

No. 619,426.

Patented Feb. 14, 1899.

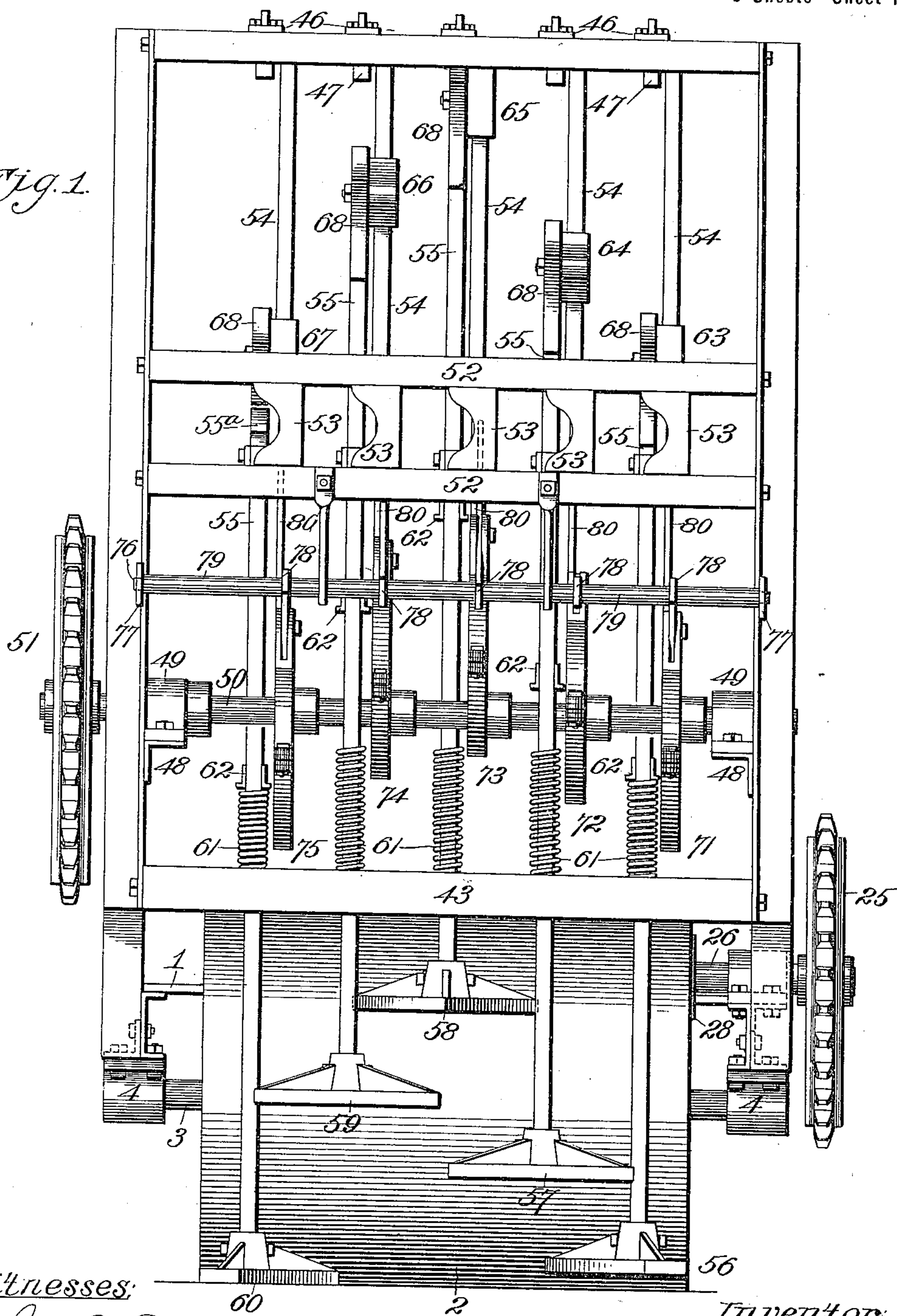
G. A. MAUGER.  
COMBINED TAMPING AND ROLLING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



Witnesses:

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G. A. Mauger.

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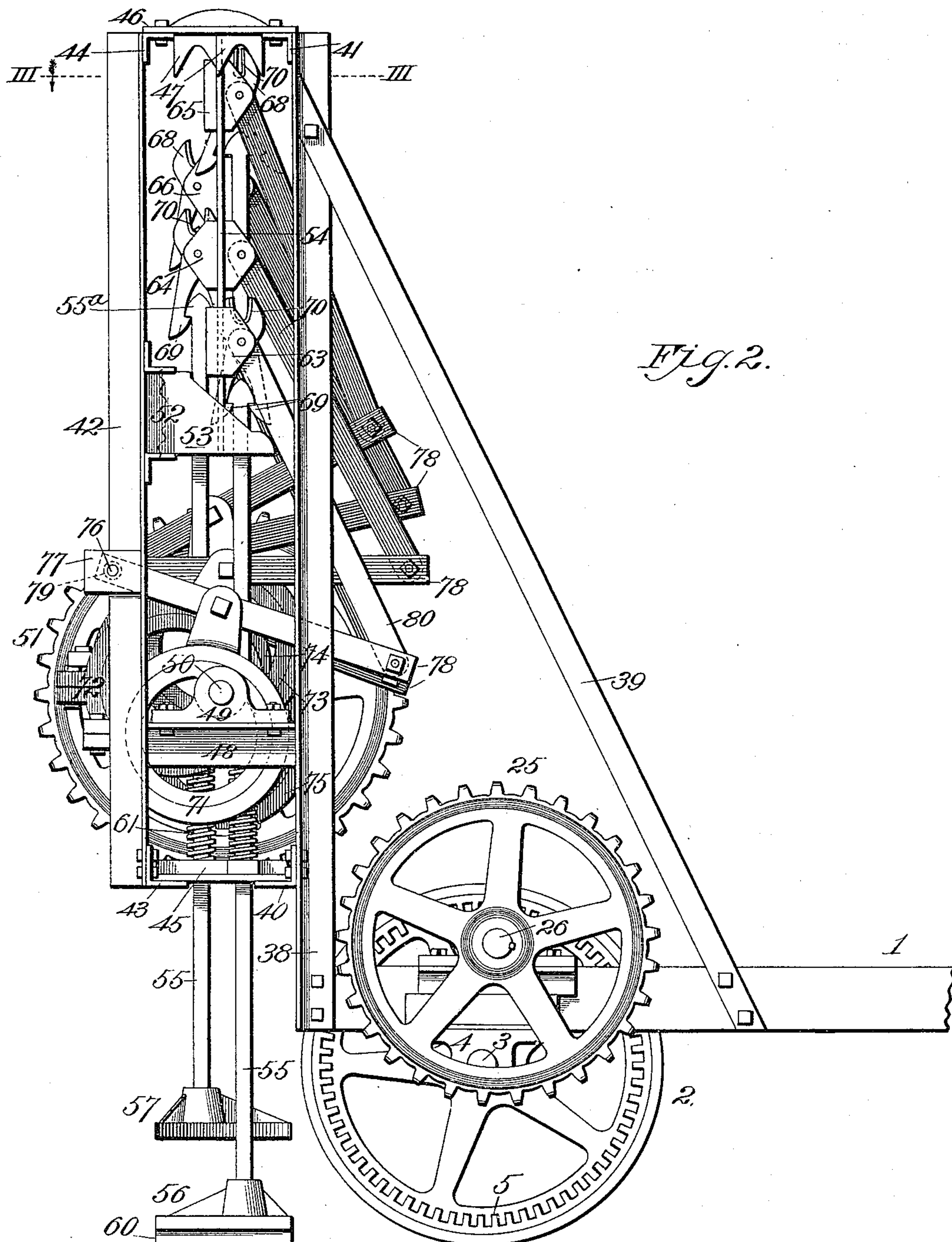
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(No Model.)



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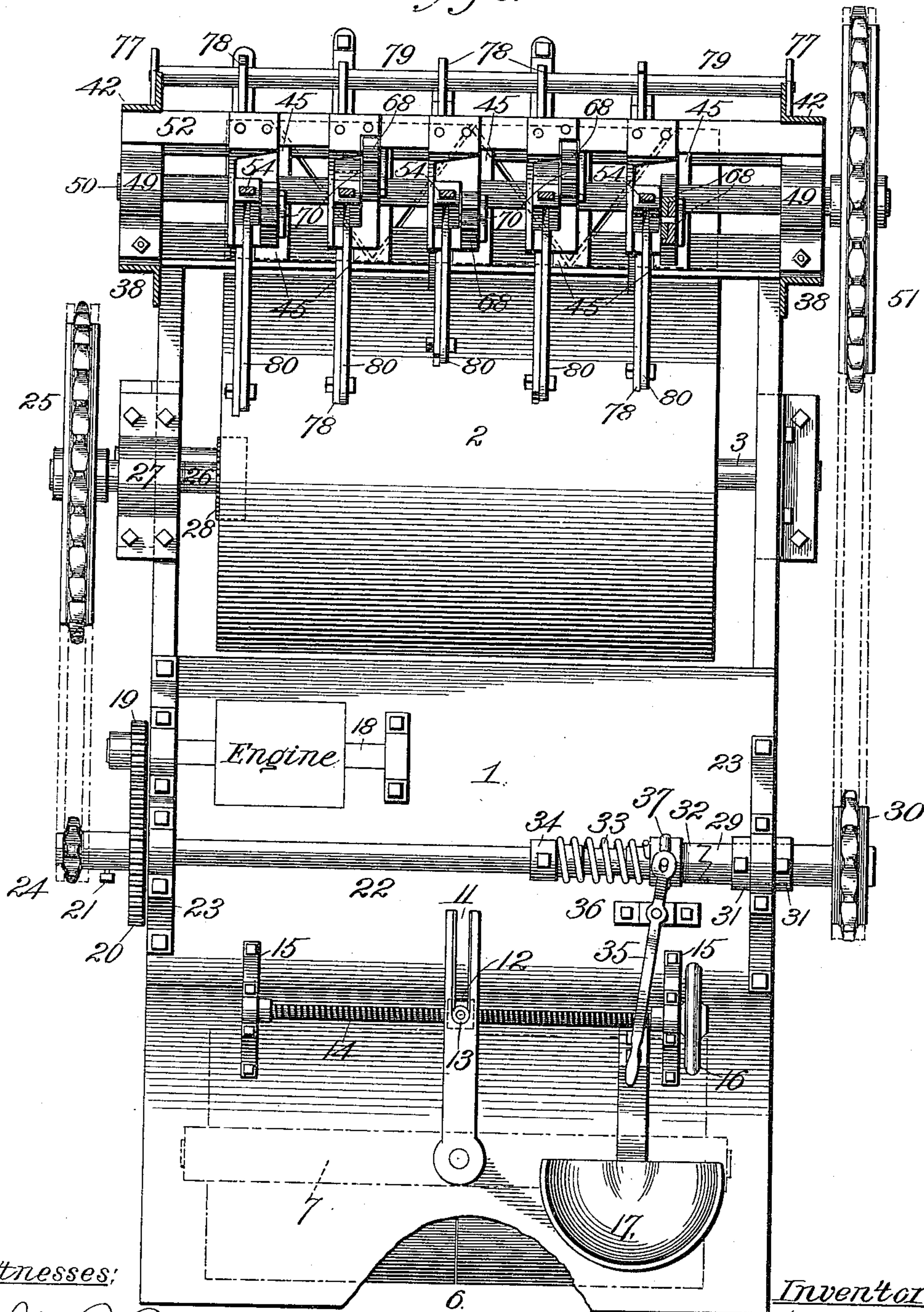
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5 Sheets—Sheet 3.

Fig. 3.



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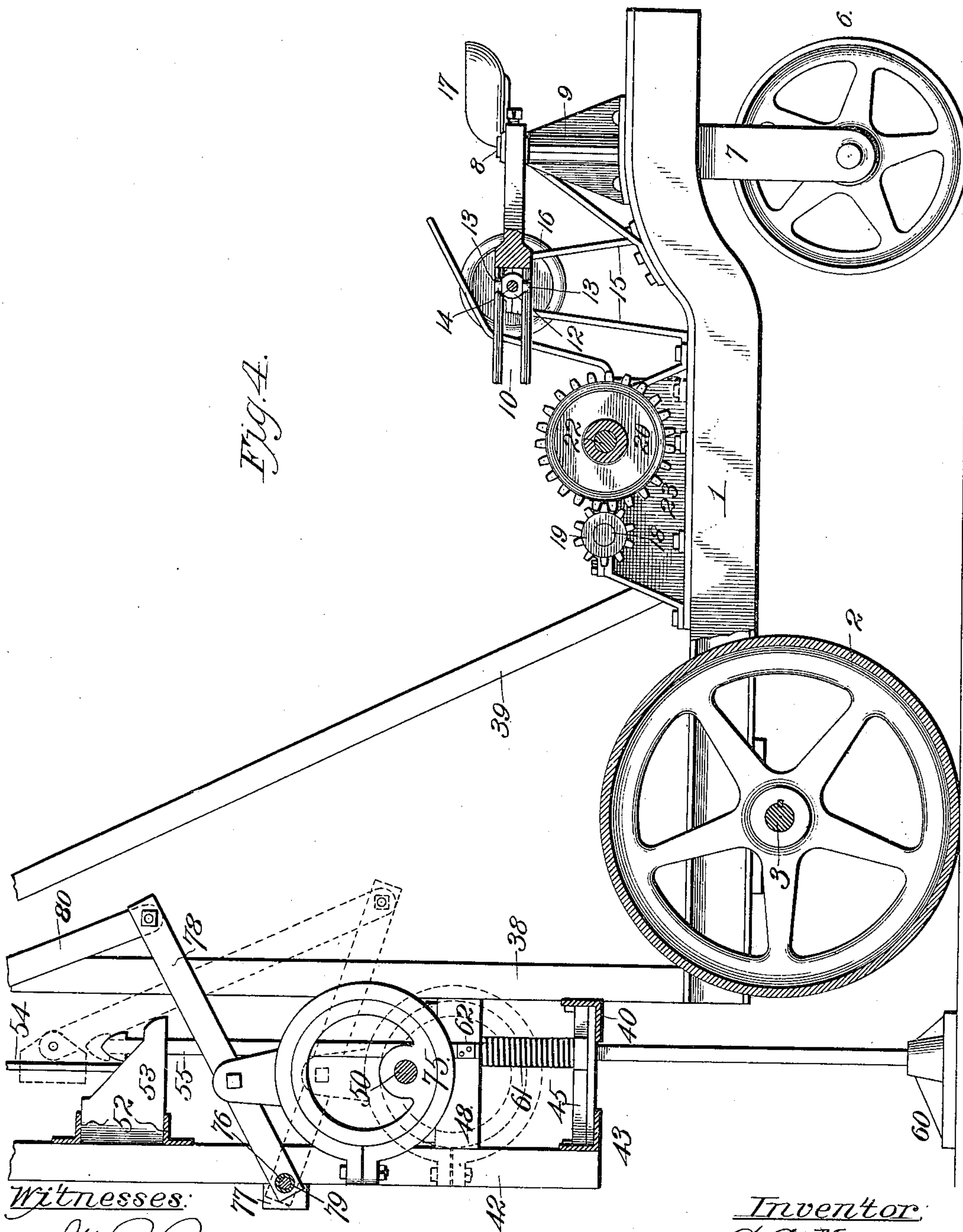
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(No Model.)

5 Sheets—Sheet 4.



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[Application filed Nov. 26, 1897.]

(No Model.)

5 Sheets—Sheet 5.

Fig. 6.

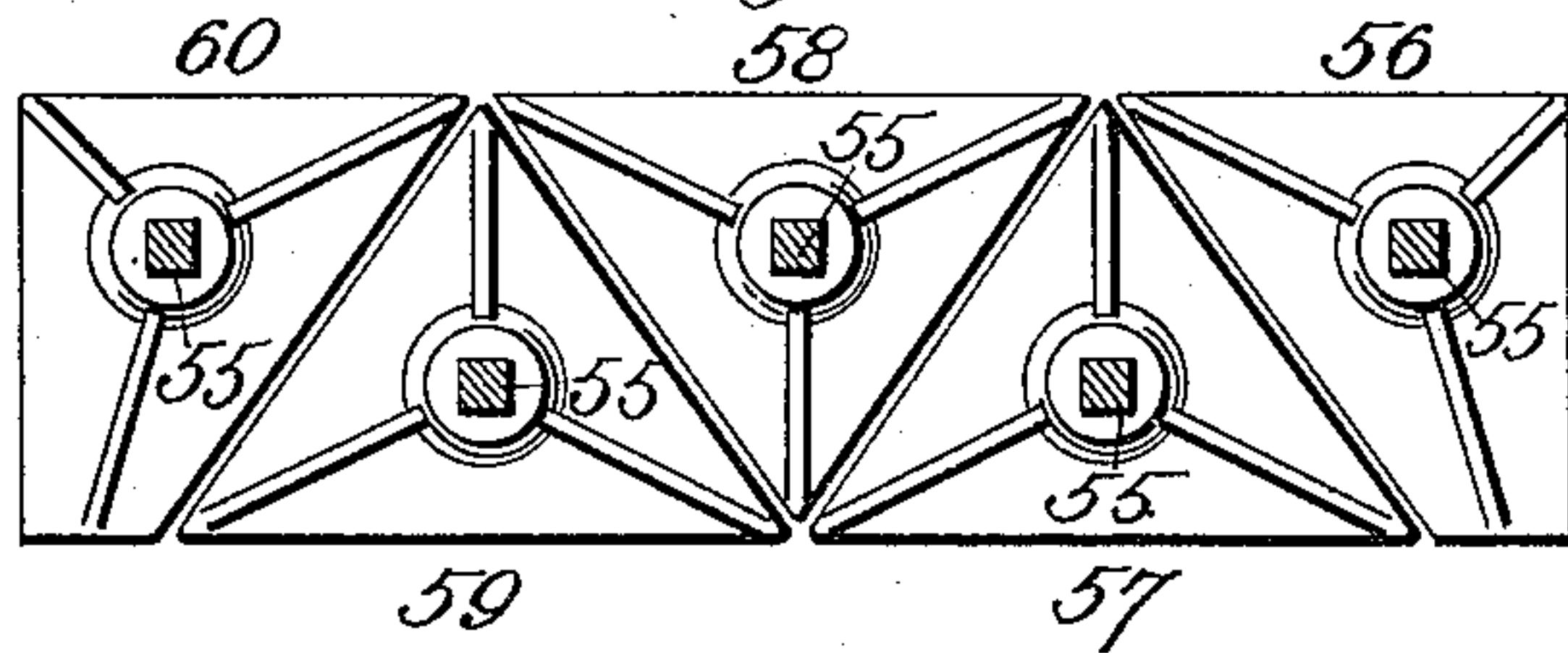
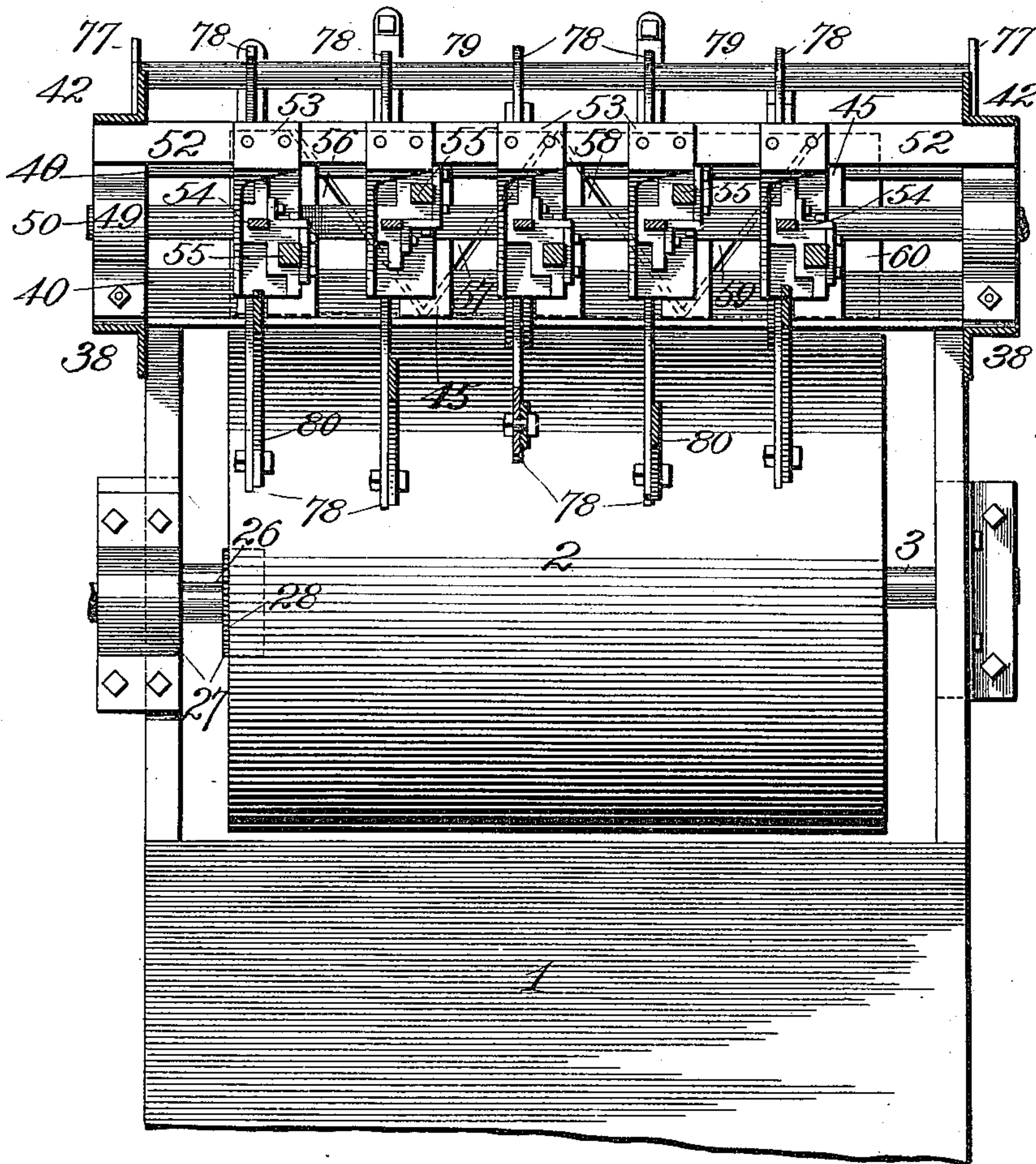


Fig. 5.



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# UNITED STATES PATENT OFFICE.

GEORGE A. MAUGER, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF  
TO HENRY R. KASSON, OF SAME PLACE.

## COMBINED TAMPING AND ROLLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 619,426, dated February 14, 1899.

Application filed November 26, 1897. Serial No. 669,833. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE A. MAUGER, a citizen of the United States, residing at Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in a Combined Tamping and Rolling Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to combined tamping and rolling machines for use particularly in laying asphalt street-pavements, sidewalks, &c.; and it consists of a roller and a series of tampers in advance of the roller, each tamper being arranged to operate with such rapidity that each stroke will overlap a part of the surface acted upon by the preceding stroke.

The object of the invention is to produce a street-paving machine in the form of a roller driven by steam or equivalent power, provided with a series of tampers by which the asphaltum may be automatically and reliably packed with a uniform pressure—unattainable, practically, by manual power—sufficient to prevent the “roller” following in the wake of the tampers from “waving” or undulating the surface of the street, to the end that a perfectly level surface, and consequently a more durable roadway, other things being equal, may be produced.

Other desirable objects attainable by the use of my machine are the great rapidity with which the work is done—viz, about eight yards per minute—the reduction of the cost of the work, and the important fact that a street thus paved can be opened up to traffic within about twenty-four hours instead of about six days, as at present.

To these ends the invention further consists in certain novel and peculiar features of construction and combinations of parts, as will be hereinafter described and claimed.

Referring to the accompanying drawings, Figure 1 is a front elevation of my combined tamping and rolling machine. Fig. 2 is a side elevation of the front portion of the same. Fig. 3 is a horizontal section taken on the line III III of Fig. 2. Fig. 4 is a view, partly in

side elevation and partly in vertical section.

Fig. 5 is a horizontal section taken just above the guide-brackets hereinafter referred to. Fig. 6 is a horizontal section to show more clearly the form and arrangement of the tampers, the tampers in said figure facing in the opposite direction from their position in Fig. 5.

In the said drawings, 1 designates a platform of any suitable form and construction.

2 designates the roller for leveling and packing the surface of the street, arranged at the front end of the platform and mounted rigidly upon the shaft 3, journaled in bearings 4, secured to the channel-irons forming the sides of the platforms, and said roller is provided with an internal gear 5, for a purpose which will hereinafter appear.

6 designates the roller by which the rear end of the platform is supported and by which the machine is steered. It is journaled in the depending arms of a U-shaped frame 7, and 8 designates the stem of said frame, said stem projecting vertically upward and centrally through the platform and the bearing-standard 9, bolted or otherwise secured to the platform.

The helm by which the steering-wheel is controlled is mounted rigidly upon the upper end of the stem 8 and, projecting forwardly therefrom, is provided with the intersecting horizontal and vertical slots 10 and 11, the horizontal slot being arranged to receive the adjustable worm-wheel 12 and permit the rotatable operation of the same and the slot 11 to receive the grooved guide-rollers 13, journaled upon the upper and lower sides of said worm-wheel, to the end that the same may be adjusted longitudinally with a minimum of friction and at the same time permit the free movement of the helm in one direction or the other. Said worm-wheel is mounted operatively upon the screw or worm shaft 14, which is journaled at its opposite ends in the bearing-standards 15, secured to the platform, and said screw or worm shaft is revolved by means of a hand or steering wheel 16 in the customary manner. A seat 17, supported as shown or in any other suitable manner, is arranged adjacent to said steering-wheel in



order that the engineer may conveniently control the direction of travel.

The engine or other motor is mounted upon the platform in any suitable manner, and the shaft 18 of said motor carries a drive-pinion 19, meshing continuously with the gear-wheel 20, secured by means of a set-screw 21 or its equivalent upon a counter-shaft 22, journaled near one end in a bearing-standard 23. A small sprocket-wheel 24, connected rigidly to the gear-wheel 20 through the medium of a chain, (illustrated by dotted lines in Fig. 3,) drives the large sprocket-wheel 25 upon the short shaft 26, journaled in a wide bearing 27, secured to the platform-framework, and said wheel, through the medium of the pinion 28 upon the inner end of said shaft, drives the roller 2 by engagement with the internal gear 5, hereinbefore referred to.

From the foregoing it will be seen that the machine is propelled and steered by mechanism which is old in the art or in kindred arts, and to such mechanism *per se* no claim is made

Mounted rotatably upon the opposite end of the shaft 22 and journaled in the bearing-standard 23, companion to the bearing-standard 23 first mentioned, is a cylindrical clutch-section 29, and mounted upon its outer end is a small sprocket-wheel 30, said clutch-section being prevented from moving longitudinally upon the shaft by means of collars 31 at opposite sides of said bearing-standard or by equivalent means. 32 designates a companion clutch-section, mounted in the customary manner to slide but not rotate upon the shaft 22. It is pressed toward the clutch-section 29 by means of the usual coil-spring 33 encircling the shaft and bearing at its opposite end against the collar 34, secured upon the shaft. 35 designates a lever by means of which said clutch-sections can be disengaged. It is mounted upon the standard 36 and has its forked end connected in the customary manner to the band 37, mounted loosely in a groove (not shown) in the periphery of said clutch-section 32. Said lever is adapted to be held at any point of adjustment by means of the customary spring-actuated dog and sector (not shown) or equivalent means. As this clutch mechanism whereby the sprocket-wheel 30 is thrown in or out of gear with the shaft 32 is old, no claim is made to it except in combination with parts to be hereinafter described.

A skeleton rectangular frame, by which the tamping mechanism is carried, is mounted upon the front end of the platform-frame just in advance of the roller 2, and this frame is preferably constructed of angle-iron because of its strength, rigidity, and light weight. The frame is constructed as follows—that is to say, 38 designates a pair of vertical standards, in practice about eight feet long, bolted at their lower ends to opposite sides of the platform-frame, and 39 indicates inclined braces, which connect the upper ends of said

standards to the platform-frame rearward of said roller, or said standards may be braced in any other suitable or preferred manner. 40 designates a longitudinal bar which connects said standards a suitable distance from their lower ends, and 41 a similar bar which connects their upper ends together. 42 designates a second pair of vertical standards projecting to the same height as the standards 38 and their lower ends reaching to the plane of the cross-bar 40. Said standards 42 occupy positions directly in advance of the standards 38, to the end that the four may form the corners of the skeleton frame. 43 designates a horizontal bar connecting the lower ends of said standards 42, and 44 a similar bar connecting their upper ends.

45 designates a series of longitudinal cross-bars or brackets, which form rigid connections between the bars 40 and 43, and 46 designates cross-bars or brackets, which connect the bars 41 and 44 in a similar manner. By preference the number of cross-bars in each series equals the number of tampers employed, and the cross-bars or brackets 46 are provided with alternately-arranged and depending knock-offs 47, arranged vertically above the cross-bars or brackets 45, said knock-offs being of **W** form, to the end that each may be provided with a notch having upwardly-converging walls—in other words, an inverted-V-shaped notch.

A suitable distance above the plane of the cross-bars 45 each bar 42 is connected to the bar 38 at the corresponding side of the machine by cross-bars 48, and secured thereon are bearing-brackets 49, in which is journaled a transverse shaft 50, said shaft occupying a position midway of the frame and of the two series of knock-offs 47, hereinbefore described, and keyed or otherwise rigidly mounted upon one end of said shaft is a large sprocket-wheel 51, which is connected by a chain (shown only in dotted lines, see Fig. 3) with the sprocket-wheel 30, to the end that the rotation of the latter wheel may more slowly revolve said shaft.

52 designates a pair of parallel transverse bars, which connect the standards 42 about midway their height, and secured firmly between said bars is a series of guide-brackets 53, which project rearwardly almost to the rear side of the skeleton frame and are connected with the superposed cross-bars or brackets 46 by a corresponding series of vertical guide-bars 54 in any suitable manner. Said brackets 53 are also provided with vertical guide-openings arranged alternately at opposite sides of and at equal distances from the center of shaft 50, through which extend and also through vertically-alined openings in the cross-bars or brackets 45 rectangular bars 55, having arrow-shaped heads 55<sup>a</sup> at their upper ends and carrying at their lower ends the tamping plates or blocks 56, 57, 58, 59, and 60. By reference particularly to Fig. 6 it will be noticed that these tamping-blocks



form practically a solid rectangular figure about equal in length to the roller 2, to the end that as the machine moves forward a path shall be made by said tampers in the freshly-laid asphaltum in which the roller treads. These tampers, as above stated, collectively form a rectangular figure, but individually are of substantially triangular form, the three inner ones being of substantially equilateral-triangle form and the outer ones of right-angle-triangle form and arranged with such relation that their adjacent margins outline the letter **W**, when viewed from the front, (see Figs. 3 and 5, particularly,) with the angular sides of the end tampers converging rearwardly and the sides of the middle tamper diverging rearwardly in order that in the second and each succeeding stroke of the tampers said tampers shall overlap the surface acted upon by the preceding stroke by the tampers between said end tampers and the middle tamper, provided, of course, the tampers be operated with sufficient rapidity to make two or more strokes before the machine has traveled a distance equal to the width of said rectangular figure, or, in other words, equal to the width of a tamper.

As illustrated, the tampers are geared to operate with such rapidity that the third stroke overlaps about one-third of the first stroke and the fourth stroke about one-third of the second stroke, and so on. Consequently as each tamper strikes a blow of about four hundred and fifty pounds the asphaltum is packed so hard that the roller simply smooths and levels without causing undulations or waves in the surface of the street, as may be observed in all asphalt pavements laid by the method employing manual tampers and an exceedingly heavy roller.

In order to prevent any possibility of the loosely-laid asphaltum being plowed up by the tampers, due to the slow but continuous movement of the machine, it is necessary that they be instantly lifted after each stroke to a plane just above the surface, as indicated by the position of the tamper 56 in Fig. 1, the tamper 60 being shown as in the act of striking the asphaltum, and this I accomplish by means of coil-springs 61, which encircle the rods or stems 55 and bear at their opposite ends against the cross-bars or brackets 65 and the plates 62, secured to said rods or stems at a suitable point, said plates being adapted in the descent of the tampers to compress the springs slightly in order that the latter in their reaction, assisted by the tendency of the tampers to rebound, may elevate and hold the same above the surface of the asphalt until they are again elevated as a preliminary to their next stroke.

63, 64, 65, 66, and 67 designate a series of cross-heads, which are slidingly mounted upon the vertical guide-bars 54, and the relative positions of said reciprocatory cross-heads determine the relative positions of the tamp-

ers 56 to 60, inclusive, to which they are respectively adapted to be connected by means of a series of dogs carried by said cross-heads, said dogs each comprising a pair of arms 68, pivoted together on the principle of a pair of ice hooks or tongs and provided at their lower ends with inwardly-disposed hooks or shoulders 69 for engagement with the arrow-heads of their respective tamp rods or stems, as shown most clearly in Fig. 2, and an expansive spring 70 interposed between the upper ends of said arms, so as to continually press the hooks 69 toward each other in order that as the eccentrics bring the cross-heads nearly to their lowest points of travel and the hook ends of the dogs strike the arrow-heads said hook ends may swing apart, and then as the cross-heads attain their lowest position shall be pushed inward below said arrow-heads, and consequently as the cross-heads rise under the continued movement of the eccentrics engage the arrow-heads and elevate the tampers. These dogs, mounted upon the cross-heads, as described, are arranged vertically below the knock-offs 47, to the end that the converging walls of the latter by engagement with the rounded upper ends of the former may overcome the resistance offered by said springs and pivotally operate said dogs in order that the arrow-heads may be released and the tampers permitted to drop till their descent is checked by forceful impact upon the asphalt, though it is to be understood, of course, and it will be apparent by reference to the drawings that the mechanism is arranged to permit only a single tamper to drop at a time in order to more equally distribute the strain upon the machine by not lifting all of the tampers at one time and more effectually and uniformly tamp or pack the asphalt, as will be readily understood. It is desirable in practice to permit the tampers to descend alternately; but this of course is simply a matter which experience and judgment may best control.

Mounted upon the shaft 50 in the customary manner and vertically below the guide-brackets 53 are a series of eccentrics numbered 71 to 75, inclusive, the relative arrangement of which upon the shaft determines the relative positions of the reciprocatory cross-heads above described, and incidentally the succession of strokes of the tampers, said eccentrics being adapted, through the medium of a system of compound levers to be presently described, to reciprocate said cross-heads, and by means of the dogs 68 successively elevate the tampers to about the position shown by the tamper 58 in Fig. 1, at which point, as shown in Figs. 1 and 2, its respective knock-off 47 causes its disengagement with the tamp-rod and permits said tamper to fall.

76 designates a rod which is mounted in arms 77, projecting forwardly from the standards 42 at a point some distance above the



shaft 50, and pivoted at their front ends upon said rod are the lower members 78 of the series of compound levers hereinbefore referred to, said members being maintained at proper points upon said rod by means of separating sleeves or collars 79, mounted upon said rod, or their equivalents. Said levers 78 are pivotally connected at a suitable point—in this instance forward of their middle—to arms of said eccentrics, as shown most clearly in Figs. 2 and 4, and at their rear or free ends are pivotally connected or linked by rods or bars 80 with the superposed reciprocatory cross-heads 63 to 67, inclusive, in order that as the eccentrics revolve they shall reciprocate said cross-heads through the medium of said compound levers. By this leverage system it is obvious that I obtain a cross-head reciprocation greatly exceeding the direct stroke of the eccentric, and consequently require an engine or motor of less horse-power capacity than would be required were the connection between the cross-heads and the eccentrics direct, as in the latter case to obtain sufficient drop for the tampers the eccentrics would have to be largely increased in size or the tampers themselves would have to be greatly increased in weight, which amounts to the same thing.

As the various operations of the machine have been described in detail, a recapitulation of the entire operation is not deemed necessary, it being sufficient to state that when traveling to and from the place of operation the tampers are thrown out of gear by the disconnection of the clutch members, said members of course always being disconnected when it is not desired to operate the tampers. The gearing, as illustrated, provides of course for only a slow movement of the rollers and about thirty-four strokes per minute of the tampers; but this of course may be varied, and the machine may also be provided with a speed-gear mechanism for use when traveling to and from the streets to be paved. This of course being common property is not shown in the accompanying drawings. Furthermore, the number of tampers may be varied; but with the number, form, and arrangement shown it is thought the best results can be obtained. In fact, the machine has already proved a success on the streets of various cities in Missouri.

It is to be understood, of course, that outside of the modifications above suggested the form, detail, construction, arrangement, and proportion of parts of the machine may be varied and mechanical equivalents substituted without departing from the spirit and scope or sacrificing any of the advantages of my invention.

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

1. In a machine of the character described, an oscillatory compound lever, a reciprocatory tamper for periodic elevation by said lever,

a knock-off to release the tamper at a predetermined height, and means to oscillate said lever periodically, substantially as described.

2. In a machine of the character described, a driven eccentric, a lever operated by the same, a reciprocatory tamper elevated by said lever, and a knock-off to release the tamper at a predetermined height, substantially as described.

3. In a machine of the character described, a tamper, a driven eccentric, a compound lever connected to the eccentric and engaging the tamper and adapted to lift the latter once in each revolution of the eccentric, and a knock-off to release the tamper when it attains a predetermined height, substantially as described.

4. In a machine of the character described, a tamper, a reciprocatory cross-head connected thereto, and an oscillating lever adapted to periodically elevate the tamper, substantially as described.

5. In a machine of the character described, a tamper, a reciprocatory cross-head connected thereto, an oscillating lever to periodically elevate the cross-head, and a knock-off to release the cross-head when it attains a predetermined height, substantially as described.

6. In a machine of the character described, a tamper, a reciprocatory cross-head connected thereto, a driven eccentric, and a compound lever connecting the eccentric and the cross-head, substantially as described.

7. In a machine of the character described, a tamper, a reciprocatory cross-head connected thereto, a driven eccentric, a compound lever connecting the eccentric and the cross-head, and a knock-off to disconnect the cross-head and the tamper, substantially as described.

8. In a machine of the character described, a tamper, a reciprocatory cross-head connected thereto, a driven eccentric, a lever fulcrumed at one end and pivotally connected to the eccentric, and a link connecting the lever and the cross-head, substantially as described.

9. In a machine of the character described, the combination with a wheeled framework, the front wheel of which is in the form of a pressure-roller, and a plurality of tampers, which conjointly are adapted to cover a surface equal in length to said roller, and arranged in advance thereof, of a driven shaft, eccentrics mounted thereon, reciprocatory cross-heads, dogs carried thereby and adapted to automatically engage the stems of the tampers and lift them to a predetermined height, levers fulcrumed at one end and pivotally connected to said eccentrics, links pivotally connecting the opposite ends of said levers with said reciprocatory cross-heads, and knock-offs to disengage said dogs from the tampers after the latter have attained a predetermined height, substantially as described.

10. In a machine of the character described, the combination of a series of tamp-



ers of such configuration that the joint between them represents the letter **W**, substantially as shown and described.

11. In a machine of the character described, a suitable frame, a tamper, having a vertical stem, suitably guided upon the frame, a driven eccentric, a compound lever connected to the eccentric and engaging the tamper and adapted to lift the latter once in each revolution of the eccentric, a knock-off to release the tamper, when it attains a predetermined height, from the influence of the lever

and permit the former to fall, and a spring 61 adapted to be compressed under the power of the descending tamper, and adapted to raise and hold the tamper above the surface of the street immediately its limit of descent has been attained, substantially as described. 15

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE A. MAUGER.

Witnesses:

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M. R. REMLEY.