a disk or flange 10, Figs. 3 and 4, and through the same, near their peripheries, are at intervals passed pairs of bolts 11. The bolts 11 are, as before stated, arranged in pairs, and each pair passes through a pair of radial slots 12, formed near the inner edge or periphery of a segmental plate 13. The segmental plates 13 being arranged around the disks 10 and a slight distance from each other constitute, as will be

obvious, adjustable heads. Each pair of opposite segmental plates 13 is connected by a curved peripheral section 14, the said sections combining to form a circular drum. An endless belt or apron, denominated as a "feed apron or belt" and designated as 15, passes about the drum thus formed around the pulley 7 and over the series of loose rollers 4.

A bell-crank lever 16 is pivoted, as at 17, to each side of the front section of the frame slightly in advance of the drum and has journaled in its front ends the shaft 18 of a belt-tightening roll 19, maintained sufficiently tight against the belt 15 through the medium of weights 20, that may be adjusted upon the levers 16 through the medium of set-bolts 21, for the purpose of increasing or decreasing the tension of the feed belt or apron 15.

Near the inner end of the rear section or frame 2 is journaled a transverse shaft 22, and the same between the side walls of the frame carries a pulley or drum 23. (See Fig. 3.) A similar shaft 24 is located near the rear end of the frame and supports a pulley 25, corresponding with the pulley 23 and of the same diameter, the said pulleys being connected by an endless delivery belt or apron 26. (See Fig. 6.)

In a standard 27, extending vertically from the lower end of the machine and outwardly some distance therefrom, there is supported a bearing-box 28, and the same receives a longitudinal main shaft 29. This shaft carries a gear 30, beveled and toothed and fixed upon the shaft. The standard 27 is also provided with a bearing-eye 31, which is in rear of the transverse shaft 8. An arm 32, formed at the inner side of the standard, is provided with a corresponding eye 33, and a short shaft 34 is journaled in the eyes 31 and 33. This shaft has mounted loosely thereon a small beveled pinion 35 and a small gear 36, secured to the rear thereof, the former being engaged and driven by the beveled gear 30 and receiving motion through the gear and shaft 29, the latter being driven by the machinery of the mill or other suitable motor. A stub-shaft 37 extends from the frame above and slightly in rear of the standard 27 and carries a loose gear or toothed disk 38. The teeth of this disk or gear are at diametrically-opposite points of its periphery omitted, thus leaving plain portions 39—in this instance two in number. Beyond these portions, however, the disk or gear may, when rotated for the purpose, engage with the teeth of the small gear 36, all as best shown in Fig. 4 of the drawings. Pins 40 project from the rear face of the disk 38 at diametrically-opposite sides of its center, for a purpose hereinafter apparent, and upon its rear face the disk is further provided with a series of superficial inclined teeth or shoulders 41, which in number agree with the untoothed portions 39 of the disk. These teeth are loosely engaged by a pawl 42, mounted upon the shaft 37, and at its free end riding over the teeth. By mechanism hereinafter apparent the disk 38 is rotated very slightly, so as to throw its teeth into engagement with the rapidly-revolving gear 36, and thus the motion is imparted to the disk 38, which will be given a one-half rotation, or, in other words, until its plain portion 39 arrives opposite the gear 36. The disposition of the disk to travel beyond this point by reason of its momentum is overcome by the pawl 42 engaging with the shoulder or tooth 41, and thus the movement of the disk is arrested at the proper time—namely, when its plain or untoothed portion arrives opposite the gear 36—and thus, as will hereinafter be apparent, such mechanism as is operated by the disk will be instantly stopped.

Upon the opposite walls or sides of the front and rear frames, at the meeting ends of the same, are mounted horizontally-disposed **E**-shaped frames 43, the same terminating flush with the inner ends of the sections 1 and 2 of the frame. Between these frames, extending parallel to each other and spanning the space between the frames, is a pair of side bars 44 of a movable carriage, which carries the cutting medium. The side bars 44 are provided at their front and rear extremities with pairs of outwardly-disposed spindles 45, (see Figs. 1 to 4,) and upon each of these spindles is mounted a roller 46, which rolls upon the lower branches of the frames 43, the latter constituting tracks for the carriage. The bars 44 are provided at their outer sides and near their ends with vertically-opposite bearings, and in the same are journaled rollers 49, which ride over the inner edges of the upper branches of the frames 43, so that, as will be seen, the upper branches of these frames constitute tracks for the carriage, as well as the lower branches of said frames. From one of the side bars 44 there extends outwardly an **L**-shaped arm or standard 50, the lower extremity of which extends into the path of and is adapted to be struck by the pins 40 of the disk 38 for the purpose of returning the carriage after a cut has been made. The carriage is provided at about its center with a transverse opening or passage 51, (best shown in Figs. 1, 2, and 3,) which has its opposite edges connected by a horizontal **U**-shaped frame 52, the terminals of which extend beyond the carriage at one side thereof. A vertical **U**-shaped frame 53 rises from the side bar 44 of the carriage nearest the extremities of the terminals, and a third, though depending, **U**-shaped frame 54 is secured to the under side of the same side bar and is vertically opposite the **U**-shaped frame 53. Each of these frames 52, 53, and 54 is provided at opposite points with **L**-shaped guide-plates 55, and each guide-plate has a pair of slots 56, through which bolts 57 pass into the frames 52, 53, and 54, by means of which the plates may be adjusted to and from each other, for a purpose hereinafter apparent. A pair of standards 58 rise and are curved outwardly from the side bar 44, that supports

the frames 53 and 54, and at each side of said frames, and these standards support a longitudinally-disposed axle 59. The axle 59 between the inner standards and opposite the opening 51 in the carriage is provided with a hub 60, loosely mounted thereon and provided with a radial flange or disk $60^{\times}$. The front face of the disk is provided with a series of radial ratchet-teeth 62, while its rear face is provided with a series of notches or depressions 61. (See Figs. 5 and 7.) A rim 63, T-shaped in cross-section, (see Fig. 11,) encircles the disk and is at intervals provided at one edge with inclined or diagonal openings or slots 64. (Best shown in Fig. 18.) Opposite each of these slots upon the exterior of the rim L-shaped brackets 65 are inverted and bolted to the rim by bolts 66. The outer portion of each bracket has a perforation 67 and the vertical portion has a perforation 68. Eyebolts 69 extend inwardly through the perforations 67, pass through washers 70, mounted on the outer ends of the brackets, and are secured in position by adjusting thumb-nuts 71. (See Fig. 11.) At intervals the hub is provided with outwardly-extending threaded studs 72, clamping-nuts 73 being mounted thereon. These studs are radially opposite the brackets 65. 74 designates steel-wire cutters or knives, the inner ends of which, after having been passed through perforations 75, with which the rim is provided, are wound about the studs 72 and secured in position by the nuts 73. The outer extremities of the wire cutters beyond the rim terminate in eyes 76, which are engaged with the eyebolts 69, before mentioned. When thus in position, the requisite tension may be given the wire cutters through the medium of the thumb-screws 71.

In Fig. 13 I have illustrated a slightly-modified construction as to the means of securing the inner ends of the wire cutters. In this figure 60, as before, designates the hub of the wheel, and from the same extends a series of plain studs 77. Pairs of lugs 78 project from the disk radially opposite each pin 77, and pivoted eccentrically between each pair of lugs upon a pintle 79 is a cam-lever 80. The wires are fastened at their outer ends in any suitable manner, passed downwardly under the cam-levers 80, about the pins 77, and thence outwardly again under the levers, which are all depressed, so as to bind the wires against the face of the disk.

In Figs. 12 and 8 I have illustrated a slightly-different means of securing the wires. Referring to said figures, 81 designates the rim of the wheel, and the same is provided at intervals with depressions 82. The rim is provided at its one side with an inwardly-disposed annular flange 83, and its periphery is toothed, as at 84, between each of the depressions 82. A series of (in this instance three) arms 85 radiate from the shaft or axle 59, and the same have their extremities inwardly disposed and provided with loose annularly-grooved rollers 86, which receive the flange 83 of the wheel, whereby the latter is supported. At intervals opposite the pegs 87, with which the hub is provided, the depressions 82 in the rim occur, and each depression has a perforation 89, through which extends an eyebolt 90, secured adjustably in position by a thumb-nut 91. To the inner end of the eyebolt the cutting-wire 92 is connected. The mechanism for operating the cutting-wheel of this description varies slightly, and will be hereinafter described.

Referring to Figs. 17 and 18, I have illustrated how in lieu of the cutting-wires thin steel strips 93 may be employed. In this instance L-shaped lugs 94 are located at intervals upon the wheel, and the same correspond with the brackets 65, (illustrated in connection with Fig. 11,) inasmuch as it has the perforations 67 and 68. Instead of passing the screws through the perforations 67, the screws are now passed through the horizontal perforations 68, and they also pass through the steel cutters 93, a washer 95 being interposed between the cutter and the bracket or lug. The screw in this instance is also different from the eyebolt employed in Fig. 11 in that its head and body portion are integral, as shown at 96. It will be seen from this description and drawings that many ways may be readily devised for constructing the cutter-wheel, giving tension to the wires, and for operating said wheel, and I therefore do not limit my invention to such details. The guide-plates 55, it will be seen, serve to guide the rim of the wheel during its rotations, and such is desirable for the reason that the wires alone serve as a support for the rim upon the disk. It is therefore necessary or at least highly desirable that some means be provided for equalizing the tension of the several wire-cutters.

In Figs. 1, 2, and 3 I have illustrated my preferred form of construction for operating the cutter. A pair of vertically-opposite keepers 97 are secured to the side wall of the frame, removable in rear of the doubled gear 30, and below the same upon a bracket 98 is pivoted by a bolt 99 a step 100. A vertically-reciprocating rod 101 is mounted in the keepers 97 and has its upper end forwardly bent, as at 102, and extended into the path of the trip-pins 40. The rod 101 is a trip-rod and is reciprocated vertically and successively by the pins 40. Its movement may be limited by the step 100 being swung thereunder, or when swung out of position the reciprocations of the trip-rod may be increased, for a purpose hereinafter apparent. An arm 103 extends from the trip-rod rearwardly, and a long curved pawl 104 is pivoted, as at 105, to the end of the arm. The upper end of the pawl is beveled and is arranged to engage with the ratchet-teeth 62, as best shown in Fig. 5 of the drawings. A light spring 106 serves to maintain the pawl against the teeth. Now, as will be obvious, the rotations of the toothed

gear or disk 38 impart to the reciprocating trip-rod 101 vertical movement and this raises the pawl and turns the cutter-wheel so that the column of clay lying in the path of its cutters is cut. In the passage or opening 51, formed in the table or bottom 107 of the carriage, a plate 108 is located, the same being supported upon a curved lever 109, pivoted, as at 110, to a depending standard 111, which extends from said bottom. The rear end of the lever 109 has a set or tension screw 112, and the same is borne upon by a flat spring 113, secured to the bottom of the carriage and serving to maintain the plate 108 normally on a level with the bottom of said carriage. The purpose and object of this plate is to prevent injury to any of the cutters of the wheel should the same come in contact with a stone concealed in the clay. Of course if a cutter should come in contact with a stone which would not yield and the support upon which the clay rested would not yield the cutter would become broken, thus causing a stoppage of the machine in order to make the proper repair. However, by the employment of this yielding plate, which is just in rear of where the cut is made, I avoid this liability, and if the cutter should arrive in contact with a stone, before the cutter would be broken the spring 113 would yield and permit the plate to tilt.

Referring more particularly to Fig. 8, 29 represents the main shaft, corresponding to the shaft 29, (illustrated in the main figures of the drawings,) and in this modified arrangement for operating the cutter a pulley 114 is mounted on said shaft. A shaft 115 is located above the pulley and adjacent to the cutter, and upon this latter shaft a wide-rimmed gear 116 and a pulley 117 are mounted, the latter being connected by a belt 118 with the pulley 114. A standard 119, located at one side of the wheel, is provided with keepers 120, and a vertical rod 121 is mounted for reciprocation therein. In a bearing 122, secured to the standard 119, a rock-shaft 123 is mounted, the same having a short inner rock-arm 124 and a long outer rock-arm 125, the former being connected by a link 126 with the lower end of a rod 121. Pivoted, as at 127, to the free end of the rock-arm 125 and adapted to swing to and away from the arm 125 and in line therewith only is a short arm 128, and pivoted, as at 129, to the extremity of the short arm and adapted to swing laterally only is a pawl 130. A coiled spring 131 has one end connected to the pawl 130 and its remaining end to the longer rock-arm 125. The rod 121 corresponds to the rod 101, and heretofore mentioned as the trip-rod, and is adapted to be struck and operated through the medium of the trip-pins 40 of the disk 38. Such operation of the rod 121 causes a slight movement or partial rotation of the cutter-wheel, so that the untoothed space normally directly opposite the gear 117 is moved slightly, and the gear always rapidly rotating engages with the teeth of the cutter-wheel and so revolves the latter until the next untoothed space arrives opposite the gear. I have herein illustrated each of the rotary cutters as being provided with eight knives; but it will be obvious that I may reduce the number, in which event certain changes in the location of the untoothed portions of the rotary cutter or wheel will be required. In other words, as shown by dotted lines, Fig. 8, the teeth will be continued in every other pair of untoothed spaces. In the construction preferred, and as illustrated best in Fig. 1, the throwing out of position of the step 100 increases the stroke or vertical reciprocation of the trip-rod and pawl 101 and 104, so that each reciprocation of the same will give the wheel about one-fourth revolution.

Referring once more to the main figures of the drawings or rather to the preferred construction of the machine, 132 represents a disk, which is mounted upon one end of the main transverse shaft 8, and the same is provided near its periphery with an annular series of radially-disposed perforations 133, in each of which a pin 134ª is mounted, said pins projecting outwardly from the face of the disk. Above the disk, in vertically-opposite ways 133ª, there is mounted for reciprocation a plate or frame 134. (Best shown in Figs. 1 and 9.) This plate or frame is provided with opposite rabbeted edges 135, and from its outer face extends a pin 136. Below the pin a box 137 is formed upon the face of the frame, and the opposite walls of the box are provided with oblique slots 138, the upper portions of which are inclined and the lower portions of which are vertical. A bolt 139 extends from the table through the frame 134 and through the box, and also passes through a loose sleeve 140, which is provided at diametrically-opposite points with trunnions 141, extending into the oblique slots 138 of the box. From the sleeve depends rigidly a rod 142. Above its lower end the rod is provided with an inclined cam-shoulder 143, and the same is drawn into the path of the pins 134 by means of a light coiled spring 144. A finger or pawl 145 is pivoted at 146 to the lower end of the rod 142, and a light coiled spring 147 connects the finger with the rod. Upon a pin 148, extending from the side of the frame, an elbow-lever 149 is fulcrumed, the same terminating at its outer end in a handle or hand-grasp 150 and at its inner end in an elongated eye 151, which loosely receives the stud or pin 136, extending from the frame 134. A pulley 152 is located in front of the carriage, and a rope or cable 153 is connected at its rear end to the carriage, passes over the pulley, and is connected at its lower end to a retracting-weight 154, adapted to aid in returning the carriage after each cut has been made. By pushing down upon the lever 149 the frame 134 will be lowered, and as it descends the oblique slots 138 of the box 137

of said frame cause the sleeve 140 to travel into alignment with the disk 38, the finger or pawl 145 being pressed, by means of one of the pins 134ª riding against the inclined shoulder 143, into engagement with the teeth of the disk 38, so that the said pin, operating against the shoulder, will rock said pawl sufficient to rotate a slight distance the teeth 38 and throw the same into engagement with the pinion 36, and thus motion is imparted to the cutter-wheel. By drawing the lever to the front the rod 142 is moved out of alignment with the disk 38 and pins 134.

As shown in Fig. 9ª, the frame 134 and box 137 may be materially modified. In the said figure, 139 represents the pin, 140 the sleeve, 142 the rod, and 141 the opposite trunnions extending from diametrically-opposite sides of the sleeve. In this instance I omit the vertical ways 133 and alter the shape of the box from elliptical to cylindrical, as shown at 155, and provide the same at its rear end with a rigidly-connected lever 156 and at diametrically-opposite sides with spiral slots 157. Practically the same result as heretofore described will be secured by an oscillation of the lever 156, inasmuch as it will be obvious the rod and its sleeve will be laterally reciprocated. The shaft 8 is extended at the opposite side of the machine at which it supports the disk 132 and carries a band-pulley 158. In a similar manner is the shaft 22 extended and carries a pulley 159, and motion is communicated from the latter pulley to the former pulley and its shaft by a belt 160, as best shown in Fig. 2, to assist in overcoming the friction of the belt upon their moving supports.

Referring more particularly to Fig. 4, 161 designates a pair of vertical ways secured to the side of the framework directly over the belt 160, and from the same rises a curved notched standard 162. An L-shaped bar 163 is toothed at its vertical portion and is mounted for reciprocation in the ways, and at its lower horizontal portion serves as a bearing for a belt-tightening roller 164. A segmentally-toothed lever 165 is pivoted between a pair of ears 166, formed on the ways, and the teeth of said lever operate in those of the vertical portion of the L-shaped bar, whereby by swinging the lever the tightener may be raised and lowered so as to press upon or release the belt 160. The lever 165 is provided at one of its edges with a lug 167, whereby it is capable of being locked in any of its adjustments by engagement with a convenient notch, with which the edge of the curved locking-standard 162 is, as shown, provided.

Upon one of the side bars 44 a T-shaped standard 169 is mounted, the same being best shown in Figs. 1 and 3. A pair of ears is formed upon the standard, and fulcrumed between the same upon a pin 170 is an angular lever 171. At opposite sides of its fulcrum the lever is provided with adjustable stop-screws 172, and its longer end is provided with an elongated eye or slot 173, in which is adjustably or loosely mounted a pin 174, from which depends a loose vertical link 175. The lower end of the link loosely engages or is connected to the free end of a gravity-pawl 176, which is pivoted, as at 177, to the side of the subjacent bar 44. At intervals the main drum is provided upon its periphery with inclined stops or shoulders 178, and with these the pawl is adapted to engage. A spring 179 retains the longer end of the lever 170 in the depressed position. The mechanism just described is, as best shown in Fig. 2, duplicated at the opposite side of the machine, and the pin 170 extends across above the framework and serves as the pin or rock-shaft for both levers 171. One of the levers carries the before-mentioned arm 50, the same extending outwardly and depending at one side of the machine, where its extremity is in contact with the pins 40 on the disk or gear 38. In rear of this gear and back of the arm 50 a stop-pin 180 projects from the bracket 181. This bracket is provided with a slot and may be adjusted by a bolt 182, which passes therethrough into the side of the frame. The bottom 107 of the carriage has its rear end beveled, as shown, and the carriage is adapted, as will hereinafter appear, to reciprocate between the drum of the machine and the pulley 23. Such reciprocation being allowed for necessitates that the bottom 107 be of a less length than is the distance between the drum and pulley, and it is necessary therefore to provide some means for supporting the brick, after they are cut, between the delivery-belt 26 of the machine and the rear end of the bottom of the carriage. This I accomplish in the following manner: Referring to Fig. 3, I slot the upper edges of the side walls of the rear frame or section of the machine near the inner ends thereof, as shown at 183, and locate in these slots coiled springs 184, upon which rest the ends of a transverse roller 185, capable of being compressed by the beveled end of the bottom 107 of the carriage as the same is reciprocated to the rear or delivery-belt and to spring back into position after such depression.

In operation the incoming clay, moving in a column upon the feed-belt 15, serves to rotate, through the medium of the belt 15, the drum until two of the stops 178 come in contact with the pawls 176. The pawls being secured to the carriage move the carriage to the rear, so that the brick as cut are pushed by the clay over the bottom of the carriage, as it returns to the starting-point, to the delivery-belt 26, and it is at its rearward movement that the bottom 107 of the carriage depresses the roller 185. The brick may successfully reach the delivery-belt and be deposited thereon by passing over the roller 185. The rod 142, being in alignment with the teeth of the disk 38 when one of the pins 134ª of the disk 132 arrives in contact with the shoulder 143 of the rod 142, swings the rod toward the disk 38, so that the finger or pawl 145 en-

gages with the teeth of said disk and is forced to move or partially oscillate to a slight degree the disk 38 before the pin 134ª can pass by the shoulder 143. Such oscillation upon the part of the rod 142 is permissible by reason of the fact that the sleeve 140 is transversely divided, the front section being swiveled on the rear section. The slight movement given the disk 38 throws the teeth thereof into engagement with the gear 36, which, as before stated, is at all times, when the machine is in operation, rotated. The rotations of the gear 38 bring that pin 40 directly under the trip 102 into contact with the same and, in a manner heretofore described, gives the cutter-wheel a partial turn, so as to sever the column of clay thereunder, the severance of the clay taking place at any time during the rearward movement of the carriage, whereby a square cut is made, in that the clay and carriage move at the same rate of speed. After the pin 40 has operated the trip it arrives in contact with the depending arm 50 of the carriage, which is moving to the rear. The first pressure against this arm serves to elevate the same, thus rocking the shaft 170 and the rock-arms 171, so that the pawls 176 are lifted out of the path of the stops or shoulders 178, and the drum is permitted to continue its rotation and feed the column of clay as the carriage is, by the further pressure of the pin 40 against the arm 50, returned to its starting position. A succeeding pin 134ª, coming in contact with the inclined shoulder 143, repeats the operation, which may be terminated by a forward pull on the lever 149, throwing the depending rod and its point out of alignment with the pins 134ª and the disk 38.

In case the clay rushes from the machine so as to cause the belt 15 and drum to travel too fast the movement of the carriage would be arrested by means of the safety-pin 180, which would trip the arm 50, operating to lift the pawls of the carriage from the paths of the lugs of the drum.

If desired, two cutter-wheels may be employed, and such I have illustrated in Fig. 14 of the drawings, to which attention is now called. In the said figure, 190 designates the cutter-shaft, and the same carries two cutter-wheels 191, arranged side by side upon the shaft and spaced a suitable distance apart. These wheels are preferably of the construction illustrated in detail in Fig. 11 of the drawings, to which figure attention is also called. As the wheels are fixed upon the shaft, a rotation of one will serve to rotate both, so that two bricks are simultaneously cut. The back of one wheel is provided with the before-described shoulders 62, which are engaged by the pawl 192, a spring 193 serving to maintain the pawl in the path of the shoulders. The face of the remaining wheel is provided with teeth. In this instance the trip-rod 101, which is operated by the same mechanism as heretofore described, is, as in the previous instance, provided with a lateral arm 103, and to the same is pivoted a curved pawl 196, adapted to reciprocate vertically. A coiled spring 197 connects the pawl with the trip-rod and the free end of the same with the teeth of the cutting-wheel. The operation of this cutter will be obvious when considered in connection with the foregoing description, and no specific description thereof is deemed necessary.

Referring to Figs. 15 and 16 it will be seen that I have illustrated how the mechanism described for operating the cutter may be adapted for operating a reciprocating cutter, instead of rotary, as in the previous instance. In this instance the disk 38 is still provided with the stop or trip pins 40 and the characteristics heretofore explained, the only difference being that the shaft 37, upon which the disk is mounted, is extended beyond the face of the disk and rests in a bearing-standard 201, beyond which it terminates in a crank 202. In addition to the pins 40, with which the rear face of the disk is provided, its front face is also provided with a pin 203. The pins 40 in this instance serve merely to return the carriage, while the pin 203 alone operates the trip-rod 204. The trip-rod in this instance is provided with a trip-arm 205, and its lower end is pivoted, as at 206, to a rocking lever 207. The lever 207 has pivoted to its outer end, as at 208, a second trip-rod 209, also having the bent end 210. The lever 207 is rigidly mounted upon a rock-shaft 211, the same being journaled in bearings 212 and provided near its center with a segmental plate or projection 213. In suitable guide-frames 214, mounted on the carriage, a U-shaped cutter-frame 215 is mounted for transverse reciprocation, and the same rests upon a loose friction-roller 216, with which one of the frames 214 is provided. Stretched between the terminals of the frame is a steel-wire cutter 217, which operates upon the moving clay in both directions—that is, in its forward and backward thrust. A swivel 218 is connected to the outer end of the cutter-frame, and a pitman-rod 219 has its inner end pivoted in the swivel, the outer end being pivoted, as at 220, to a vibrating rod 221, the lower end of which is pivoted at 222 to the segmental plate 213. The operation of this arrangement of cutters is as follows: The pin 203 of the disk 38 raises the inner trip-rod 204 and thus oscillates the shaft 211 in one direction and withdraws the cutter-frame 215, and the crank 202, engaging under the end of the outer rod 209, raises it and the outer end of the lever 207, oscillating the shaft 211 in the opposite direction and making the inward thrust of the cutter-frame, and so the operation continues, a brick being cut at each forward and rearward reciprocation of the frame. The cutter-frame travels with the carriage in the same manner as the rotary cutters before mentioned as traveling, the segmental plate 213 and the pivot 222 permitting the rod 221 to swing laterally for such movement. If desired, a series of wires may

be employed, so that several are cut at each thrust.

In Fig. 19 I have illustrated a somewhat simpler form of machine, the same yet embodying most of the features in the other forms—that is, as regards the cutting mechanism, driving mechanism, carriage, &c.

Referring to the said Fig. 19, 223 designates the front section of the framework; 224, the rear section; 225, the track-frames for the carriage, and 226 the carriage itself, which is returned in this instance wholly by the weight 227, which is connected by a cord 228 to the carriage and passes over a pulley 229. The carriage comprises the standards 230, shaft 231, and the cutter-wheel 232.

233 designates a disk, which is mounted upon the main transverse shaft 234, which accommodates the drum 235. (Shown by dotted lines.) The disk is provided at intervals with pins 236 and the drum at intervals with stops 237. The feed-belt 238 passes over the drum in the manner before described, as does the delivery-belt 239 pass over the pulley 240 at the rear portion of the machine. The pawls 250 of the gravity pattern are pivoted loosely to the carriage and depend in the path of the stops 237. At one side of the disk 233 keepers 241 are located, the same being vertically opposite each other, and under the same a spring-step 242 extends, the same being secured to a bracket 243, secured to the front portion of the frame. In the keepers 241 the trip-rod 244 is mounted for reciprocation, the same resting at its lower end upon the spring-step 242, and the upper end of the rod is inwardly bent into the path of the pins 236, as shown at 245. An arm 246 extends from the rear edge of the frame 223, and upon the same is fulcrumed, as at 247, an oscillating lever 248. The inner end of the lever is slotted, as at 249, and is loosely engaged by a pin 251, extending from the side of the trip-rod. A pawl 253 has its lower end pivoted, as at 252, to the lever 248, and a coiled spring 254 is connected to the pawl 253 and to that side or end of the lever 248 opposite which the pawl 253 is pivoted. The operation of this construction of machine is as follows: The column of clay moving over the delivery-belt 238 serves to move the belt, drum, disk 233, and carriage. The rotation of the disk causes one of the pins 236 thereof to depress the trip-rod 244, and the same elevates through the lever 248 the pawl 253, thus operating or partially rotating the cutter-wheel 232, and the cut is made. The movement to the rear of the carriage is continued until the pawls are liberated from the stops by means of stop-pin 255, extending inwardly from the framework into the paths of the pawls and serving to elevate the same out of engagement with the stops 237 after the cut is made, whereupon the carriage is instantly returned by the weight 227.

While I have in the foregoing description set forth a preferable mode of construction, I would have it understood that I do not wish to be limited thereto, since changes in the form, proportion, and the minor details of construction may be made without departing from the spirit or sacrificing any of the advantages of my invention.

Having described my invention, what I claim is—

1. In a brick-cutting machine, a cutting-wheel consisting of a central hub, an outer rim, and cutting devices connecting the hub and rim, substantially as specified.

2. In a brick-cutting machine, a cutting-wheel consisting of a central hub, a surrounding rim, and cutting-wires radiating from the hub to the rim, substantially as specified.

3. In a brick-cutting machine, a rotating cutting device comprising a central disk or wheel mounted upon a shaft, a loosely-detachable surrounding rim, and cutters radiating from the wheel to the rim, substantially as specified.

4. In a brick-cutting machine, a cutting-wheel consisting of an inner hub having an annular flange or disk, an outer rim, radiating cutting-wires connecting the disk and rim, and tension devices for the wires, substantially as specified.

5. In a brick-cutting machine, a cutting-frame comprising an inner disk or wheel, an outer detachable rim, radiating cutting-wires connecting the wheel and rim, and tension devices for the wires, resting upon elastic supports, substantially as specified.

6. In a brick-cutting machine, a cutting-wheel comprising an inner disk or hub mounted upon a shaft, an outer flanged rim, cutters extended between said disk or hub and rim, and securing devices for the cutters, substantially as specified.

7. In a brick-cutting machine, a cutting-wheel comprising an inner disk or hub, an outer flanged rim the edge of which is provided with inclined slots, wire cutters mounted in the slots and having their inner ends secured to the disk, and securing devices for the cutters mounted over the slots upon the rim, substantially as specified.

8. In a brick-cutting machine, a cutter consisting of a hub having a disk, threaded studs projecting from the hub, clamping-nuts mounted on the studs, an outer surrounding rim having openings, wire cutters wound upon the studs and clamped by the nuts and having their outer ends extended through the openings of the rim, L-shaped brackets mounted upon the rim over the openings, eyebolts depending through perforations in the brackets and connected to the outer ends of the wire cutters, and nuts threaded on the outer ends of the eyebolts, substantially as specified.

9. In a brick-cutting machine, a cutting device comprising a wheel mounted upon a shaft ranged longitudinal with the machine, cutting-wires attached to said wheel and extending radially to an outer detachable rim supported by said cutting-wires, and means

of automatically rotating the cutting-wheel, whereby the cutting-wires sever the bars of clay, substantially as specified.

10. In a brick-cutting machine, a cutting device comprising an inner hub having an annular flange or rim, an outer rim or wheel, cutting-wires having their inner ends secured to the disk, securing devices for the cutting-wires, attached to the outer rim or wheel, and means of applying tension to the wires, substantially as specified.

11. In a brick-cutting machine, a rotating cutting device comprising an inner hub or wheel mounted upon a shaft ranged longitudinally with the framework of the machine and an outer flanged detachable rim or wheel supported and secured in position by cutters radiating from the inner wheel, to which said cutters are attached at their inner ends, the outer ends of said cutters extending through apertures in the outer rim and connected to devices mounted upon the rim over the apertures for securing the cutters, substantially as specified.

12. In a brick-cutting machine, a cutting device comprising an inner hub or disk, an outer flanged rim having openings or depressions therein, wire cutters mounted within the free ends of the openings and having their inner ends clamped to studs in the disk, and securing and tension devices for the free ends of the cutters mounted upon the rim, in combination with means for automatically rotating said cutting device, whereby the bars of clay are cut into brick, substantially as described.

13. In a brick-cutting machine, the combination, with a series of U-shaped frames 53, radiating from a common point, a shaft at said point, and guide-plates mounted adjustably upon the U-shaped frames, of the hub mounted on the shaft, the rim encircling the hub and located between the plates, and the series of wire cutters connecting the hub and rim, substantially as specified.

14. In a brick-cutting machine, the combination, with a framework and a rotatable cutter mounted at an angle to the same and provided at one side with teeth, of means for feeding a column of clay to the cutter, a vertically-reciprocating trip-rod, a pawl pivoted to the trip-rod and at its free end engaging the teeth of the cutter, and means for raising and lowering the trip-rod, substantially as specified.

15. In a brick-cutting machine, the combination, with the frame and the rotary cutter mounted thereon and at an angle thereto and provided with teeth, of a gear, means for operating the gear, trip-pins on the gear, a reciprocating trip-rod adapted to be engaged successively by the pins, and a pawl pivoted to the trip-rod and engaging the teeth of the rotary cutter, substantially as specified.

16. In a brick-cutting machine, the combination, with the frame-work, a cutter extending at an angle to the same, and a trip-rod mounted for reciprocation at the side of the frame, of means for intermittingly operating the trip-rod and connections between the rod and cutter for communicating motion from the former to the latter, substantially as specified.

17. In a brick-cutting machine, the combination, with the frame, the rotatable cutter mounted in the transverse opening in the same, and means for operating the cutter and for feeding a column of clay thereto, of a plate yieldingly supported in the table of the machine at the side of the path of the cutter, substantially as specified.

18. In a brick-cutting machine, the combination, with the carriage having the bottom provided with a transverse opening, the rotary cutter, and means for operating the same, of the plate 108, mounted at one side of the cutter and occupying a portion of the opening, the arm 109, supporting the plate, the standard 111, depending from the under side of the bottom and pivotally connected to the arm, and the spring 113, bearing on the rear end of the arm, substantially as specified.

19. In a brick-cutting machine, the combination, with the carriage having the bottom provided with a transverse opening, the rotary cutter, and means for operating the same, of the plate 108, mounted at one side of the cutter and occupying a portion of the opening, the arm 109, supporting the plate, the standard 111, depending from the under side of the bottom and pivotally connected to the arm, the spring 113, connected to the bottom, and the set-screw 112, passing through the rear end of the arm 109 and borne upon by the free end of the spring, substantially as specified.

20. In a brick-cutting machine, the combination, with the front and rear sections of the frame, the feed and delivery belts, and their pulleys mounted in their respective sections, of the intermediate reciprocating carriage, the bottom of which is not equal to the distance between the upper sides of the adjacent pulleys of the two belts, and the intermediate yieldingly-supported roller 185, located in the path of and adapted to be depressed by the rear end of the bottom, substantially as specified.

21. In a brick-cutting machine, the combination, with the framework, the drum journaled at the intermediate portion thereof, the pulley at the front end of the framework, and the endless feed-belt passing around the pulley and drum, of a movable carriage mounted on the framework above the drum, stops on the drum for moving the carriage to the rear, means for returning the carriage at or before the end of its movement, a cutter, and means for operating the cutter during the forward movement of the carriage, substantially as specified.

22. In a brick-cutting machine, the combination, with the framework, the pulley at the front end of the same, the shaft 8, the disks 10, mounted on the shaft, the curved rim-sec-

tions 14, and the pairs of opposite segmental plates 13, having slots and adjusting-screws passing therethrough into the disks, said rims being provided with stops 178, of the reciprocating carriage mounted on the framework above the drum, the pawls pivoted to the framework and depending in front of the stops, whereby the carriage is moved to the rear by rotation of said drum, means for raising the pawls out of engagement with the stops, and means for returning the carriage after such raising, substantially as specified.

23. In a brick-cutting machine, the combination, with the frame-work, the pulley, the drum, the endless feed-belts, and stops mounted upon the periphery of the drum, of the movable carriage mounted on the framework, gravity-pawls pivoted to the carriage and depending into the path of the stops, means for operating the drum, means for elevating the pawls out of engagement with the stops at the end of the rearward movement of the carriage, and means for automatically returning the carriage to its starting-point, substantially as specified.

24. In a brick-cutting machine, the combination, with the framework, the rotatable drum, means for operating the same, and stops upon the drum, of a movable carriage mounted above the drum, pawls on the same for engaging the stops of the drum, rock-arms pivoted on the carriage, connections between the same and pawls, a rotatable gear provided with pins, means for operating the gear in a reverse direction to that of the drum, and an arm depending from the rock-arms into the path of and adapted to be struck by the pins, substantially as specified.

25. In a brick-cutting machine, the combination, with the framework, the drum mounted for rotation therein, means for operating the drum, and a series of stops mounted on the drum, of a carriage mounted for movement on the framework above the drum and having opposite T-shaped standards, angle-levers for each of the standards, a rock-shaft connecting the standards, journaled therein and connected rigidly with the angle-levers, springs for normally depressing the angle-levers, set-screws mounted at opposite sides of the rock-shaft in said angle-levers, links connected to the outer slotted ends of said angle-levers and to the free ends of the pawls, an arm depending from one of the levers, a rotatable wheel having pins for striking the arms, and means for operating the wheel, substantially as specified.

26. In a brick-cutting machine, the combination, with the framework, a cutting medium mounted across the same, a trip-rod, and means upon the rod for operating the cutting medium, of a main shaft, a gear located at the side of the frame, means for communicating motion from the main shaft to the gear, a disk above the gear, provided with a toothed periphery, with the exception of the intermediate plain portions, pins upon the disk for reciprocating the trip, and devices for intermittingly slightly rotating the disk so as to throw its teeth into engagement with the gear, substantially as specified.

27. In a brick-cutting machine, the combination, with the framework, the cutter located across the same, the reciprocating trip, and devices mounted on the trip for operating the cutter at each reciprocation of the trip, of a longitudinal power-shaft, a gear located at one side of the same, a disk supported rotatably above the gear, having a toothed periphery and intermediate plain untoothed portions, pins on the disk for engaging the trip, means for communicating motion from the shaft to the gear, a rod supported at one side of the disk and provided at its lower end with a finger normally out of engagement with the teeth of the disk, and means for intermittingly throwing the finger into engagement with the disk and oscillating the rod, substantially as specified.

28. In a brick-cutting machine, the combination, with the framework, the cutter located across the same, the reciprocating trip, and devices mounted on the trip for operating the cutter at each reciprocation of the trip, of a longitudinal power-shaft, a gear located at one side of the same, a disk supported rotatably above the gear, having a toothed periphery and intermediate plain untoothed portions, pins on the disk for engaging the trip, means for communicating motion from the shaft to the gear, a rod pivotally supported at one side of the disk, a finger or pawl pivoted to the lower end of the rod, a spring for retracting the rod and pawl, a disk located at one side of the lower end of the rod, pins extending from the disk, means for rotating the disk, and an inclined shoulder mounted on the lower end of the rod in the path of the pins, substantially as specified.

29. In a brick-cutting machine, the combination, with the framework, the cutter located across the same, the reciprocating trip, and devices mounted on the trip for operating the cutter at each reciprocation of the trip, of a longitudinal power-shaft, a gear located at one side of the same, a disk supported rotatably above the gear, having a toothed periphery and intermediate plain untoothed portions, pins on the disk for engaging the trip, means for communicating motion from the shaft to the gear, a rod pivotally supported at one side of the disk, a finger or pawl pivoted to the lower end of the rod, a spring for retracting the rod and pawl, a disk located at one side of the lower end of the rod, pins extending from the disk, means for rotating the disk, an inclined shoulder mounted on the lower end of the rod in the path of the pins, and means for throwing the rod into and withdrawing the same from the path of the pins of the disk, substantially as specified.

30. In a brick-cutting machine, the combination, with the framework, the cutter located across the same, the reciprocating trip, and

devices mounted on the trip for operating the cutter at each reciprocation of the trip, of a longitudinal power-shaft, a gear located at one side of the same, a disk supported rotatably above the gear, having a toothed periphery and intermediate plain untoothed portions, pins on the disk for engaging the trip, means for communicating motion from the shaft to the gear, ways located upon the frame above the last-mentioned disk, a vertically-sliding frame mounted in the ways and provided with a pin and with an open box, obtuse slots formed in the opposite side walls of the box, a pin extending from the frame through the box, a sleeve formed in two sections swiveled together and mounted on the pin for reciprocation, trunnions mounted on the rear section and taking into the slots of the box, a depending rod secured to the front sections of the sleeve and provided with a shoulder located in the path of the pins of the disk, a spring for retracting the rod, a pawl pivoted to the lower end of the rod and adapted to engage the teeth of the first-mentioned disk, a spring for elevating said pawl, and an elbow-lever pivoted on the framework terminating at one end in a handle and at the other end in an eye, the latter engaging the pin of the sliding frame, substantially as specified.

31. In a brick-cutting machine, the combination, with the framework, the cutter mounted across the same, and means for feeding clay to the cutter, of the vertically-reciprocating trip, keepers for the same, means for operating the trip and releasing the same, devices mounted on the trip for operating the cutter, and the support 100, pivoted to the bracket 98 and adapted to be swung into and out of the path of the trip, substantially as specified.

32. In a brick-cutting machine, the combination, with the front and rear frame-sections and the opposite pairs of horizontal track-frames 43 of substantial **E** shape, of the intermediate movable carriage comprising opposite side bars, bearings extending outwardly from the side bars over the lower terminals of the frames 43, rollers journaled in the bearings and bearing against the upper surfaces of the lower terminals of the frames 43, pairs of perforated lugs extending from standards mounted on the side bars opposite the upper terminals of the frames 43, and rollers loosely mounted in the lugs and bearing against the upper terminals of the frames 43, substantially as specified.

33. In a brick-cutting machine, the combination, with the framework, the cutter mounted across the same, and means for feeding clay to the cutter, of a vertically-reciprocating trip, keepers for the same, means for operating the trip and releasing the same, devices mounted on the trip for operating the cutter, and means for regulating the throw of the trip, substantially as specified.

34. In a brick-cutting machine, the combination of front and rear sections having endless carriers mounted thereon, a carriage movably mounted longitudinally between said front and rear sections and having a rotary cutter mounted therein, a wheel having projections extending therefrom, and means for intermittingly communicating motion from the wheel to the cutter, substantially as specified.

35. In a machine for cutting off brick, the combination of a movably-mounted rotary cutter, the framework having front and rear sections, endless carriers operating in said sections, the intermediate longitudinally-movable reciprocating carriage supporting the rotary cutter, and means for feeding clay to the cutter, substantially as specified.

36. In a machine for cutting off brick, the combination of the framework, the front and rear sections thereof, the drum mounted in the front section, means for expanding and contracting the circumference of the drum adjustably to the length of the brick, the longitudinally-movable carriage mounted on the front and rear sections, and means for operating a cutter upon a bar of clay, whereby the same is cut into brick, substantially as specified.

37. In a machine for cutting off brick, a framework having a front section, an adjustable expansible drum mounted therein, a band-wheel mounted on the shaft carrying the drum, and an endless feed-belt rotating on said drum, in combination with a rear section, a delivery-belt revolving over pulleys mounted within the frame of said rear section, a band-wheel mounted on the shaft carrying one of the pulleys of the delivery-belt, means of revolving the delivery-belt, and a band or belt connecting the band-wheels, and means of applying tension to the band or belt, substantially as specified.

38. In a machine for cutting off brick, a framework, front and rear sections thereof, endless carriers mounted therein, a band-wheel mounted on the shaft of a pulley over which the rear carrier revolves, a band-wheel mounted on the shaft of a pulley or drum over which the front or feed carrier revolves, means of connecting said band-wheels, tension devices for regulating the friction applied to the band-wheels, the carriage mounted on said front and rear sections for reciprocation therein, the rotary cutter mounted within the carriage and at an angle thereto, and means for feeding a bar or bars of clay in the path of the cutter, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HORACE A. RIGGS.

Witnesses:
JOHN H. SIGGERS,
HORACE G. PIERSON.