No. 721,461. PATENTED FEB. 24, 1903.

C. J. POLLOCK.

MOTOR.

APPLICATION FILED SEPT. 20, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

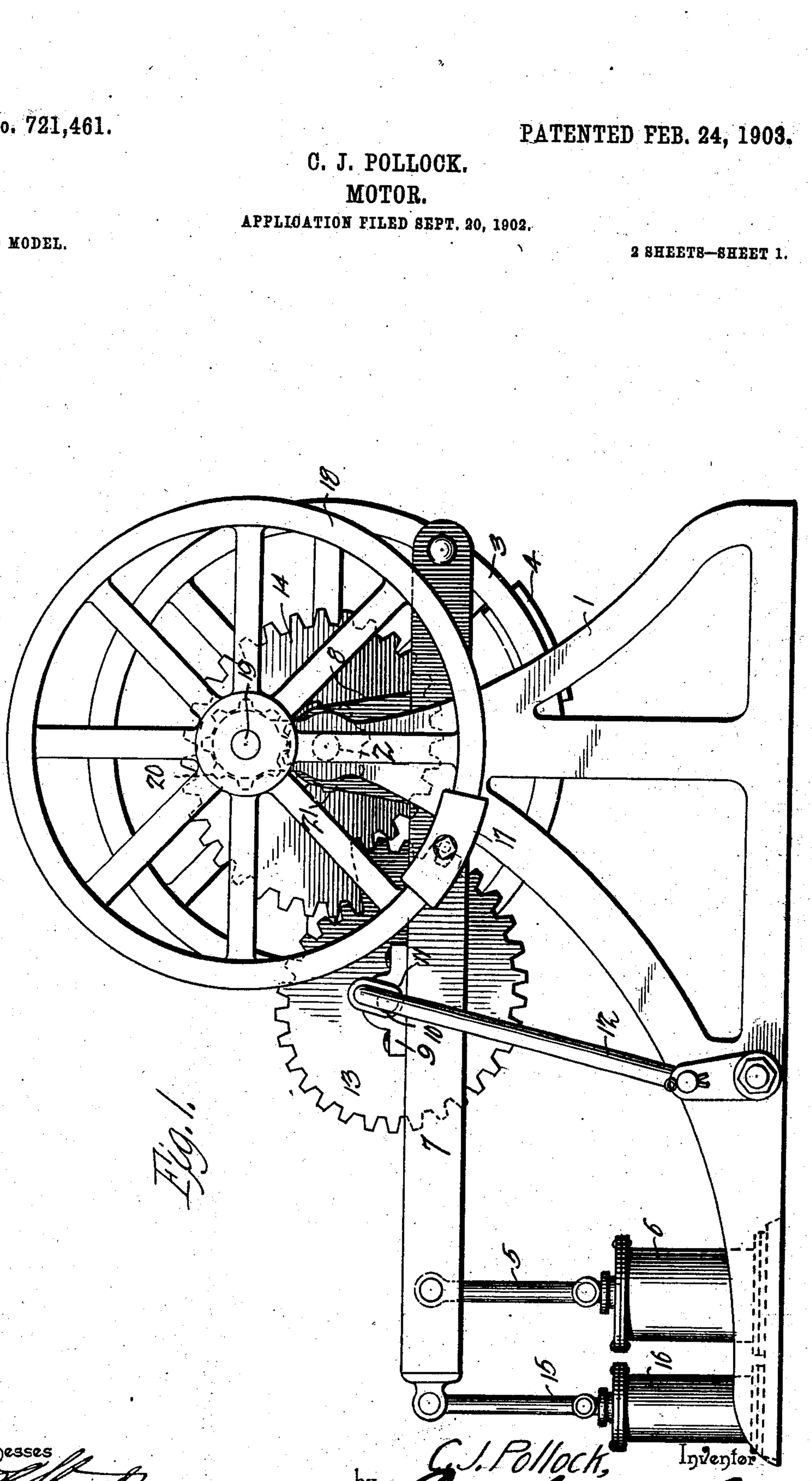

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

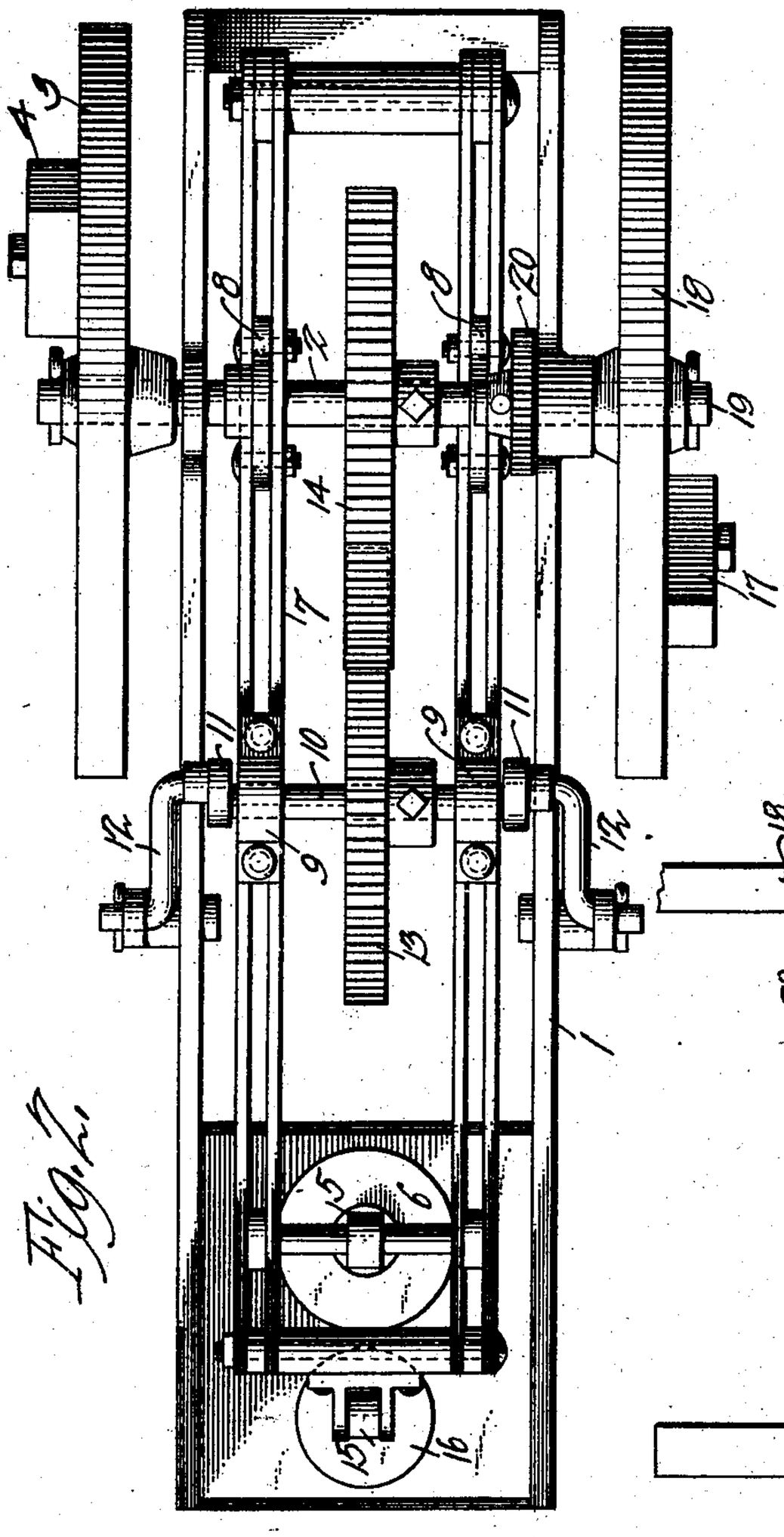

Fig. 2.

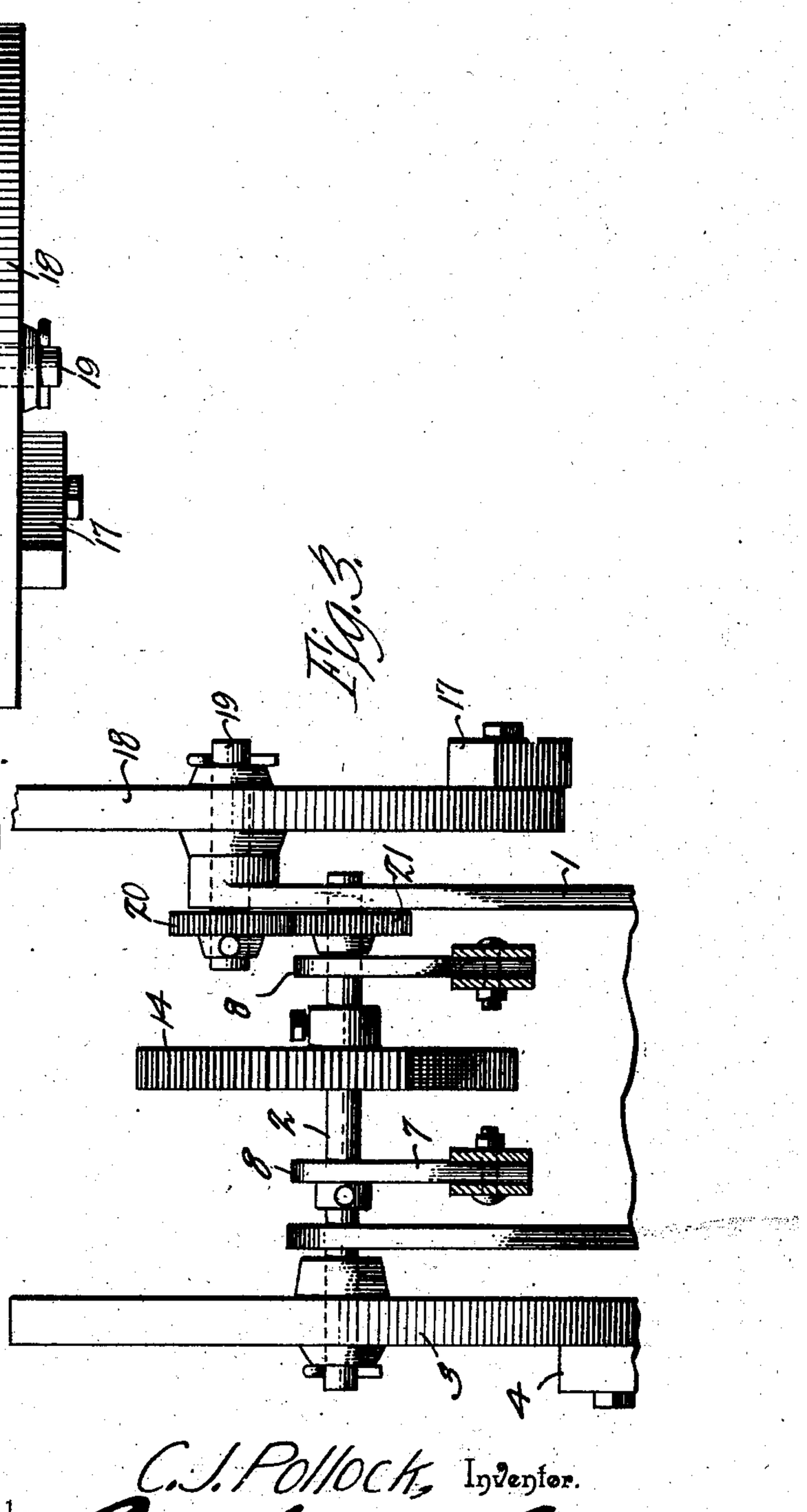

Fig. 3.

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UNITED STATES PATENT OFFICE.

CALVIN JAY POLLOCK, OF KIRKSVILLE, MISSOURI.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 721,461, dated February 24, 1903.

Application filed September 20, 1902. Serial No. 124,230. (No model.)

To all whom it may concern:

Be it known that I, CALVIN JAY POLLOCK, a citizen of the United States, residing at Kirksville, in the county of Adair and State of Missouri, have invented a new and useful Motor, of which the following is a specification.

The invention relates to improvements in motors.

The object of the present invention is to improve the construction of motors, more especially that shown and described in Patent No. 675,497, granted to me June 4, 1901, and to provide a simple and comparatively inexpensive motor designed especially for operating air-compressors and provided with a rotary weight adapted to be raised on the ineffective stroke of the air-compressor and to fall or move downward on the effective stroke, whereby the power will be applied most effectively and advantageously to the resistance encountered.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a side elevation of a motor constructed in accordance with this invention. Fig. 2 is a plan view of the same. Fig. 3 is a transverse sectional view.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates a supporting-frame, constructed of any suitable material and of any desired size and configuration and composed of two sides and suitable connecting cross-pieces and provided at opposite sides with suitable bearings for the reception of a transverse shaft 2. The shaft 2 carries at one end a rotary element, preferably consisting of a wheel 3, provided with a weight 4, arranged at the periphery of the wheel or at any other suitable point and adapted, as hereinafter explained, to be raised on the ineffective stroke of a piston 5 and an air-compressor 6 and to fall or move downward on the effective stroke of the same, whereby a great power is effectively applied to an air-compressor or other device on the working or effective stroke of the same. Although the motor is shown applied to an air-compressor, yet it will be readily understood that it is applicable to various other machines and devices. The transverse shaft 2 also forms a pivot or fulcrum for an oscillatory frame or lever 7, which although arranged horizontally in the drawings may operate in any other desired position, and it is approximately oblong, as clearly shown in Fig. 2, and is provided at opposite sides near one end with a pair of upwardly-extending hangers 8, which are provided with suitable perforations or bearing-openings for the shaft 2, and in practice any desired form of bearings or antifriction devices may be employed. The oblong frame or lever may be constructed as shown in the accompanying drawings or in any other desired manner, and the sides may consist of bars arranged in pairs and spaced apart to receive the hangers and also to receive bearings or journal-boxes 9 for a crank-shaft 10. The bearings or journal-boxes may be of any desired construction, and the shaft 10 is provided at its ends with cranks 11, which are connected by links 12 with the base of the frame or with any other stationary support. The links 12, which consist of rods or bars, are adapted to oscillate longitudinally of the main or supporting frame, and they cause the frame or lever 7 to oscillate when the crank-shaft is rotated. The lower ends of the rods or bars may be fulcrumed in any suitable manner, and their upper ends may be bent or extended inward at right angles to form pivots for connecting them to the cranks of the shaft 10.

The outer or counter shaft 10 is connected with the inner or fulcrum shaft 2 by means of snail-gear 13 and 14, provided with reversely-arranged spirally-disposed cogs or teeth, which are adapted to mesh and to vary the levers of the machine, whereby the actuating power on the ineffective stroke of the air-compressor or other device will be applied to the weight to be lifted, so that on the effective stroke of the air-compressor or other device the power of the weight will be advantageously applied.

The outer end of the frame or lever 7 is connected with the piston 15 of a cylinder 16, designed to be operated by steam, compressed air, or any other motive power. The piston 5 of the air-compressor 6 is connected with the lever-frame at a point between the cyl-

inder 16 and the fulcrum of the frame in order to increase the power of the machine, and the lever-frame may be of any desired length, and the air-compressor and the piston of the cylinder may be arranged at any point to secure the desired application of power. As the weight begins to ascend the cogs of the snail-gear 13, meshing with the other gear 14, are located the greatest distance from the center of the said gear 13, and the cogs or teeth of the other gear 14 are located the shortest distance from the center, so that great leverage is obtained for lifting the weight. By this arrangement only a comparatively small amount of power will be required for swinging the lever or frame upward to raise the weight. As the weight begins to descend the cogs or teeth of the gear-wheel 13 gradually approach the center, thereby increasing the leverage or driving power of the rotary elements and its weight, and the teeth of the other snail-gear 14 gradually increase their distance from the center, thereby increasing the leverage of the machine and providing a slow downward stroke of great power for operating the air-compressor. The greatest application of power is at the end of the downward stroke, where the greatest resistance is encountered in an air-compressor, and by means of the falling of the weight and the automatic change of leverage by the snail-gear an excessive application of power is produced at the instant where it will be found most effective and of the greatest advantage in air-compressors. Instead of applying the power on the downward stroke of the oscillatory frame or lever the snail-gears and the other parts may be arranged for applying the maximum power on an upward stroke or at any other desired point to suit the character of the machine or device to be operated.

It will be seen that the motor is exceedingly simple and inexpensive in construction, that it possesses great strength and durability, and that the leverage resulting from the arrangement of the snail-gears and the oscillatory frame is such that only a very small amount of power will be necessary to lift the weight, and that the power of the motor is applied during the downward movement of the weight, which supplements the action of the oscillatory frame or lever. It will also be apparent that the snail-gearing automatically changes the leverage as the application of the power is changed, the power being applied to the outer end of the lever or frame to lift the weight and the weight operating as the power to operate the air-compressor or other device. Ordinary or sprocket gear-wheels may be employed, if desired, for communicating motion from one shaft to the other, and I desire it to be understood that various changes in the form, proportion, size, and the minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

In order to balance the machine and to prevent the same from being jarred or vibrated and loosened at its foundations by the intermittent driving action of the rotary weight, a reversely-rotating weight 17 may be employed. This weight, which is located at the side of the machine opposite that at which the weight 4 is arranged, is mounted on a rotary element, preferably consisting of a wheel 18, keyed or otherwise secured to a counter-shaft 19. The counter-shaft 19 carries a pinion or gear 20, which meshes with a pinion or gear 21 of the inner shaft 2, upon which the wheel 3 is mounted. Either or both of these rotary weights may be provided, and it will be clear that on the effective stroke of the air-compressor the weights will swing downward in opposite directions and will counterbalance each other to prevent any jar or vibration of the framework or any tendency of the same to loosen at the foundation.

What is claimed is—

1. In a machine of the class described the combination of an oscillatory frame or lever, a rotary element provided with a weight, gearing connected with the rotary element for communicating motion to and for being operated by the same, one of the gears being located beyond the pivot of the oscillatory frame or lever and being connected with a stationary or fixed support, whereby the frame or lever will be oscillated when the gear is rotated, and means connected with the outer end of the frame or lever for actuating the same to lift the weight, substantially as described.

2. In a machine of the class described the combination of an oscillatory frame or lever, a rotary element having a weight, gearing connected with the rotary element and located at the pivot of the frame or lever and at a point beyond the same, the outer gear being connected with a fixed support, whereby the frame or lever will be oscillated when the weight is rotated, and means for raising the weight, substantially as described.

3. In a machine of the class described the combination of an oscillatory frame or lever, a rotary element having a weight, gearing connected with the rotary element and located at the pivot of the frame and at a point beyond the same, the outer gear being connected with a fixed support, whereby the frame will be oscillated when it is rotated, and means connected with the outer end of the frame for rotating the weight, substantially as described.

4. In a machine of the class described the combination of an oscillatory frame or lever, a rotary element having a weight, snail-gearing connected with the weight for rotating the same and for being actuated by the weight, one of the snail-gears being carried by the frame or lever at a point beyond the pivot thereof, and connected with a fixed support for oscillating the frame, and means connect-

ed with the outer end of the frame or lever for actuating the same to raise the weight, said snail-gearing being arranged to automatically change the leverage as the machine is alternately operated by the said means and by the weight, substantially as described.

5. In a machine of the class described the combination of an oscillatory frame or lever, inner and outer shafts, the inner shaft forming the pivot of the frame or lever, a rotary element having a weight and mounted on the inner shaft, gearing connecting the shafts, means for connecting the outer shaft to the fixed support, whereby the frame or lever is operated when the outer shaft is rotated, and means connected with the outer portion of the frame to oscillate the same for moving the weight upward, substantially as described.

6. In a machine of the class described the combination of an oscillatory frame or lever, an inner shaft forming a fulcrum for the frame or lever, an outer crank-shaft mounted on the frame or lever and connected with a fixed support, a rotary element having a weight and mounted on the inner shaft, snail-gearing connecting the shafts, and means connected with the outer portion of the frame or lever for moving the weight upward, substantially as described.

7. In a machine of the class described the combination of a supporting-frame, an oscillatory frame or lever, an inner shaft forming the pivot for the oscillatory frame or lever, an outer shaft provided at opposite sides with cranks and mounted on the frame or lever, links connecting the cranks with the supporting-frame, snail-gears mounted on the shaft and connected with each other, a rotary gear mounted on the shaft and provided with a weight, a cylinder having a piston connected with the outer portion of the oscillatory frame or lever, and an air-compressor having a piston connected with the oscillatory frame or lever at a point between the fulcrum thereof and the said cylinder, substantially as described.

8. In a machine of the class described the combination with a weight, and a suitable motive power arranged to alternately operate the machine, of snail-gearing arranged to reverse the leverage of the machine accordingly as the same is actuated by the weight and the motive power, substantially as described.

9. In a machine of the class described the combination of an oscillatory frame or lever, a motive power, a weight, said motive power and weight being adapted to alternately actuate the machine, and snail-gearing arranged to change the leverage of the machine accordingly as the same is driven by the weight and by the motive power, substantially as described.

10. In a machine of the class described the combination with an oscillatory frame or lever, a motive power for actuating the same in one direction, a pair of reversely-rotating weights for moving the oscillatory frame or lever in the opposite direction, and gearing for connecting the rotary weights with the oscillatory frame or lever, substantially as described.

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

CALVIN JAY POLLOCK.

Witnesses:
H. F. RILEY,
J. H. JOCHUM, Jr.