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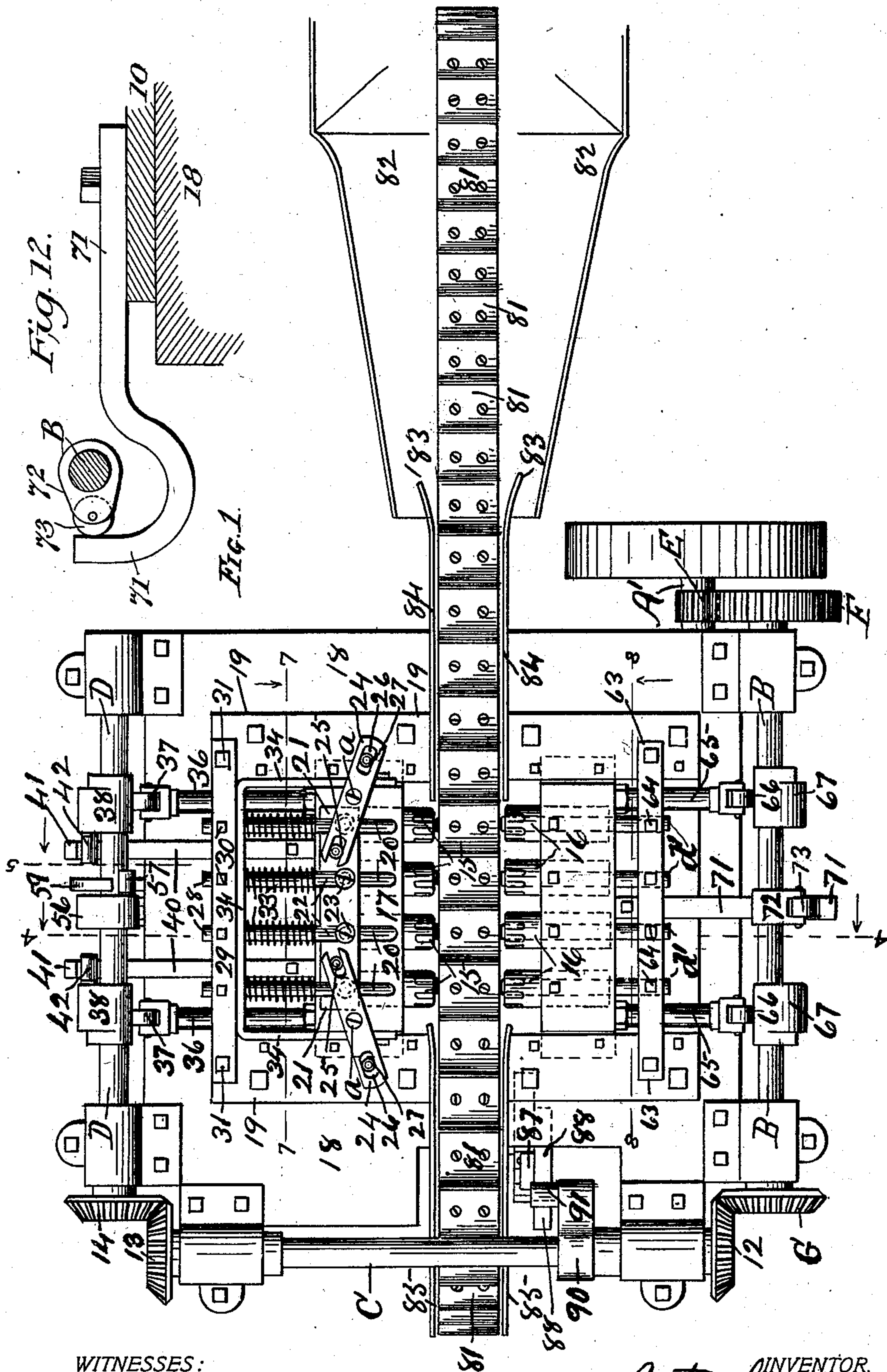
Patented June 17, 1902.

A. GERSTMAYR.
NUT CRACKING MACHINE.

(Application filed May 15, 1901.)

(No Model.)

6 Sheets—Sheet 1.



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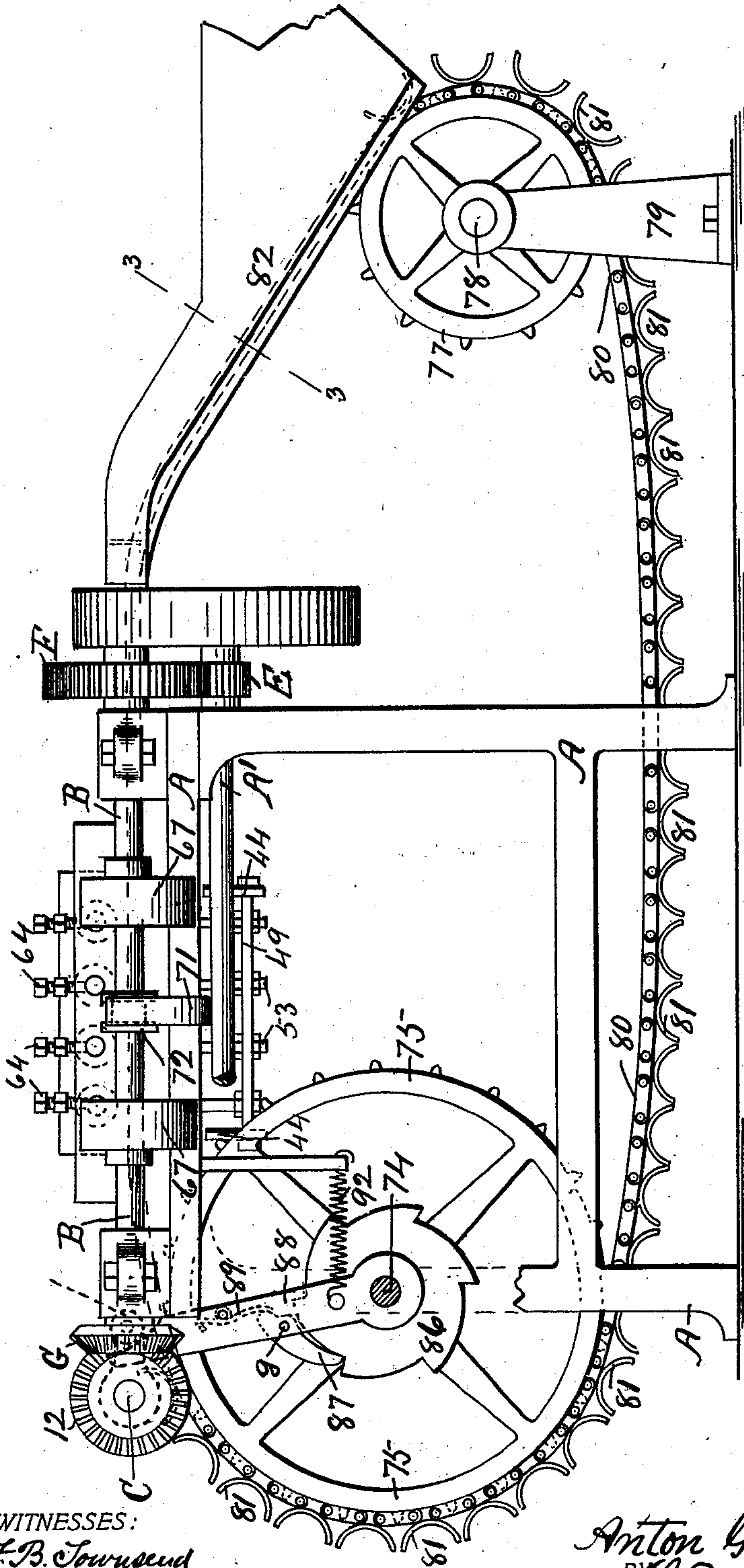
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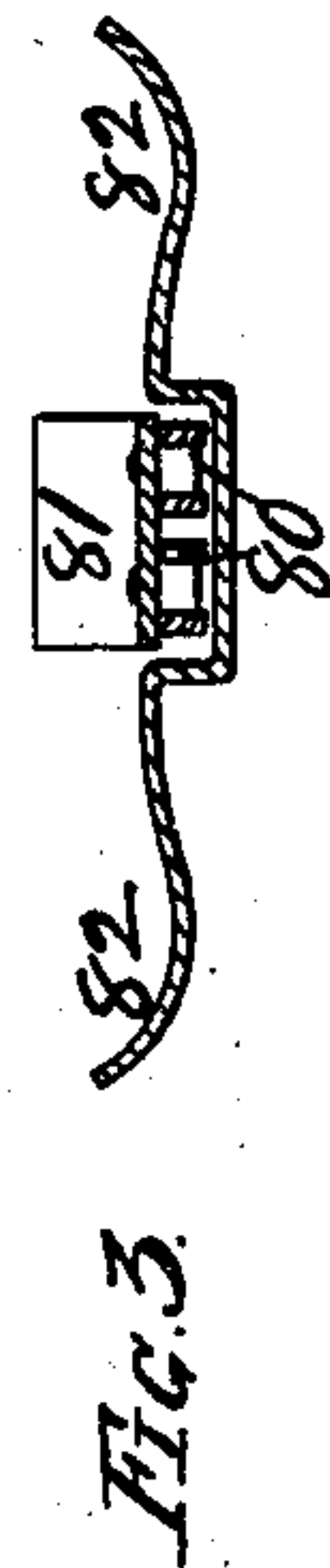
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FIG. 2.



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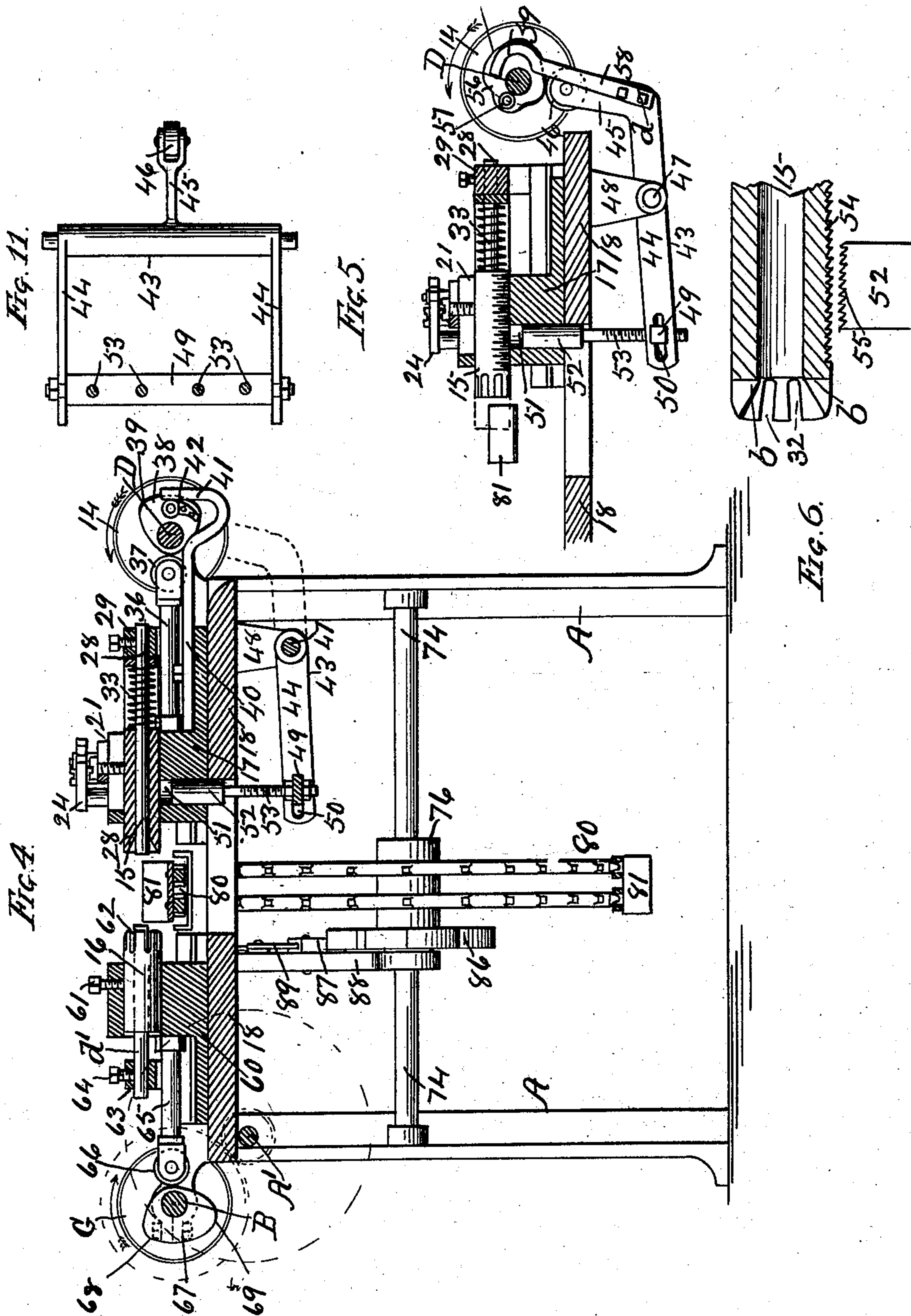
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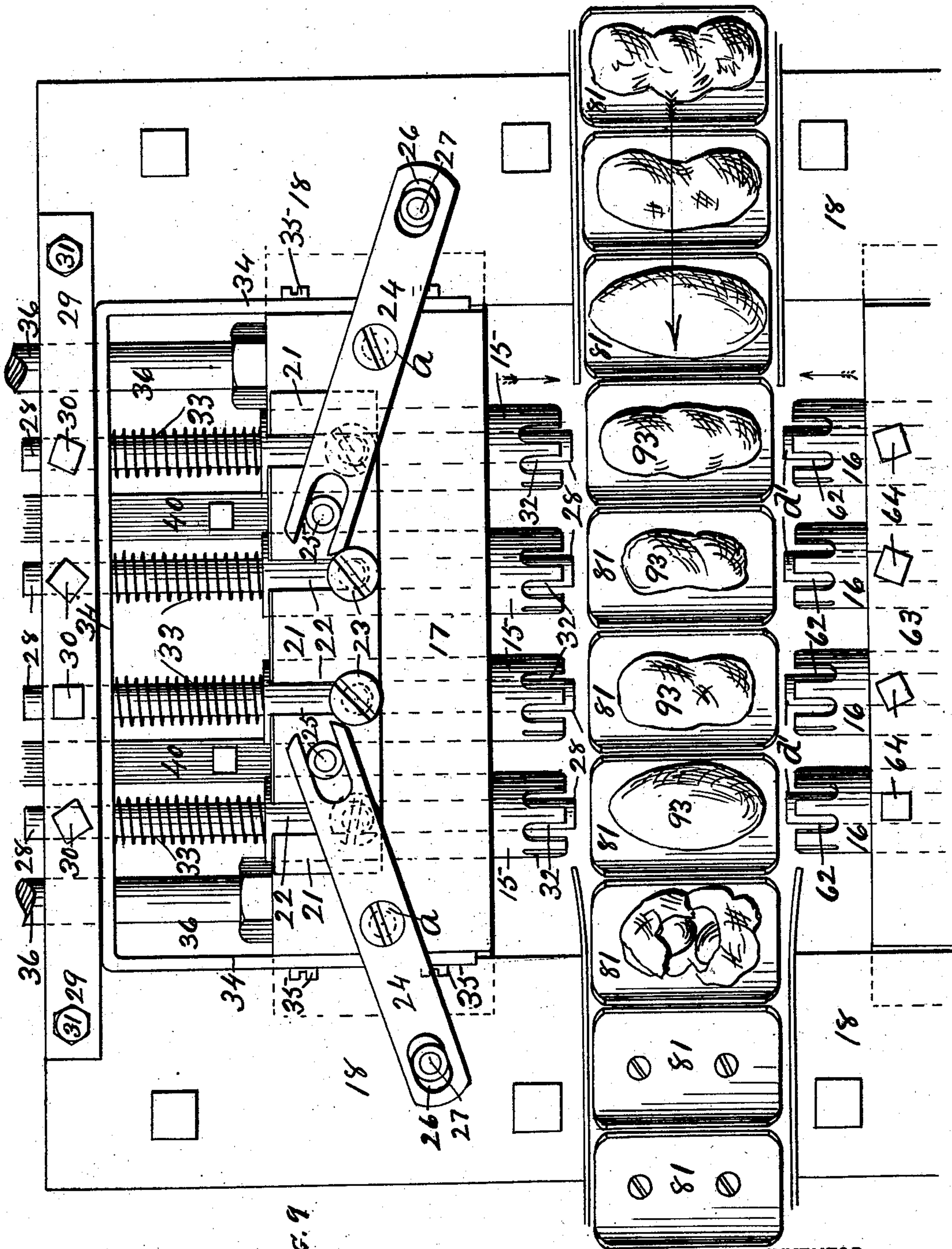
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Fig. 9

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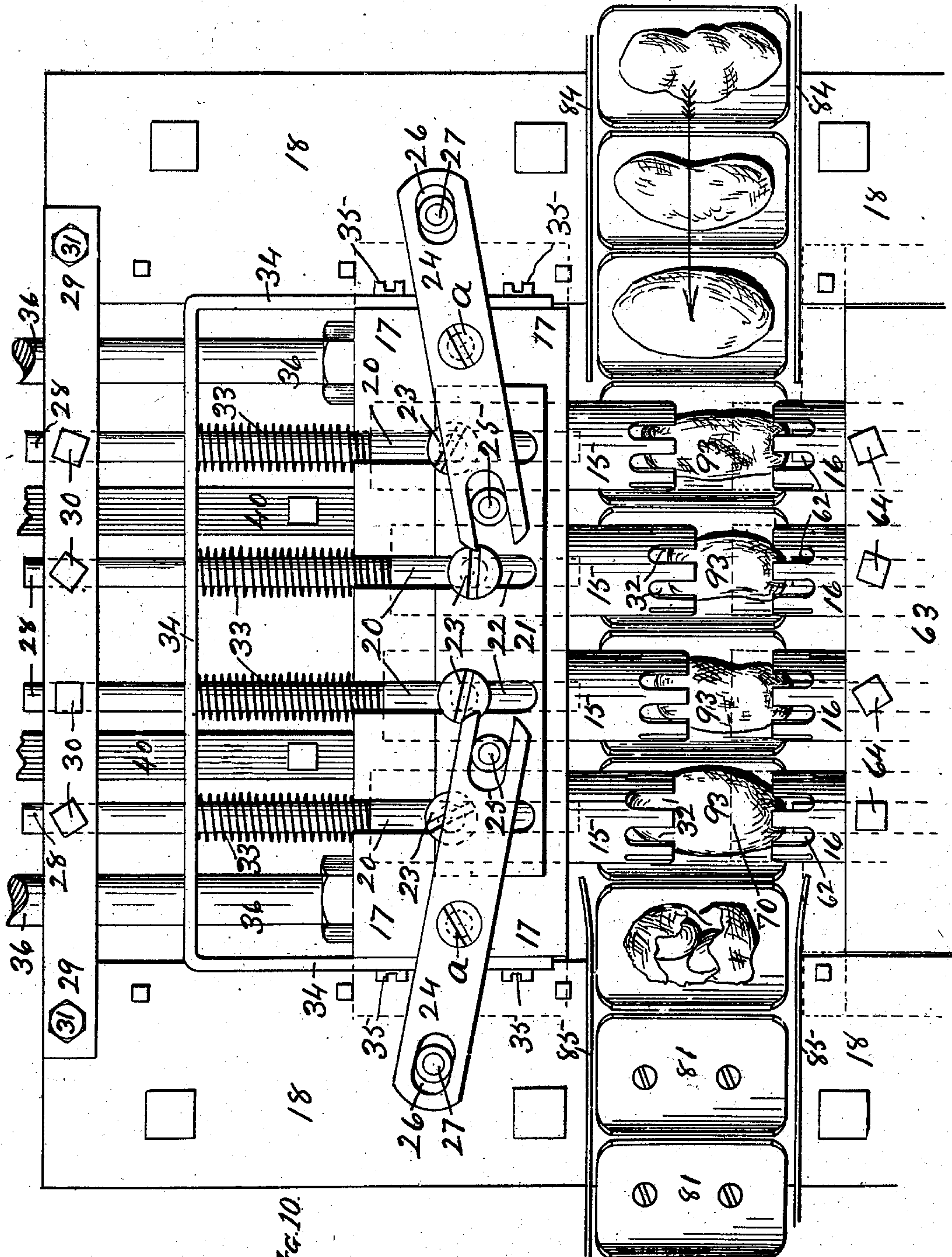
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6 Sheets—Sheet 6.



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Fig. 10.

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UNITED STATES PATENT OFFICE.

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NUT-CRACKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 702,721, dated June 17, 1902.

Application filed May 15, 1901. / Serial No. 60,333. (No model.)

To all whom it may concern:

Be it known that I, ANTON GERSTMAYR, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Nut-Cracking Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an automatic machine for cracking nuts, and has for its object to provide an arrangement of this character that will greatly facilitate the operation over that of the devices ordinarily used for this purpose.

In the drawings, Figure 1 is a top plan of a machine embodying the improved features. Fig. 2 is a side elevation with portions of the supporting-frame broken away. Fig. 3 is a transverse section on line 3, Fig. 2. Fig. 4 is a vertical section on line 4, Fig. 1, looking in the direction indicated by the arrow. Fig. 5 is a broken-away vertical section on line 5, Fig. 1. Fig. 6 is a detail of a locking device. Fig. 7 is a vertical section on line 7, Fig. 1. Fig. 8 is a vertical section on line 8, Fig. 1. Fig. 9 is a top plan showing a number of nuts in position for the forward movement of the cracking-heads, the motion-transmitting mechanism shown in Fig. 1 being omitted. Fig. 10 is a similar view showing the cracking or crushing heads engaging the nuts. Fig. 11 is a detached detail, and Fig. 12 is a detached side elevation, of a cam and roller for retracting one of the carriages.

A will represent the different parts of the main frame supporting the operating mechanism; A', the driving-shaft; B, a counter-shaft running parallel therewith; C, a second counter-shaft arranged at right angles thereto, and D a third counter-shaft mounted at right angles to the shaft C and located at the opposite side of the machine. These shafts are provided with suitable journal-bearings in the supporting-frame, and motion is transmitted from the driving-shaft by a pinion E, mounted thereon, engaging a gear-wheel F on counter-shaft B, which has a pinion G mounted on the opposite end thereof, which

engages a pinion 12, mounted on the adjacent end of counter-shaft C, which in turn carries a pinion 13 on its opposite end engaging a pinion 14 on the adjacent end of shaft D. By this means a simultaneous motion is communicated to the different shafts disposed along three sides of the machine and serves to actuate different parts of the working mechanism, as will be hereinafter set forth in detail.

A number of nut crushing or cracking heads are arranged in two groups or series opposite each other. These heads are duplicates, but are differently mounted and have different movements. In this machine four heads are shown in each series. The heads 15 on one side are what may be termed the "piston" or "anvil" heads, but will be referred to throughout the description as "piston-heads" in distinguishing from the companion series of crushing or hammer heads 16, which do not have an independent movement from their mountings. Any number of heads, more or less than that shown, may be used, in accordance with the capacity required in the machine.

The piston-heads 15 are hollow and are loosely mounted in a carriage 17 and have both a simultaneous and an independent movement with reference thereto—that is, supposing the carriage to have a back-and-forth travel of half an inch the reciprocating movement of the piston-heads in the same time will be approximately one inch, or double that of the space traversed by the supporting-carriage.

The carriage 17 rests loosely on a bed 18, having a border-frame 19, which rises above the level of the bed and in which the carriage is framed. This carriage is provided with vertical slots 20, Figs. 1, 4, 7, 9, and 10, which start in from the rear side, but stop just short of opening out through the front side. These slots are in line with the piston-heads and correspond in number thereto. A movement-plate 21, Figs. 1, 4, 5, 7, 9, and 10, is loosely mounted on the carriage 17 and is adapted to have an independent movement thereon. This plate is provided with slots 22, which correspond to slots 20 in the carriage and are in line therewith. Screws or

posts 23 are inserted down through slots 20 and 22 and are fixed in each of the piston-heads, as best shown in Fig. 7. The companion fulcrum-levers 24 are pivoted, as at *a*, to the respective ends of the carriage. The inner ends of these levers are forked and loosely embrace studs 25, fixed in the movement-plate 21. The outer ends of these levers are each provided with a slot 26, which loosely engages a post 27, fixed in the border-frame 19 of the carriage-bed 18. This provides for the proper leverage and change of position of the levers in actuating the plate 21.

An ejector-rod 28 extends longitudinally and loosely through each of the piston-heads. The outer ends of these rods are secured adjustably in a bridge 29 by means of set-screws 30. The bridge 29 is secured to the carriage-bed by bolts 31. When the piston-heads are in their normal position, the inner ends of the ejector-rods project a little, as shown in Figs. 1, 4, and 9. These rods are stationary and serve the purpose of ejecting any portion of the nuts that may stick in the heads as they travel back to their normal position. The piston-heads are cupped out on their inner ends, as at *b*, Fig. 6, to better engage the spherical surface of the object being crushed. These ends are also provided with a number of slots 32 to facilitate the dislodgment or escape of the pieces of shell. A spring 33 is coiled around the outer end of each ejector-rod. The inner ends of these springs bear against the adjacent ends of the piston-heads and the outer ends against the transverse bar of a rectangular frame 34, the right-angle ends of which are secured to the carriage by bolts 35. When the carriage and piston-heads are in their normal position, these springs are compressed between the frame 34 and the rear ends of the heads, and on the inward movement of the carriage the tension so stored up serves to force the piston-heads to the advanced position beyond the travel of the carriage, as shown in Fig. 10. The forward movement of the piston-heads is limited, and they are periodically locked against a back movement just as the nuts are being crushed. The locking means employed will be described later on. It will be observed in Fig. 10 that some of the piston-heads are farther advanced than others. This provides for nuts of different dimensions, and each head will stop independently of the others when the nuts are clamped between the two series, as the propelling-springs permit of the forward movement being arrested at any point, in accordance with the length of the object clamped. The piston-heads are retracted by the plate 21 and the companion fulcrum-levers 24, the bottom of slots 22 in the plate bearing against the screws or pins and forcing the return of the piston-heads to their normal position. The fulcrum-levers are actuated by the movement of the carriage 17.

The inner ends of companion rods 36, Figs. 1, 9, and 10, are secured to carriage 17. The

outer bifurcated ends are disengaged and have each a friction-roller 37 journaled therein, as best shown in Figs. 1 and 4. The companion cams 38 are mounted on the counter-shaft D. The high parts 39 of these cams are adapted once in each revolution to come in contact with friction-rollers 37 and impart an endwise movement to rods 36, and thereby transmit the required forward movement to carriage 17. The return movement of the carriage is accomplished through the medium of the companion bars 40, the inner ends of which are bolted to the carriage and the outer ends bent around and upwardly to form the hook ends 41, Fig. 4, with the inner side of which a lesser cam-piece 42, secured to the adjacent sides of the cams 38, is adapted to engage once in each revolution in retracting the carriage.

When the series of piston-heads have reached their forward clamping position, means is provided for locking or holding the same stationary against a back movement when the series of crushing-heads on the opposite side make their last forward movement in completing the operation of crushing the nuts. This means or mechanism will be next described.

A yoke 43, Figs. 2, 4, 5, and 11, consisting of the companion side bars 44 and the joining upturned stem end 45, is located under the carriage-bed, the stem end extending above the outer edge and having a friction-roller 46 journaled therein. The yoke is mounted on a pivot-rod 47, having its respective ends retained in lugs 48, projecting downwardly from the carriage-bed. The open ends of the yoke are connected by a transverse bar 49, the respective ends of which are loosely secured in the slots 50 to provide for a forward-and-back movement of the bar in unison with that of the reciprocating carriage 17. The carriage is provided vertically with apertures 51, Figs. 4 and 5, in line with the under side of the series of piston-heads.

A number of plungers 52 are inserted in the apertures 51, one for each of the piston-heads. These plungers are provided with stems 53, the lower ends of which are threaded and adjustably secured in the transverse bar 49, as best shown in Figs. 2, 4, 5, and 11. The under side of the piston-heads is provided with serrations 54 and the upper ends of the plungers with serrations 55. When these two serrated surfaces are made to engage, the piston-heads are prevented from having a backward movement under pressure from the series of crushing-heads. A cam 56 is mounted on shaft D, and when the high part thereof comes in contact with the friction-roller 46 it has the effect of depressing that end of the yoke and correspondingly elevating the opposite end carrying the plungers 52 and throwing the same into a locking engagement with the piston-heads. A roller 57 is journaled on one side of the cam 56. The lower end of a bar

58 is secured to the stem end of yoke 43, as at *d*. The upper part of this bar terminates in the hook or curved end 59 and is positioned adjacent to one side of cam 56 and in the path of the roller 57. At the proper time in each revolution of shaft D after cam 56 shall have passed out of contact with yoke-roller 46 the roller 57 is adapted to come in contact with the upper inner circumferential surfaces of the curved end of bar 58 with an upward pull and return the yoke to its normal position (shown in Figs. 4 and 5) and retracting the locking-plungers from their engaged position with the piston-heads.

The series of crushing-heads 16 are hollow and are mounted in a carriage 60, resting on the bed 18. These heads occupy a fixed working position with reference to their carriage and are longitudinally adjustable by means of set-screws 61. The crushing-heads are directly in line with the companion series of piston-heads. The contact ends of these heads are cupped like the piston-heads and provided with slots 62 for the escape of the fragments of shell.

The stationary ejector-rods *d'* are inserted through the crushing-heads and have their rear ends secured in a bridge 63 by means of adjusting set-screws 64. The inner ends of companion rods 65 are secured to carriage 60 and the outer disengaged ends provided with friction-rollers 66, as shown best in Fig. 1. The companion cams 67 are mounted on the driving-shaft B in line with the rods 65 and have a rolling contact with the rollers 66. The cams 67 are adapted to have two operative contacts in intermittingly advancing the carriage 60. The contour of these cams is shown in Fig. 4 and the direction of rotation indicated by the arrow. The high part 68 has the first moving contact and advances the carriage 60 and the crushing-heads to the position shown in Fig. 10. In this position there is a distinct pause in the forward movement of the carriage until the still higher part 69 of the cam comes into engagement and advances the carriage to the limit of its forward movement, which brings the ends of the crushing-heads to the line 70, Fig. 10, and the operation is completed. The means employed for returning this carriage to its normal position is similar to that used in retracting the companion carriage 17, carrying the series of piston-heads on the opposite side, and consists of a bar 71, the inner end of which is attached to carriage 60, Fig. 1, and a cam 72 and a roller 73, journaled in the periphery thereof, as shown in Fig. 1. The outer end of the bar 71 is turned upward in position to be engaged once in each revolution by the cam 72 and its roller and the carriage retracted.

The mechanism for automatically carrying or feeding the nuts to the crushers will next be described. The general arrangement for this purpose is somewhat similar to that of the ordinary endless elevator-belt and buckets.

The respective ends of a subshaft 74 are journaled in the machine-frame. A sprocket-wheel 75, provided with an elongated hub part 76, is rigidly mounted on this shaft. A companion sprocket-wheel 77 is mounted on a shaft 78, Fig. 2, journaled in companion standards 79, but one of which is shown. An endless sprocket-chain 80 is carried by these sprocket-wheels and passes over and under the machine. A portion of the path traveled by this chain lies between the companion series of crushing-heads. The nut-carriers 81 are mounted on the sprocket-chain and are open at both ends to allow the crushing-heads to enter at each end above the bottom thereof.

A suitable nut-holding receptacle (not shown) will be arranged in such relative position with reference to sprocket-wheel 77 that the nut-carriers running up over the same will pass through the body of nuts and load up. The carriers at the point of loading up are inclosed on each side by an inclined trough 82, adapted to receive the overflow and return the same to the nut-holding receptacle. The carriers are ordinarily intended to hold one nut each, but at times are liable to pick up two or more which may project past the respective ends of the carriers, the excess being dislodged by wings 83, forming a part of a guide-trough 84, which prevents a lateral play of the sprocket-chain and carries and retains the same in a straight path. The trough 85 serves the same purpose and will dress the broken particles inwardly on the carriers should they momentarily adhere to the crushing-heads as they recede from each other and lodge near the ends of the carriers.

The sprocket-chains and carriers are adapted to have a periodical movement in bringing the nuts into position to be operated upon by the crushers. In this instance means are provided for periodically moving the feed mechanism a distance equal to the space occupied by four of the carriers and corresponding to the number of crushing-heads in each series and four nuts cracked at each operation. This may of course be varied in a greater or less degree, in accordance with the required capacity of the machine.

A ratchet-wheel 86 is rigidly mounted on the elongated hub 76. One end of a pawl 87 is pivoted to a movement tripping-lever 88, as at *g*, the opposite loose end engaging the ratchet-wheel 86, Figs. 1, 2, and 4. The pawl 87 is held in its engaged position by a spring 89, indicated by dotted lines in Fig. 2. The lower end of the tripping-lever 88 is loosely mounted on subshaft 74, the upper loose end of which rests against the adjacent edge of the machine-frame in the normal position shown in Fig. 2. A crank-arm 90, Fig. 1, is mounted on shaft C and rotates therewith. This crank-arm has a roller 91 journaled in the outer end thereof, which once in each revolution comes in contact with the upper

loose end of the tripping-lever 88 and depresses the same to a certain point and has the effect of rotating the driving sprocket-wheel and moves the sprocket-chain and nut-carriers a certain distance at predetermined intervals. When the roller 91 passes out of contact, the tripping-lever is returned to its normal position by a spring 92, ready for the next contact of the crank-arm and its roller.

10 The movements of the different parts are so arranged and timed with reference to each other that the operation of cracking nuts is performed with facility. As shown in Fig. 9, the loaded carriers have just moved into
15 position to bring the nuts 93 between the crushing-heads. The carriers are now at rest, and the crushing-heads begin their forward movement. The companion series have a simultaneous forward movement for a part
20 of the time. The piston-head series move up to the nut-engaging position shown in Fig. 10, which is the limit of their forward movement. At the same time the companion heads move forward to the position shown in the same
25 figure and come to rest momentarily and then receive a second forward impulse and crush the nuts. The companion series of heads are then returned to their normal position to clear the carriers, which are again
30 moved the required distance to again bring a certain number of nuts into position to be operated upon, and so on continuously.

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

1. In a machine of the class described, the combination with a number of piston-heads, of a carriage in which said heads are loosely mounted, means for imparting a forward-and-back movement to said carriage, and means
40 for reciprocating said piston-heads independently of the movement of the supporting-carriage, substantially as described.

2. In a machine of the class described, the
45 combination with a supporting-bed, of a carriage having a forward-and-back movement thereon, the piston-heads loosely mounted in said carriage and adapted to have both a movement with said carriage and a movement independent thereof, means for actuating the
50 carriage, and means for reciprocating the piston-heads, substantially as described.

3. In a machine of the class described, the combination with a carriage provided with
55 vertical slots and having a forward-and-back movement, of a number of piston-heads loosely mounted therein, a movement-plate mounted on said carriage, the companion fulcrum-levers, and the operative connection between
60 the piston-heads, the movement-plate and said fulcrum-levers, substantially as described.

4. In a machine of the class described, the combination with a supporting-bed, of a traveling carriage provided with vertical slots,
65 of a movement-plate, slotted in line with said vertical slots, the series of piston-heads,

the screws or posts, inserted down through the slots in the carriage and movement-plate and fixed in the piston-heads, the fulcrum-
70 levers pivoted at their longitudinal center to said carriage, the operative connection between said movement-plate and fulcrum-levers, whereby said piston-heads are retracted, and means for imparting a forward move-
75 ment thereto, substantially as described.

5. In a machine of the class described, the combination with a supporting-bed, of a traveling carriage provided with vertical slots
80 and seated on said bed, a movement-plate correspondingly slotted and loosely mounted on the traveling carriage and having an independent movement thereon, a number of piston-heads having a reciprocating movement in said carriage, the screws or posts in-
85 serted down through said slotted parts and fixed in the piston-heads, the companion fulcrum-levers pivoted at their outer ends to said carriage and the inner ends loosely en-
90 gaging the movement-plate, means for advancing the piston-heads on their forward movement, and the operative connection for actuating the fulcrum-levers in returning
95 said heads to their normal position, substantially as described.

6. In a machine of the class described, the combination with a traveling carriage, of the companion rods having their inner ends se-
100 cured thereto and friction-rollers journaled in the outer ends thereof, a counter-shaft D, the companion cams mounted thereon and adapted once in each revolution, to engage said rollers and impart a forward movement to said
105 carriage, and means for returning the same to its normal position when said cams have passed out of contact, substantially as described.

7. In a machine of the class described, the combination with a traveling carriage, of a
110 number of piston-heads, adapted to have a reciprocating endwise movement therein, the locking-plungers inserted from the under side of said carriage in line with each of the piston-heads, and means for periodically throw-
115 ing said plungers into and out of engagement with said heads, substantially as described.

8. In a machine of the class described, the combination with a traveling carriage pro-
120 vided with apertures starting in from the under side, a number of piston-heads loosely mounted in said carriage, the locking-plungers inserted in said apertures, a yoke, a transverse bar having its respective ends loosely inserted in the open ends of said yoke and in
125 which the lower stem ends of said plungers are secured, and means for rocking said yoke in throwing said plungers into and out of engagement with reference to said piston-heads, substantially as described.

9. In a machine of the class described, the
130 combination with a yoke, comprising companion side bars, provided with slots in their open ends, and an upturned stem end, a transverse bar, having its respective ends loosely

inserted in said slots, a plurality of vertically-moving plungers, having their lower ends secured in said transverse bar, the series of piston-heads, with which said plungers are adapted to periodically engage and lock the same against an endwise movement, and means for imparting a rocking movement to said yoke, substantially as described.

10. In a machine of the class described, the combination with the piston-heads, the plurality of locking-plungers, the tilting yoke, the yoke-actuating cam, the shaft on which said cam is mounted, and means for returning said yoke to its normal position when the actuating-cam rolls out of contact, substantially as described.

11. In a machine of the class described, the combination with a carriage having a forward-and-back movement, of a number of crushing-heads adjustably mounted therein, the companion rods having their inner ends secured to said carriage and provided with friction-rollers in the outer disengaged ends, the companion cams having two contacts with said rollers in each revolution and imparting two distinct forward movements to said carriage with a pause between said movements, and means for returning the carriage to its normal position, substantially as described.

12. In a machine of the class described, the combination with a supporting-bed, of a trav-

eling carriage mounted thereon, the crushing-heads, inserted in said carriage and in line with the piston-heads opposite thereto, the companion cams, the operative connection between said carriage and cams, whereby said cams are adapted to have two advancing contacts with said carriage in each revolution, the cam-shaft, and means for returning said carriage to its normal position, substantially as described.

13. In a machine of the class described, the combination with a supporting-bed, of the companion carriages located thereon and having a reciprocating movement toward and away from each other, a number of piston-heads loosely mounted in one of said carriages, means for temporarily locking the piston-heads against a back movement when the limit of their forward movement is reached, a number of crushing-heads rigidly mounted in the companion carriage, means for advancing said companion carriage to its forward position step by step, and means for returning the carriages to their normal position, substantially as described.

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

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