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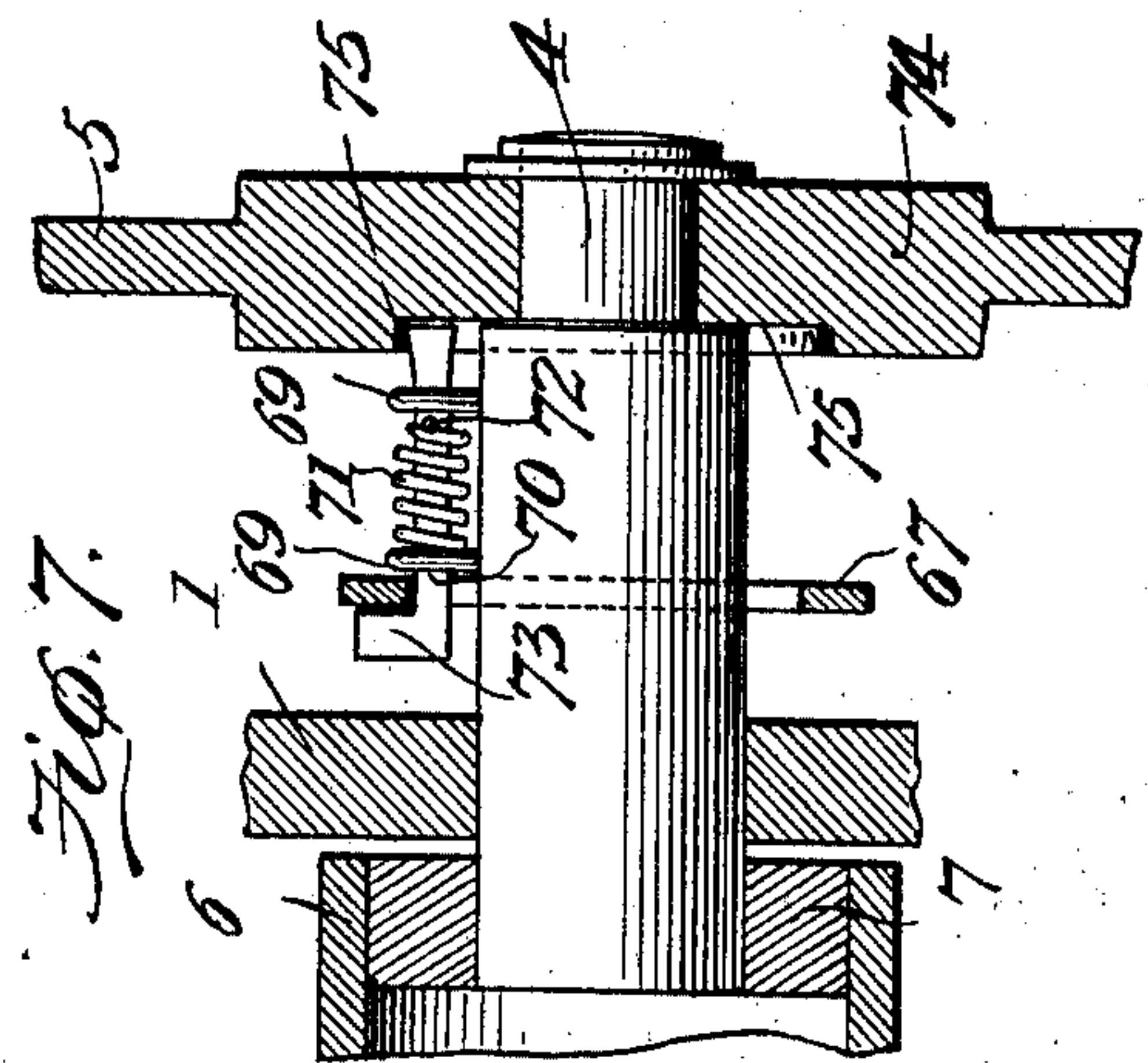
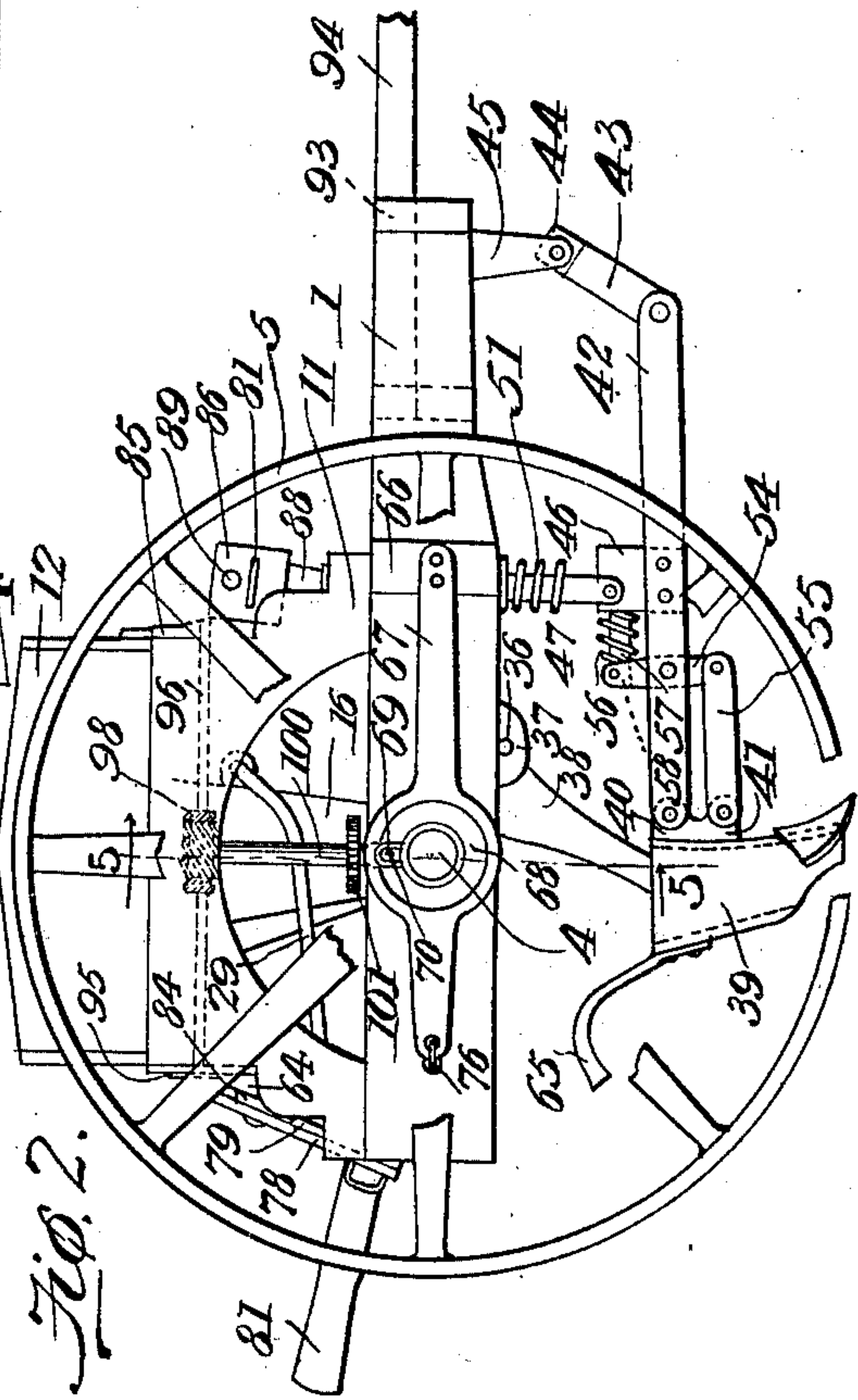
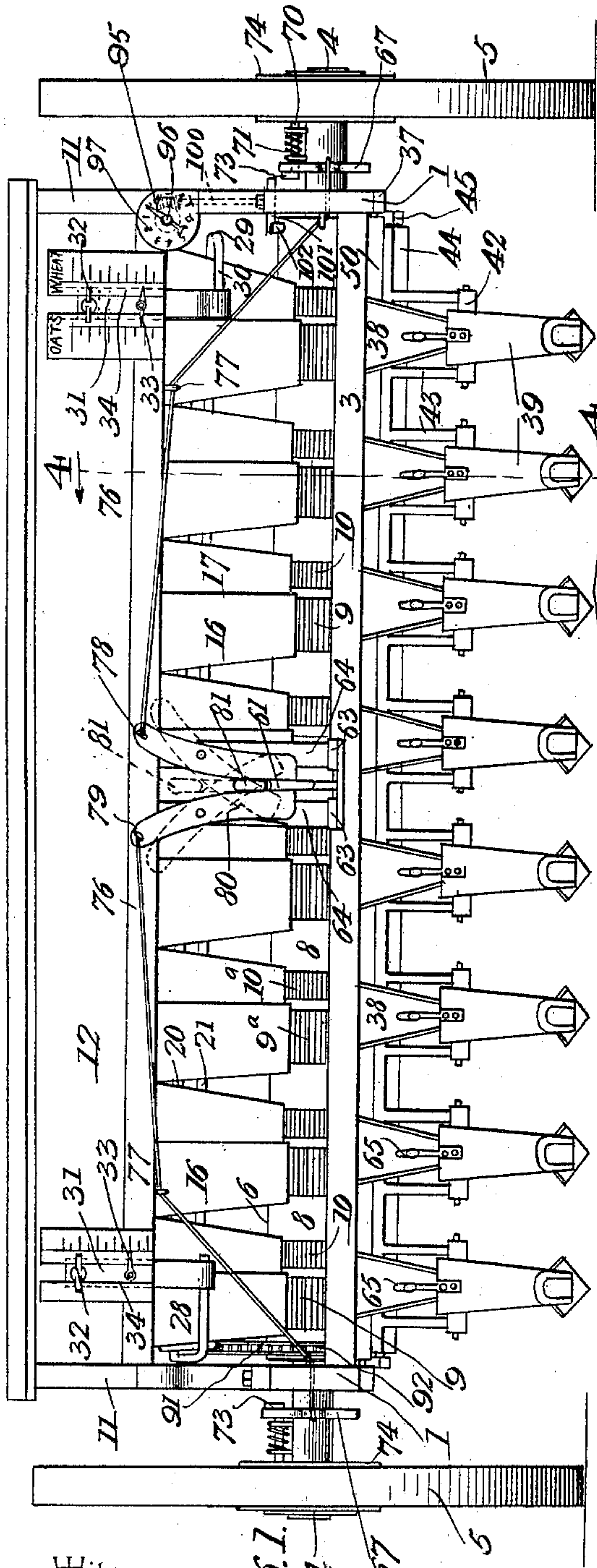
PATENTED APR. 5, 1904.

E. C. BAIN.  
GRAIN DRILL.

APPLICATION FILED SEPT. 9, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



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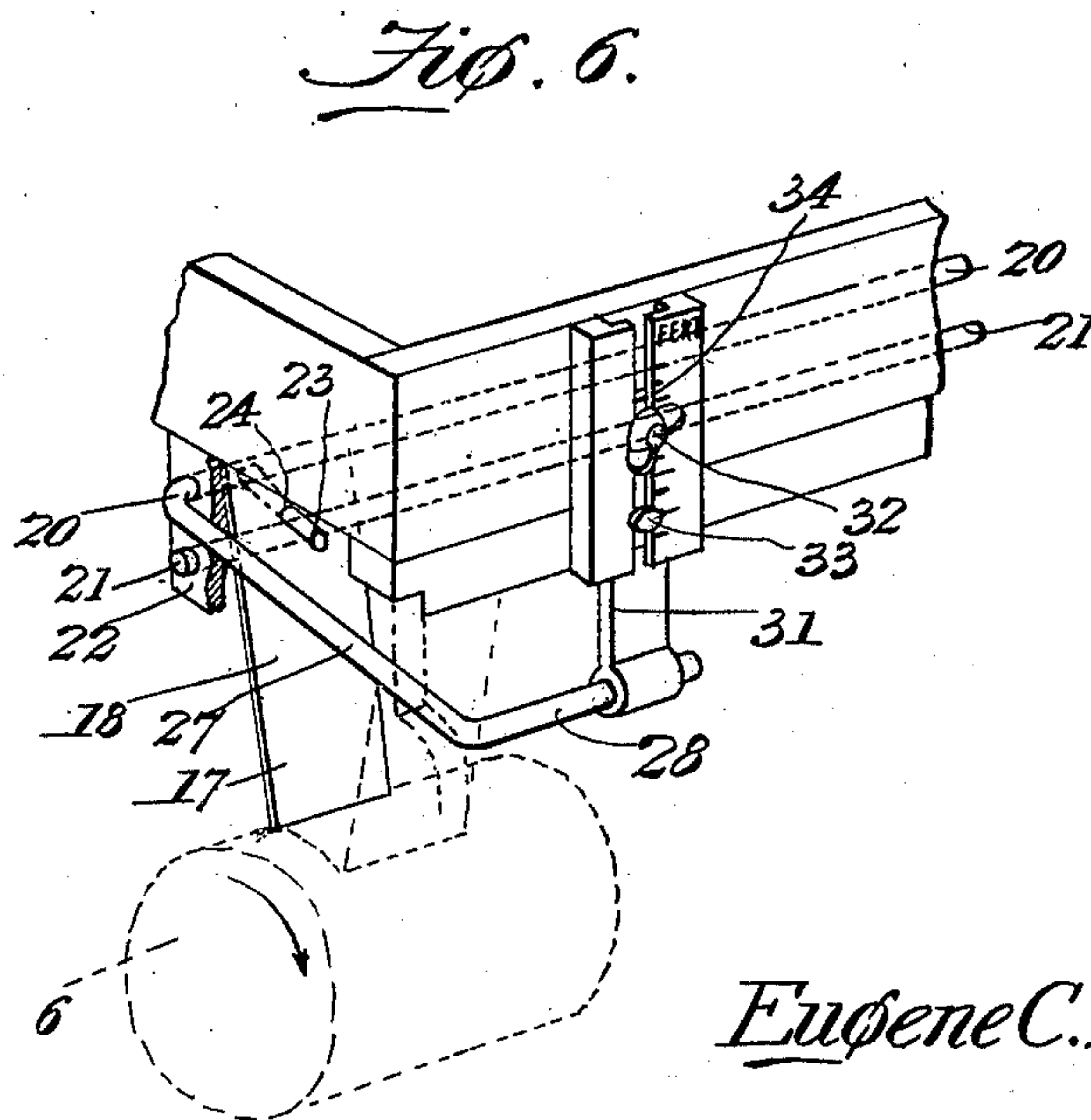
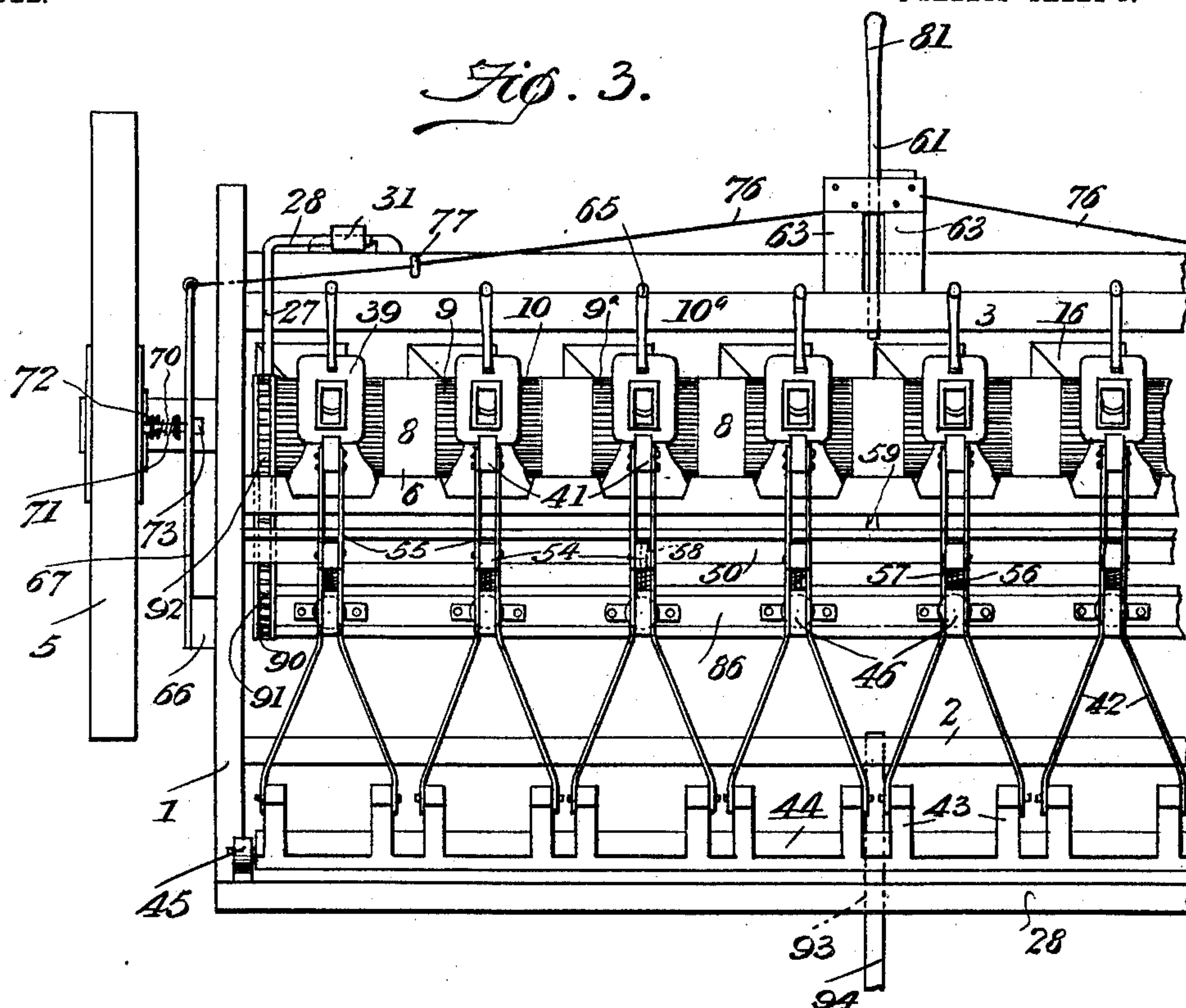
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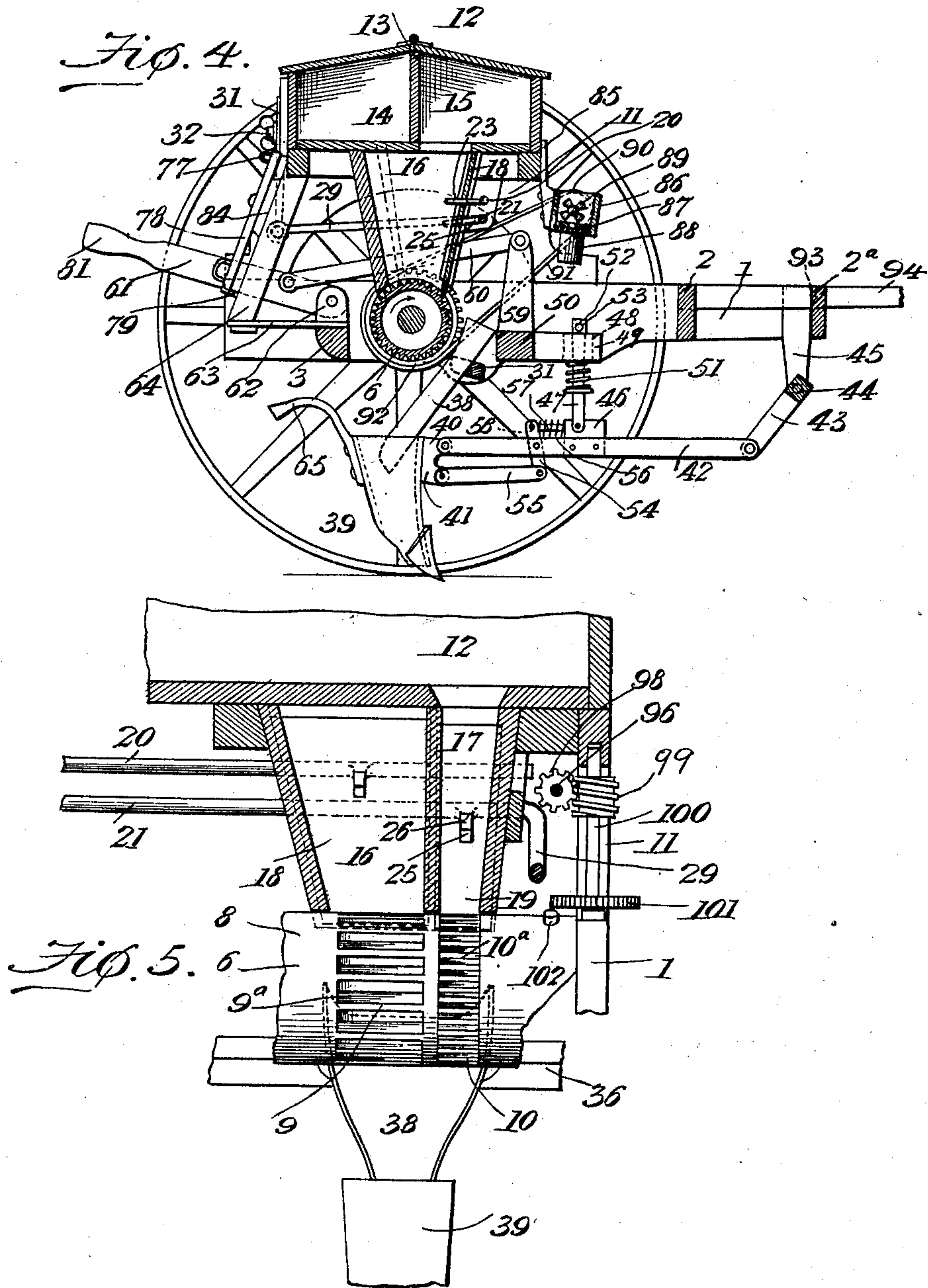
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# UNITED STATES PATENT OFFICE.

EUGENE CANGTON BAIN, OF EAST RADFORD, VIRGINIA, ASSIGNOR OF  
ONE-FIFTH TO WM. J. WALL, OF CHRISTIANBURG, VIRGINIA.

## GRAIN-DRILL.

SPECIFICATION forming part of Letters Patent No. 756,315, dated April 5, 1904.

Application filed September 9, 1903. Serial No. 172,522. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE CANGTON BAIN, a citizen of the United States, residing at East Radford, in the county of Montgomery and State of Virginia, have invented a new and useful Grain-Drill, of which the following is a specification.

This invention relates to grain-drills; and it has for its object to provide a device of this class which shall possess superior advantages in point of simplicity, durability, and general efficiency.

Further objects of my invention are to provide for the simultaneous distribution of seed and fertilizing material in a simple and convenient manner, to regulate the amount of the discharge of each, and to provide improved means consisting of clutches and other devices simultaneously operated by the manipulation of a single lever whereby the feeding mechanism may be thrown into and out of gear and the drill-shoes be simultaneously lowered or raised from the ground, as the case may be.

With these and other objects in view my invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a rear elevation of a grain-drill constructed in accordance with the principles of my invention. Fig. 2 is a side elevation with parts of the spokes of the rear wheel removed. Fig. 3 is a bottom plan view of a part of the machine. Fig. 4 is a vertical sectional view taken on the line 4 4 in Fig. 1. Fig. 5 is a transverse sectional view taken through a portion of the machine on the plane indicated by the line 5 5 in Fig. 2. Fig. 6 is a perspective detail view illustrating the means for operating the gage-slides of the hoppers. Fig. 7 is a transverse sectional detail view taken vertically through one of the ends of the axle and illustrating the clutch mechanism by means of which the adjacent wheel may be locked upon the axle.

Corresponding parts in the several figures are indicated by similar numerals of reference.

In the construction of my improved grain-drill I provide a suitable frame, the side pieces of which, 1 1, are connected at the front by a pair of cross-pieces 2 2<sup>a</sup> and at the rear edge by a cross-piece 3, all of which are of suitable length to provide for a machine of the desired dimensions.

The sides of the machine afford bearings for a shaft or axle 4, upon the projecting ends or spindles of which transporting and operating wheels 5 are loosely mounted. Said shaft carries between the side pieces a drum or cylinder 6, which may be integral with the axle, if desired, but which is usually for the sake of lightness made hollow or tubular, as shown in the drawings, and connected with the axle by means of suitable heads 7. This cylinder or drum is divided into a number of sections equal to the number of drills which it is designed to employ and of which eight have been shown in the accompanying drawings, although I desire it to be understood that a greater or a lesser number may be employed within the scope of my invention. These sections are separated by interspaces, (designated 8.) Each of the sections of the cylinder is subdivided into two annular subsections, (designated, respectively, 9 and 10,) the subsections 9 being the longer of the two. The subsections 9 and 10 are provided with longitudinal grooves or recesses, (designated 9<sup>a</sup> and 10<sup>a</sup>,) the said recesses forming cups for the purpose of feeding or conveying, respectively, fertilizing material and seed to the seed-tubes of the drills, as will be presently more fully described.

The sides of the frame are made to support brackets 11, which in turn support the hopper 12, which is divided longitudinally by a partition 13 into two compartments 14 and 15, adapted to contain, respectively, the fertilizing material and the seed that is to be planted. Extending downwardly from and connected with openings in the bottoms of the respective compartments are conveyers 16 and 17, the lower ends of which are fitted to the curvature of the drum-cylinder 6 and communicating, respectively, with the subsections 9 and 10 of said drums. Conveyers



16 and 17 are obviously provided for each pair of subsections 9 and 10 of the drum, thus admitting of the passage of fertilizing material and seed to the cups formed by the recesses or indentations in the drum. To provide for the regulation of the feed the conveyer-tubes 16 and 17 are provided with cut-offs or slides 18 and 19.

20 and 21 designate rock-shafts which are journaled in front of the conveyers in brackets 22, (see Fig. 6,) which are suitably connected with the frame of the machine. The shaft 20 has a plurality of arms 23 engaging slots 24 in the slides 18. Arms 25, similarly extending from the shaft 21, engage slots 26 in the slides 19. It will thus be obvious that when the shaft 20 is rocked the slides 18 of all the conveyers 16 will be raised or lowered, according to the direction in which the said shaft is rocked, while similarly the rocking of the shaft 21 will effect the adjustment of the slides 19, which are mounted to regulate the escape of the contents of the conveyer-tubes 17. The shaft 20 is provided at one end with a crank 27, having a laterally-extending handle 28. The shaft 21 is provided at the opposite end of the machine with a crank 29, having a laterally-extending handle 30. (See Fig. 1.) The handles 28 and 30 are pivotally connected with slides, as 31, mounted in suitable guideways upon the rear side of the hopper-box, said slides being capable of being held at various adjustments by means of set-screws 32. Each of said slides is provided with a pointer 33, and the guideways 34, in which said slides are mounted, are provided with gages or indicators showing the quantity of fertilizing material and seed which will be allowed to escape during the passage of the machine over a given area and which may be readily determined by simple tests.

36 designates a rock-shaft which is mounted in brackets 37, depending from the side pieces of the frame a short distance in front of the axle, and said rock-shaft carries a plurality of scoops or conductors 38, adapted to receive the seed and fertilizing material discharged by the cups or recesses in the drum, the upper ends of the said scoops being sufficiently wide to receive the grain and fertilizing material discharged from a pair of conveyers 16 and 17, while the lower ends of said scoops are contracted, so that the seed and fertilizing material will be delivered therefrom into the drill-tubes 39, which are supported underneath. Each of said drill-tubes is to be provided in the customary manner with a furrow-opener at its lower end, and each drill-tube is furthermore provided upon its front side near its upper end with a pair of lugs 40 and 41. The upper lugs 40 are pivotally connected with beams or supporting-bars 42, which diverge forwardly and the front ends of which are connected pivotally

with arms or brackets 43, depending from a rock-shaft 44 at the front end of the machine, where said rock-shaft is mounted in brackets 45, depending from the front corners of the frame. The pairs of bars or beams 42 are spaced by blocks 46, with the upper ends of which are pivotally connected bifurcated links 47, the upper ends of which extend through slots 48 in arms 49, that extend forwardly from a rock-shaft 50, the ends of which are journaled in the sides of the frame of the machine. Springs 51, coiled upon the links 47, bear against the under sides of the arms 49, thereby normally pressing the blocks 46 and the bars 42, connected by said blocks, in a downward direction, while the said links 47 are free to yield in an upward direction through the slots 48, in which they are retained by means of pins 52, inserted through transverse openings 53. Pivotally mounted between the pairs of bars 42 are levers 54, the lower ends of which are connected by means of links 55 with the lugs 41 upon the rear sides of the drill-tubes. The upper ends of the levers 54 are pressed by springs 56, coiled upon rods 57, which extend rearwardly from the blocks 46 and through openings 58 in said levers 54. It will be seen that by the pressure exercised by said springs the lower ends of the drill-tubes will be forced in a forward direction in the proper position to engage the ground. Should obstacles be encountered, the drill-tubes will yield against the pressure of the springs 56, and breakage of the supports will thus be avoided.

The rock-shaft 50, the arms or brackets 49 of which are connected by the links 47 with the blocks 46, is for the purpose of raising or lowering the drill-tubes, and said rock-shaft for this purpose is provided with an arm or crank 59, which is connected by means of a link-rod 60 with a lever 61, fulcrumed between a pair of ears or brackets 62, rising from the rear cross-piece 3 of the machine. Said cross-piece is also provided with rearwardly-extending brackets 63, the outer ends of which are connected with the hopper-box 12 by means of inclined braces or supports 64. It will be observed that by moving the rear end of the lever 61 downwardly the rock-shaft 50 will be actuated to elevate the drill-tubes from the ground, while by an upward movement of said lever the drill-tubes will be lowered into the ground, with which they are held in engagement by the pressure exercised by the springs 51. The said drill-tubes are provided at their front sides with upwardly and rearwardly extending handles 65, by means of which they may be individually manipulated to raise them from the ground in case this should be necessary in order to avoid stumps or similar obstructions, this operation being performed by the operator who walks behind the machine.



The sides of the frame of the machine are provided with laterally-extending brackets 66, to which are suitably secured rearwardly-extending resilient plates 67, provided with openings 68, which encircle the ends of the axle. Each end of the latter is provided with perforated ears or lugs 69, affording bearings for a pin 70, which is actuated in an outward direction by means of a spring 71, coiled upon said pin between the inner lug 69 and a cross-pin 72. The pin 70 at each end of the axle has a head 73, which bears against the inner side of the resilient plate 67. The inner side of the hub 74 of each wheel is provided with a plurality of recesses 75, adapted to be engaged by the point of the adjacent pin 70. It will be seen that when the free ends of the resilient plates 67 are moved in an inward direction the pins 72 will be moved inwardly and out of contact with the recesses 75 in the hubs 74 of the wheels, which latter are thus permitted to revolve loosely upon the axle. When, on the other hand, the free ends of the plates 67 are permitted to spring in an outward direction, the action of the springs 71 upon the pins 70 will force the latter outwardly into engagement with the recesses 75 and the hubs of the wheels, which latter, being thus connected with the axle, will cause the latter and the drum 6 connected therewith to rotate. The springs or resilient plates 67 are actuated simultaneously by means of cords or other flexible connections 76, suitably connected with their free ends and extending through guides 77 to the upper ends of levers 78 and 79, which are fulcrumed upon the inclined braces 64, extending from the front ends of the brackets 63 in an upward direction to assist in supporting the hopper 12. The fulcrum of said levers are near their upper ends, and the inner edges of said levers are curved downwardly and inwardly, as shown, until they are practically in contact with each other, the lever 78 being provided near its lower end with a notch 80, adapted to receive the operating-lever 61, and also with a handle 81, by means of which it may be manipulated when necessary. When the lever 61 engages the notch 80, the levers 78 and 79 are held separated at their lower ends, and consequently a strain is exercised through the flexible connections 76 upon the free ends of the resilient plates 67, whereby the pins 70 are held out of engagement with the recesses in the hubs of the wheels. In order to start the machine in operation, it is only necessary to manipulate the lever 78 by its handle 81 in such a manner as to permit the free end or handle of the lever 61 to be elevated, thus permitting the upper ends of the levers 78 and 79 to be sprung apart by the action of the springs or resilient plates 67, which at the same time permit the pins 70 to pass into engagement with the wheel-hubs. By the same

operation of the lever 61 the link-rod 60 will actuate the rock-shaft 50 so as to set the drill-tubes into the ground, and thus to start the machine in operation. It will be observed that the lever 78 is mounted upon a block 84, whereby it is spaced slightly in advance of its mate 79, thereby permitting the said levers 78 and 79 to cross each other scissors-like when the lever 61 is raised. When it is desired to stop the operation of the machine, this may be instantly accomplished by simply lowering the lever 61 until it engages the notch 80 at the lower end of the lever 78.

Brackets 85 upon the front side of the box or hopper 12 support an auxiliary hopper 86, which extends the entire width of the machine and in the bottom of which is disposed a slide 87, having series of perforations of varying sizes, which said perforations by properly adjusting the said slide may be put in alinement with tubes 88, extending downwardly from the box 86. The ends of the latter are provided with bearings for a longitudinally-corrugated shaft or roller 89, one end of which carries a sprocket-wheel 90, from which a chain 91 passes over a sprocket-gear 92 upon one end of the drum 6, which is mounted upon the axle, or the said sprocket-wheel may be secured directly upon the axle, if preferred. This device, comprising the box 86 and the longitudinally-corrugated revoluble shaft 89, constitutes an auxiliary seeding device which may be used for scattering seed broadcast.

The front cross-bars 2 and 2<sup>a</sup> of the frame are provided with notches or recesses 93 for the reception of the tongue 94, to which the draft is attached in the usual manner.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of this machine will be readily understood by those skilled in the art to which it appertains. The general construction of the device is simple and of such a nature that the complete machine may be produced at a moderate expense.

The superstructure of the machine, consisting of the hopper, the conveyers, and the supporting-brackets, together with such minor parts as are operatively connected therewith, may be removed by simply removing the bolts which at the corners connect the supporting-brackets with the frame of the machine, and the latter may then be used as a harrow for cultivating purposes, the blades of the drill-tubes forming the harrow-teeth.

I also provide my machine with an indicator comprising a hand 95, mounted upon the end of a shaft 96 and movable over a dial 97. The shaft 96 carries at its rear end a gear-wheel 98, meshing with a worm 99 upon the upper end of a shaft 100, having at its lower end a tappet-wheel 101, which is operatively engaged by a tappet 102, extending from the drum 6. This indicating device will be geared





hand-lever and a handle whereby it may be manipulated to disengage said notch, and flexible connections between the upper ends of said levers and the spring-plates governing the clutch mechanism, whereby said spring-plates shall be held under tension when the lower ends of the pair of levers are separated by the interposition of the hand-lever.

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

EUGENE CANGTON BAIN.

Witnesses:

GEO. W. WILSON,  
J. YOST RAGAN.