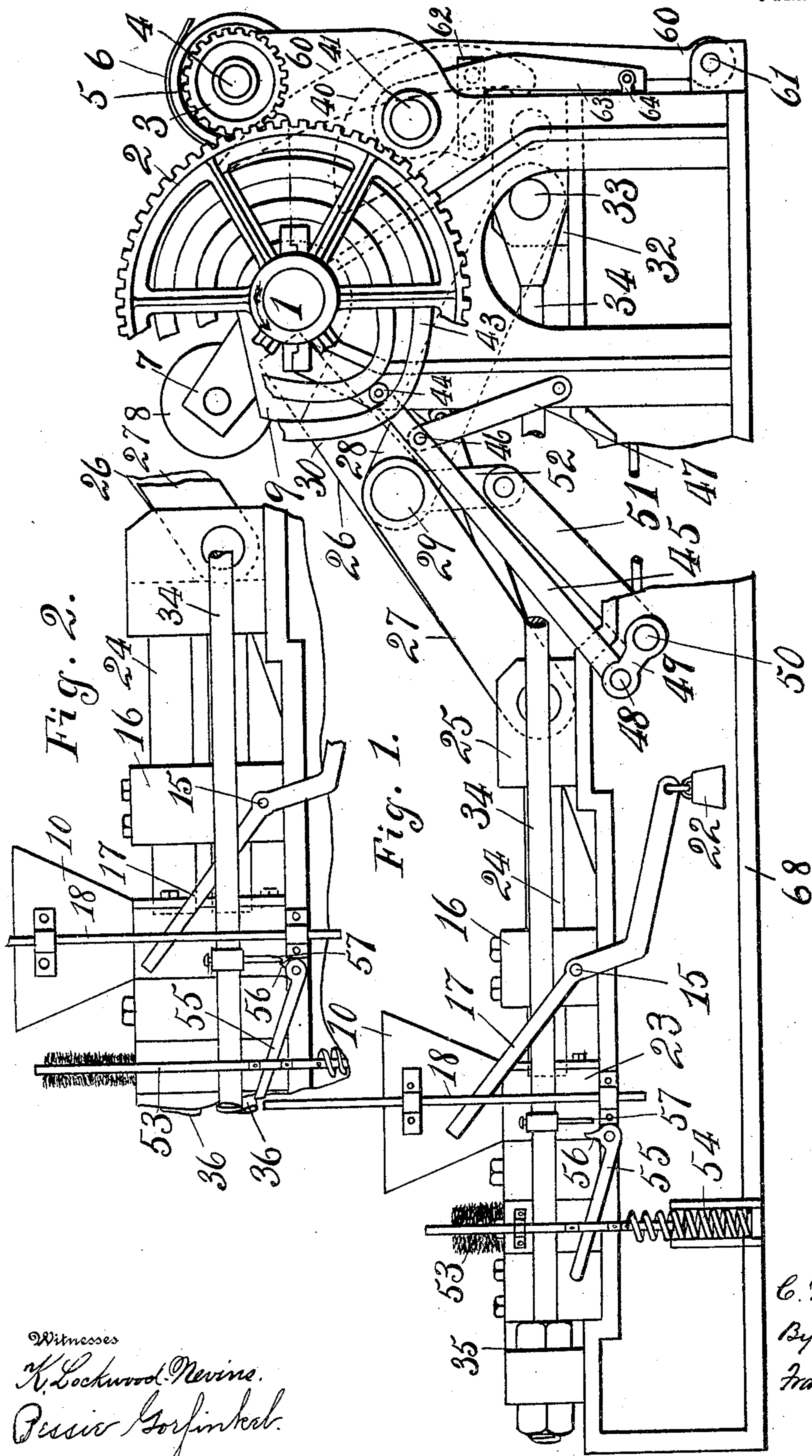


No. 820,288.

PATENTED MAY 8, 1906.

C. DEMETRAK.
BRIQUETING MACHINE.
APPLICATION FILED SEPT. 30, 1903.

6 SHEETS—SHEET 1.



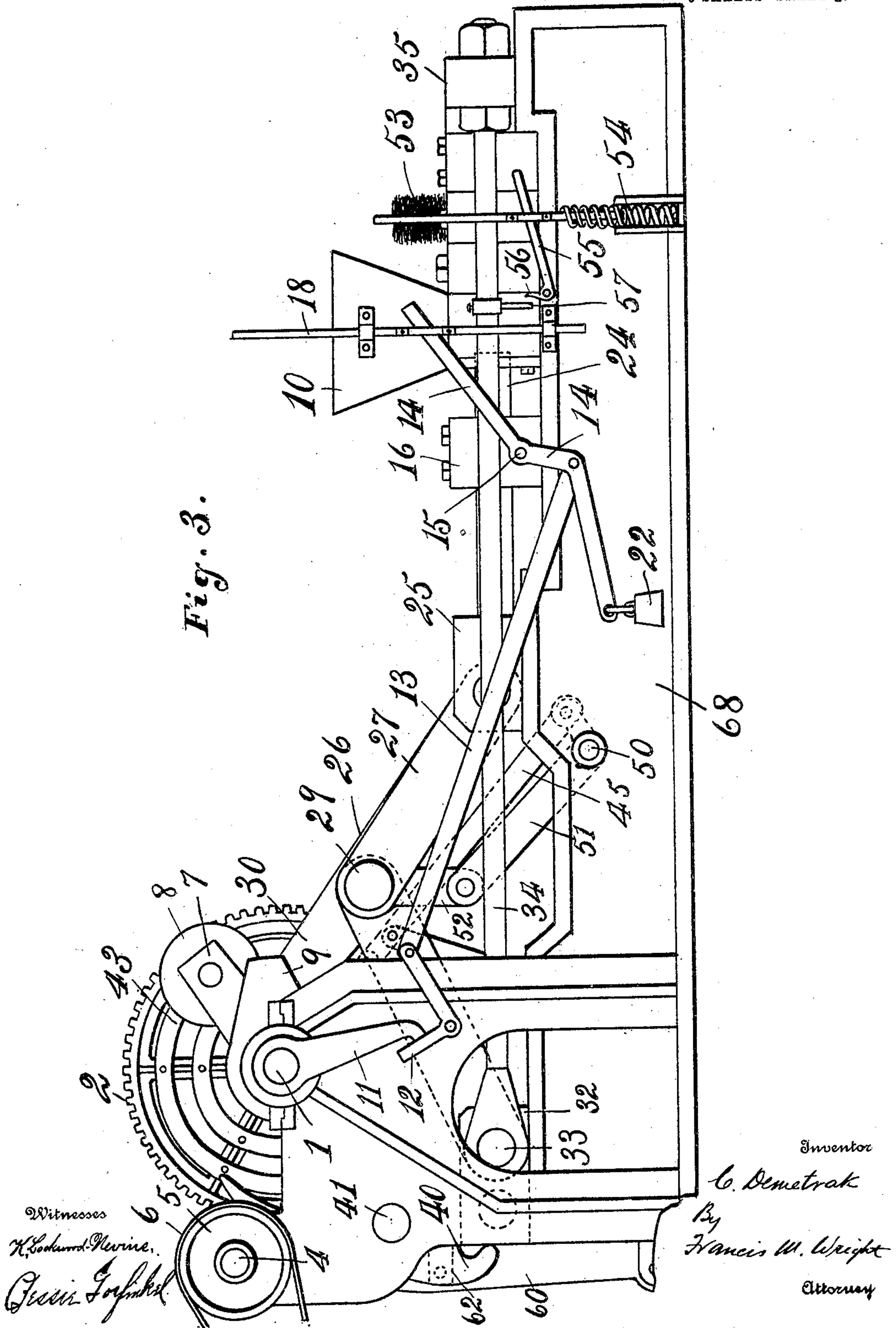
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6 SHEETS—SHEET 2.

Fig. 3.



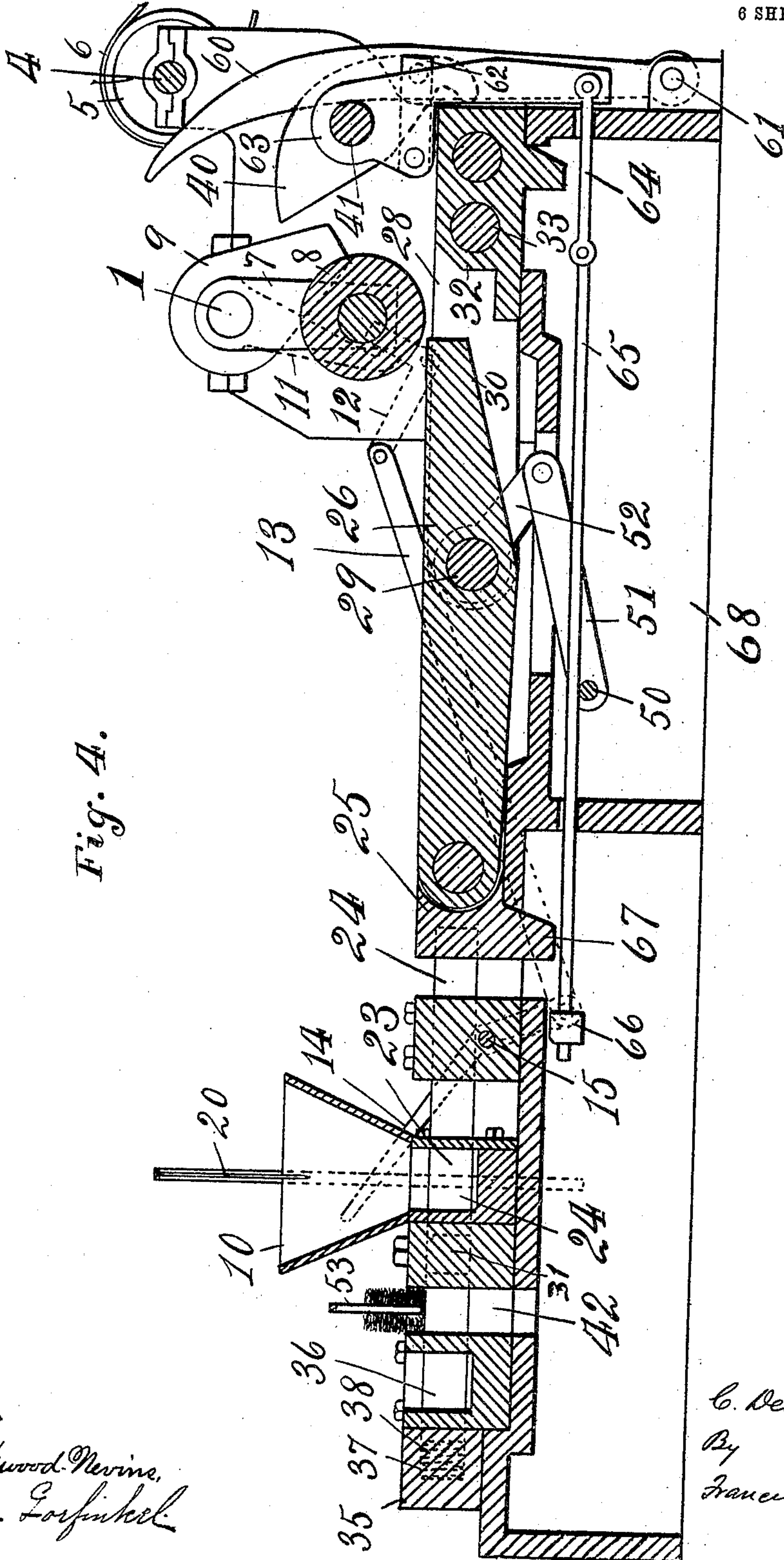
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6 SHEETS—SHEET 3.

Fig. 4.



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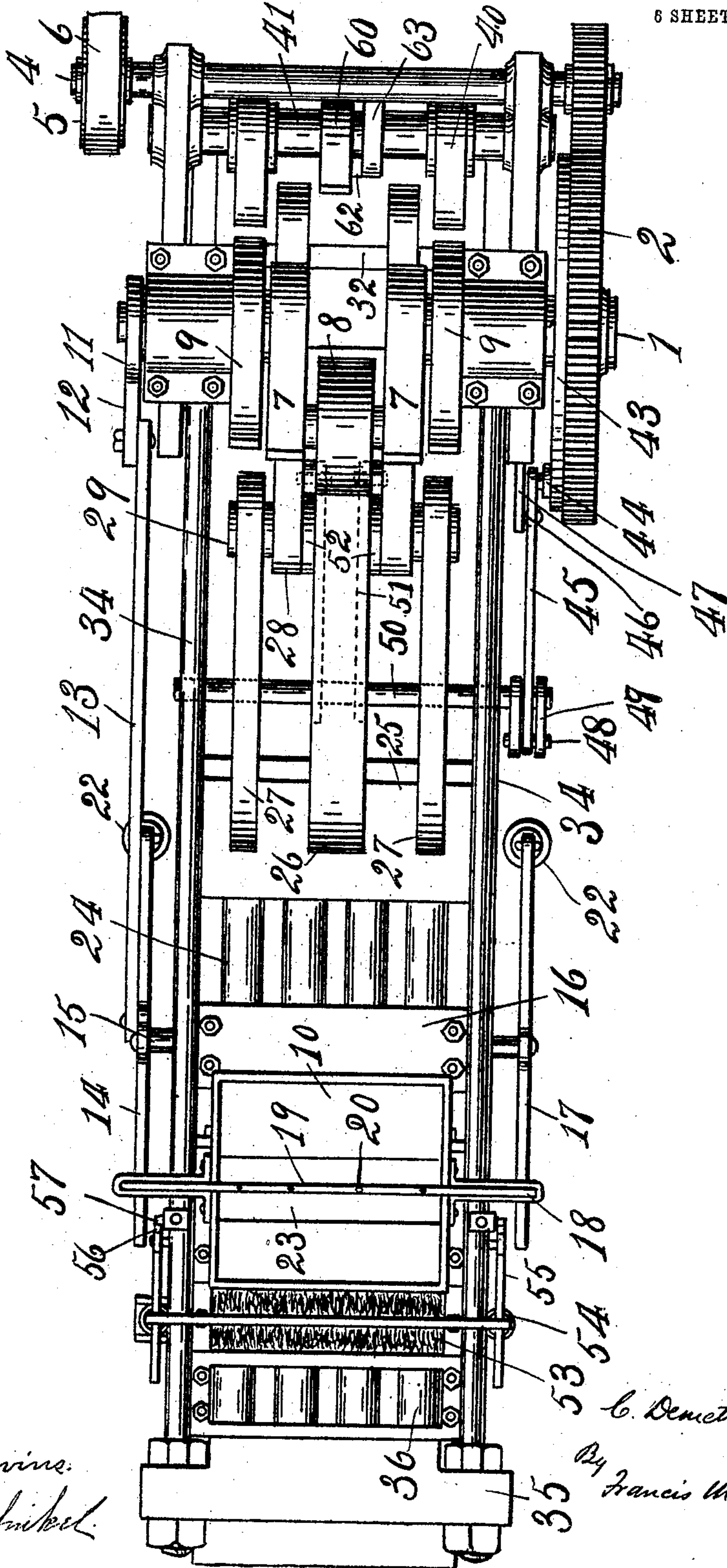
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6 SHEETS—SHEET 4.

Fig. 5.



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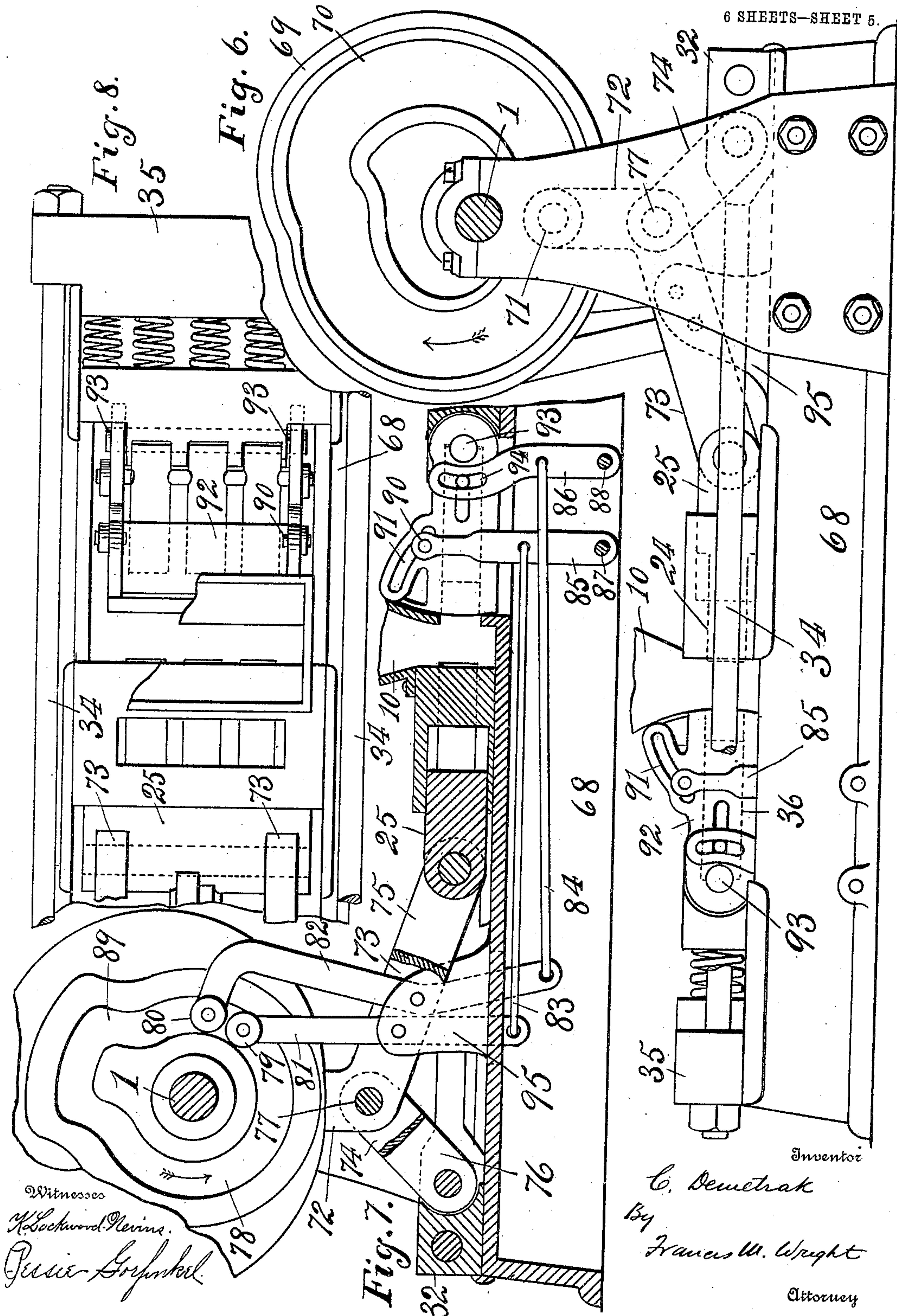
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6 SHEETS—SHEET 5.

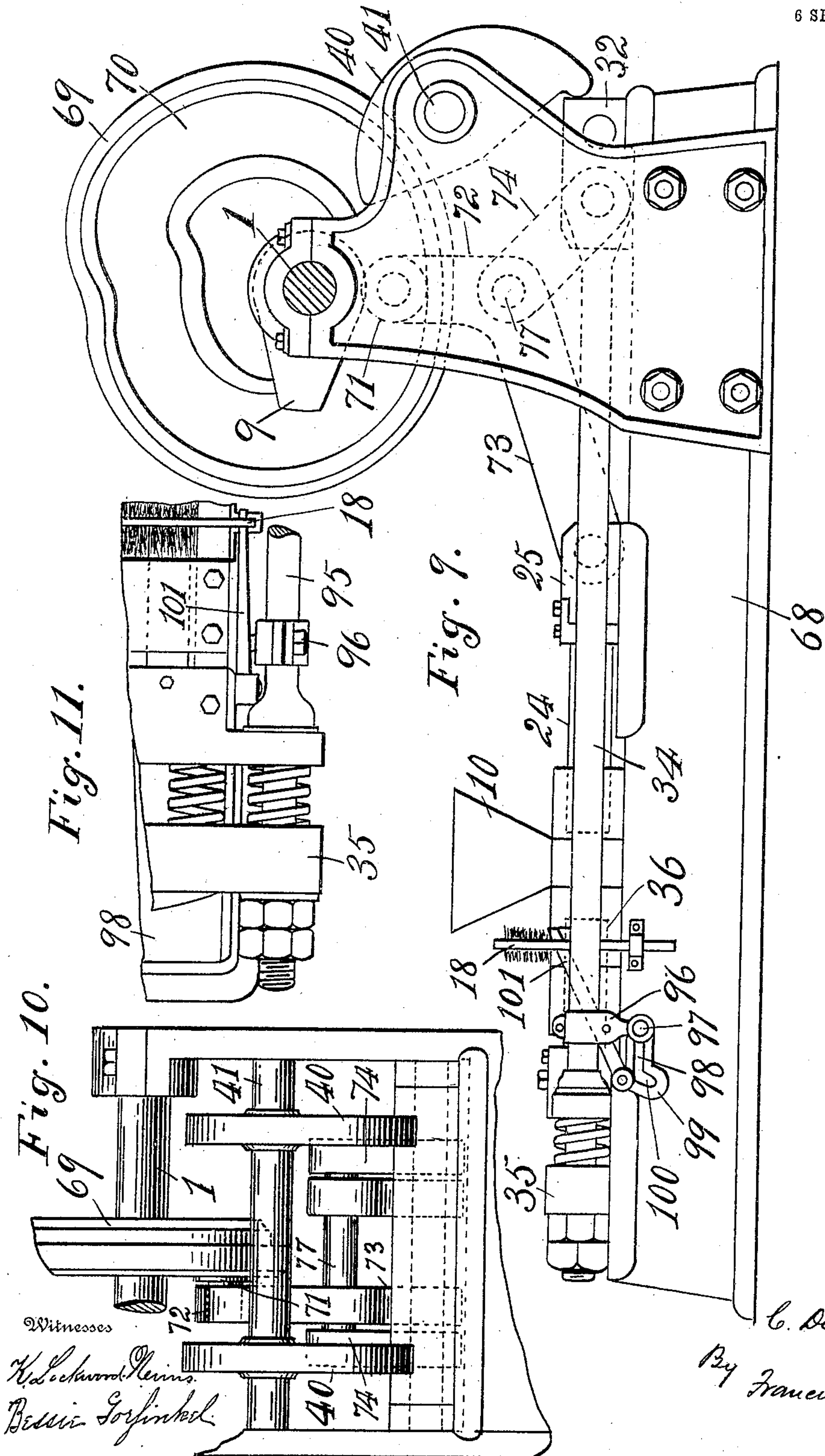


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UNITED STATES PATENT OFFICE.

CONSTANTINE DEMETRAK, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR
TO AMERICAN BRIQUETTING CO., OF SAN FRANCISCO, CALIFORNIA,
A CORPORATION OF CALIFORNIA.

BRIQUETING-MACHINE.

No. 820,288.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed September 30, 1903. Serial No. 175,122.

To all whom it may concern:

Be it known that I, CONSTANTINE DEMETRAK, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Briqueting-Machines, of which the following is a specification.

My invention relates to improvements in machines for making briquets, the object of my invention being to provide a machine of this character which shall be simple in construction, effective in proportion to its size and weight, and one in which the shape or size of the briquet may readily be varied at pleasure.

My invention, therefore, resides in the novel construction, combination, and arrangement of parts for the above ends, hereinafter fully specified, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a broken side elevation of my improved machine. Fig. 2 is a side elevation of one end of the machine, showing a modified form of the invention. Fig. 3 is a side elevation of an opposite side of the machine from that shown in Fig. 1. Fig. 4 is a longitudinal vertical section of the machine. Fig. 5 is a plan view of the machine. Fig. 6 is a side elevation of a modified form of the machine. Fig. 7 is a longitudinal section of one end thereof. Fig. 8 is a broken plan view of one end thereof. Fig. 9 is a side elevation of a further modification of the machine. Fig. 10 is a broken end view thereof. Fig. 11 is a broken plan view of a portion of the machine.

Referring to the drawings, 1 represents the main shaft, driven by means of a gear-wheel 2, pinion 3, shaft 4, pulley 5, and belt 6 from any suitable source of power. Shaft 1 is formed with a crank 7, carrying a roller 8, and has also attached thereto two arms 9.

The hopper 10 having been filled with the material to be compressed, said material is agitated at each revolution of the main shaft by means of an arm 11, mounted on said shaft, engaging a bell-crank lever 12, connected by a link 13 to a lever 14 on a rock-shaft 15; extending through a block 16. Said rock-shaft carries at its other end a lever 17, and said levers 14 and 17 loosely engage slides 18 at the sides of the hopper, which

slides are connected at the top by a bar 19, and from said bar depend fingers 20, which extend down into the hopper 10 and thoroughly agitate the material therein. As will readily be seen, the downward movement of said fingers 20 corresponds to the rearward movement of the bell-crank lever 12, while said bell-crank lever returns rapidly under the action of weights 22, suspended from the rearwardly-extending arms of the levers 14 and 17. This return movement causes said fingers 20 to move rapidly upward to prevent the material from caking or clogging. Thus the material is caused to fall into a box 23 beneath the hopper, maintaining said box full. Through said box 23 slide pistons 24, the rear ends of which are connected to a head 25, said head being connected to a toggle system of levers consisting of three forward levers 26 27 27 and two rear levers 28. The middle lever 26 and the outer levers 27 are connected to the two rear levers 28 by a pivot-bar 29, and the center lever 26 has a rearwardly-extending free end 30 behind said pivot.

The front ends of the pistons 24 slide through the block 16, then through said box 23, and then into dies 31, bushing the material from said box into said dies. The parts being in the position shown in Fig. 1 and the main shaft moving in the direction of the arrow, the first result of the onward movement from said position will be that the roller 8, engaging the free end of the lever 26, will cause said lever and the levers 27 to move forward, carrying therewith the head 25, containing the forwardly-moving piston 24, so that the ends of said pistons move forward toward and into the dies. The rear ends of the levers 28 are connected to a head 32, which is connected by pivot-bars 33 with side bars 34, extending at the sides of the machine forward to a head 35, containing pistons 36. Therefore the descent of the roller 8 will hold back the head 32, and will therefore hold the pistons 36 against the pressure due to the forward movement of the pistons 24, thereby compressing the material in the dies and forming the briquets.

In order to avoid breaking the machine by the accidental presence of a piece of iron or a like hard substance in the dies between any pair of pistons 24 and 36, each of the pistons 36 is resiliently contained in a cavity 37 in

the head 35, there being provided in said cavity behind the piston a very powerful spring 38, which will yield only under very great pressure. In case of the presence of the foreign substance, as aforesaid, the piston will yield and permit the shaft to continue to revolve without breaking the machine.

The parts will now have arrived at the position shown in Fig. 4, where it will be seen that the toggle system is flattened or spread to its utmost extent. The next act of the operation is to expel the briquets from the die-block. This is effected by the two arms 9 impinging upon the levers 40, mounted loosely upon a transverse shaft 41, the lower ends of said levers 40 abutting against the rear ends of the head or block 32 and moving said head or block with the toggle-levers and pistons forward. By this means the briquets are brought into an open space 42 in front of the dies. It is necessary, however, now to slightly reduce the pressure on the briquets to allow them to drop. This is done by means of a cam 43, formed on the inner side of the gear-wheel 2, in which is a roller 44 on a link 45, having a pivotal engagement 46 with an arm 47, said link being connected, as shown at 48, with a short arm 49, extending from a rock-shaft 50. From said rock-shaft 50 extends a central arm 51, which is attached by a link 52 to the pivot-bar 29. When now said link 45 is moved outwardly under the influence of said cam, the pivot-bar 29 is caused to rise, thus withdrawing the pistons 24 or slightly opening the space between the ends of said pistons and of the pistons 36. The briquets are thus allowed to drop, and their drop is insured by means of brushes 53, which are normally pressed upward by means of springs 54 and are pressed downward by means of levers 55, having a short arm 56, engaged by lugs 57 on the bars 34 when the latter move forward, so that at a certain point in their forward movement said levers 55 have imparted thereto a rapid motion, bringing the brushes down quickly and pushing the briquets down, if necessary, to remove them from the ends of the pistons and also cleaning and oiling said ends for the next operation. The briquets will drop into any suitable receptacle. It is now necessary to move the pistons back to their original position. This is accomplished in the first place by the continuation of the slope of the cam 43, which presses the link 45 outward and the toggle system upward, thus drawing the ends of the pistons 24 away from the ends of the pistons 36. This is also assisted by means of the roller 8 contacting with a lever 60, pivoted at its lower end 61 and connected by a link 62 with a lever 63, pivoted on the transverse shaft 41, the lower end of said latter lever being connected by a link 64 with a shifting rod 65, having a shifting block 66, secured there-

on, engaging the lug 67 on the head 25. Evidently the rearward movement of the roller will cause also said shifting rod and head to move rearwardly. The toggle system and pistons will now be moved rearwardly, and in addition the pistons 24 will be moved still farther to the rear by reason of said toggle system bending under the influence of the cam 43.

It will be observed that the block and the guides for the pistons are removably supported on the bed 68, so that they can be substituted by others which will give different sizes and shapes of briquets. Also the briquets can be formed in more than one tier. In Fig. 2 I have shown a modified form of the machine in which two tiers of pistons and two rows of dies are used.

In the modification shown in Figs. 6, 7, 8 instead of a roller 8, carried on a crank 7 on the shaft 1, there is mounted on said shaft 1 a cam-wheel 69, having a cam-groove 70 on one side thereof, in which is a roller 71, carried on the end of an arm 72, bent upward from a toggle-arm 73, pivotally connected with a rear toggle-arm 74. On the other side of the cam-wheel are similar toggle-arms 75 76, the arm 75, however, not being bent upward like the arm 73. These toggle-arms 73 74 75 76 are pivoted together by means of a bolt 77. The front arms are pivotally mounted in the front block or head 25, while the rear toggle-arms are pivotally mounted in the rear head 32. It will readily be seen that these arms take the place of the toggle system described in the first modification. In this modification also I have illustrated a modified mechanism for discharging the briquets, which mechanism may be used also equally well with the toggle system shown in the first modification. This discharge mechanism is operated by means of a cam-groove 78 on the opposite side of the cam-wheel 69 to the cam-grooves 70, and in said cam-groove 78 are received two rollers 79 80, mounted upon the ends of levers 81 82, pivoted upon a standard 95, erected upon the bed 68 of the machine between the two toggle-arms 73 75. Said levers 81 82 extend through an aperture in the bed to the under side thereof and are connected at their lower ends with rods 83 84, which rods are attached at their forward ends to levers 85 86, pivoted at 87 88 on the frame of the machine. The cam-groove has formed therein a rise 89, which in the revolution of the cam-wheel in the direction of the arrow in Fig. 7 moves outward in succession the rollers 79 80. The outward movement of the roller 79 causes the upper end of the lever 85 to move rearwardly. The upper end of said lever carries a pin 90, which extends into a slot 91, extending obliquely upward from the die-block 92, which is pivoted in its rear end, as shown at 93. Therefore the rearward movement of the upper end of said le-

ver has the effect of swinging said die-block 92 downward, carrying with it the briquet which has just been formed. Immediately thereafter the rise 89 in the cam-groove 78 operates the roller 80, which has the effect of drawing rearward the upper end of the lever 86. Said lever is slotted at its upper end, and in said slot extends a pin 94 from the dies, so that the said rearward movement of the lever 86 has the effect also of moving the dies rearwardly, and since the die-block has now been swung downward out of alinement with the pistons the briquets are free to be discharged.

15 In the modification shown in Figs. 9, 10, 11 I employ the toggle system illustrated in Figs. 6, 7, 8 and the briquet-discharging mechanism shown in Figs. 1 to 5, but slightly modified. The bars 34 at the sides have secured thereon downwardly-extending lugs 96, having pins 97, which when the bars move forward move in horizontal slots 98, formed in levers 99, said slots terminating in downwardly and forwardly extending oblique portions 100, and when the pins 97 arrive at said oblique portions they cause said levers 99 to swing on their pivots, the lower or slotted portion forwardly, and the long upwardly and rearwardly extending arms 101 downward. Said arms pass through slides 18, attached to the brushes, and thus cause said brushes to descend and insure the removal of the briquets.

I claim—

35 1. In a briqueting-machine, the combination of a hopper, a box thereunder, a horizontal piston moving through said box to feed the material therefrom, a die into which the material is fed, a second horizontal piston moving through the die, a horizontal toggle-lever the ends of which are connected with said pistons respectively, one arm of said lever having an extension beyond the toggle-joint, a main shaft, a crank-arm thereon, and 45 a roller carried by said crank-arm engaging said extension to straighten the lever, substantially as described.

50 2. In a briqueting-machine, the combination of a hopper, a box thereunder, a horizontal piston moving through said box to feed the material therefrom, a die into which the material is fed, a second horizontal piston moving through the die, a horizontal toggle-lever the ends of which are connected with

said pistons respectively, one arm of said lever having an extension beyond the toggle-joint, a main shaft, a crank-arm thereon, a roller carried by said crank-arm engaging said extension to straighten the lever, a plate having a cam-groove on said shaft, an arm 60 operatively connected with said toggle-lever to bend the same, and a roller carried by said arm moving in said cam-groove, substantially as described.

3. In a briqueting-machine, the combination of a hopper, a box thereunder, horizontal pistons moving through said box to feed the material therefrom, dies into which the material is so fed, horizontal pistons moving through said dies, heads for said pistons, 70 springs between one of the heads and the corresponding pistons, a toggle-lever the ends of which are operatively connected to said heads, and means for straightening said toggle-lever, substantially as described. 75

4. In a briqueting-machine, the combination of a die, horizontal pistons moving in opposite directions therein, a horizontal toggle-lever the ends of which are operatively connected with said pistons, means for moving 80 the toggle-joint vertical to straighten the toggle-lever, means for moving the whole system of pistons and toggle-lever horizontally to move the briquets out of the die, and auxiliary means for bending the toggle-lever after it has been so moved to release the briquets and allow them to fall, substantially as described. 85

5. In a briqueting-machine, the combination of a hopper, a box thereunder, horizontal pistons moving through said box to feed the material therefrom, dies into which said material is so fed, pistons moving through the dies, a toggle-lever the ends of which are operatively connected to said pistons, a shaft 95 provided with means for engaging said toggle-lever to straighten the same, agitators in the hopper, and an arm on said main shaft actuating said agitator as the shaft revolves, substantially as described. 100

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

C. DEMETRAK.

Witnesses:

FRANCIS M. WRIGHT,
BESSIE GORFINKEL.