

E. C. GENTZLER.
 STARTING MECHANISM FOR INTERNAL COMBUSTION ENGINES.
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916,296.

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Fig. 1.

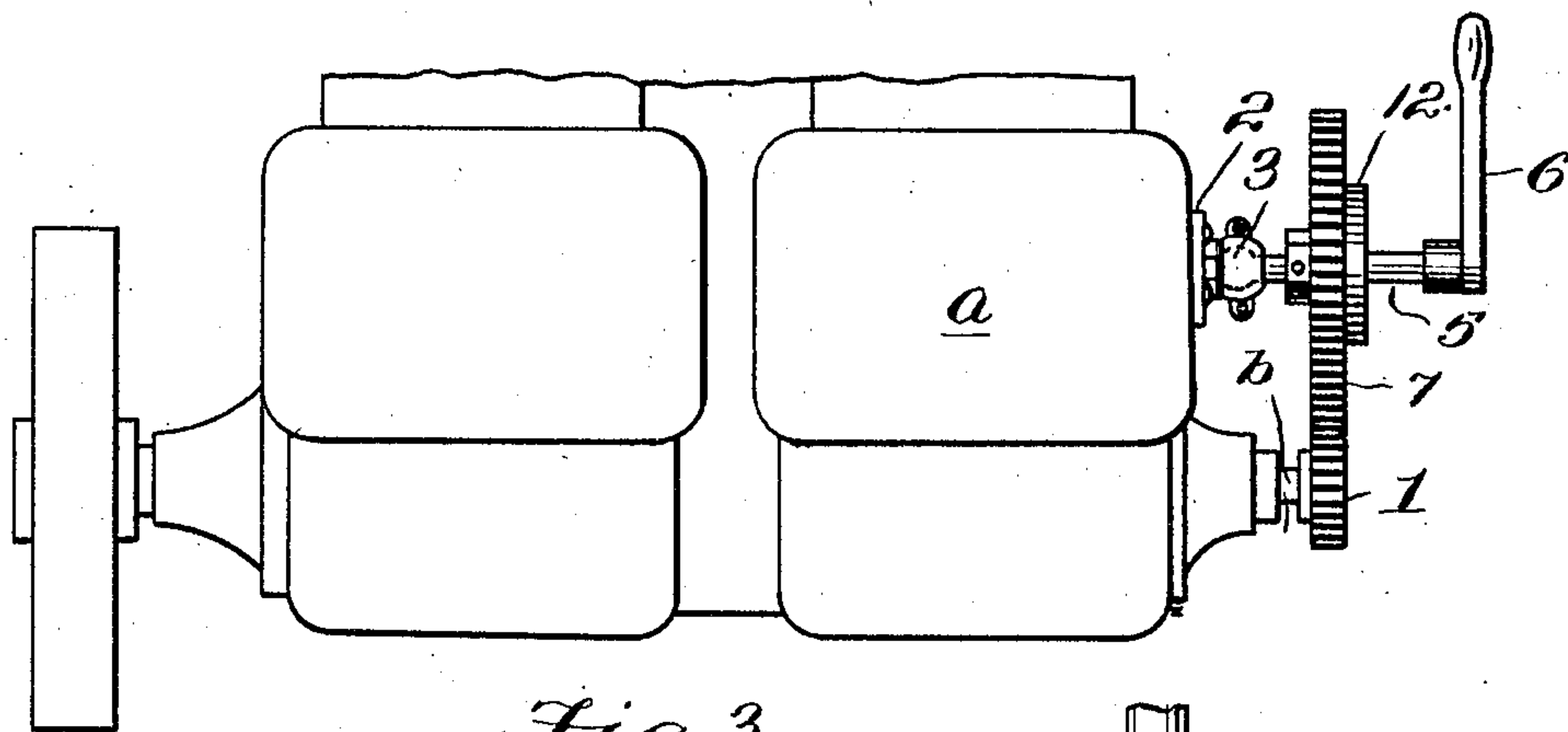


Fig. 3.

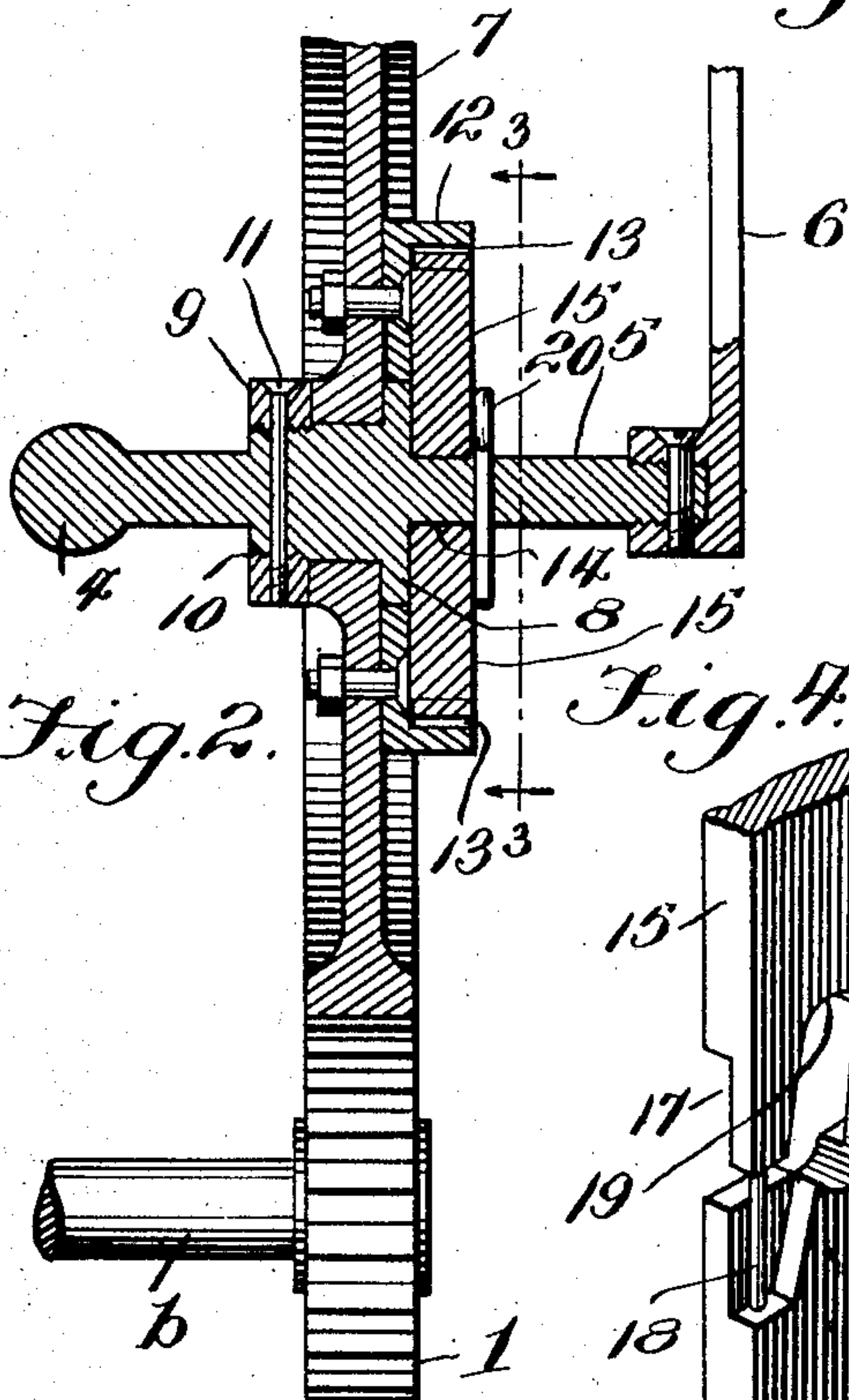


Fig. 2.

Fig. 4.

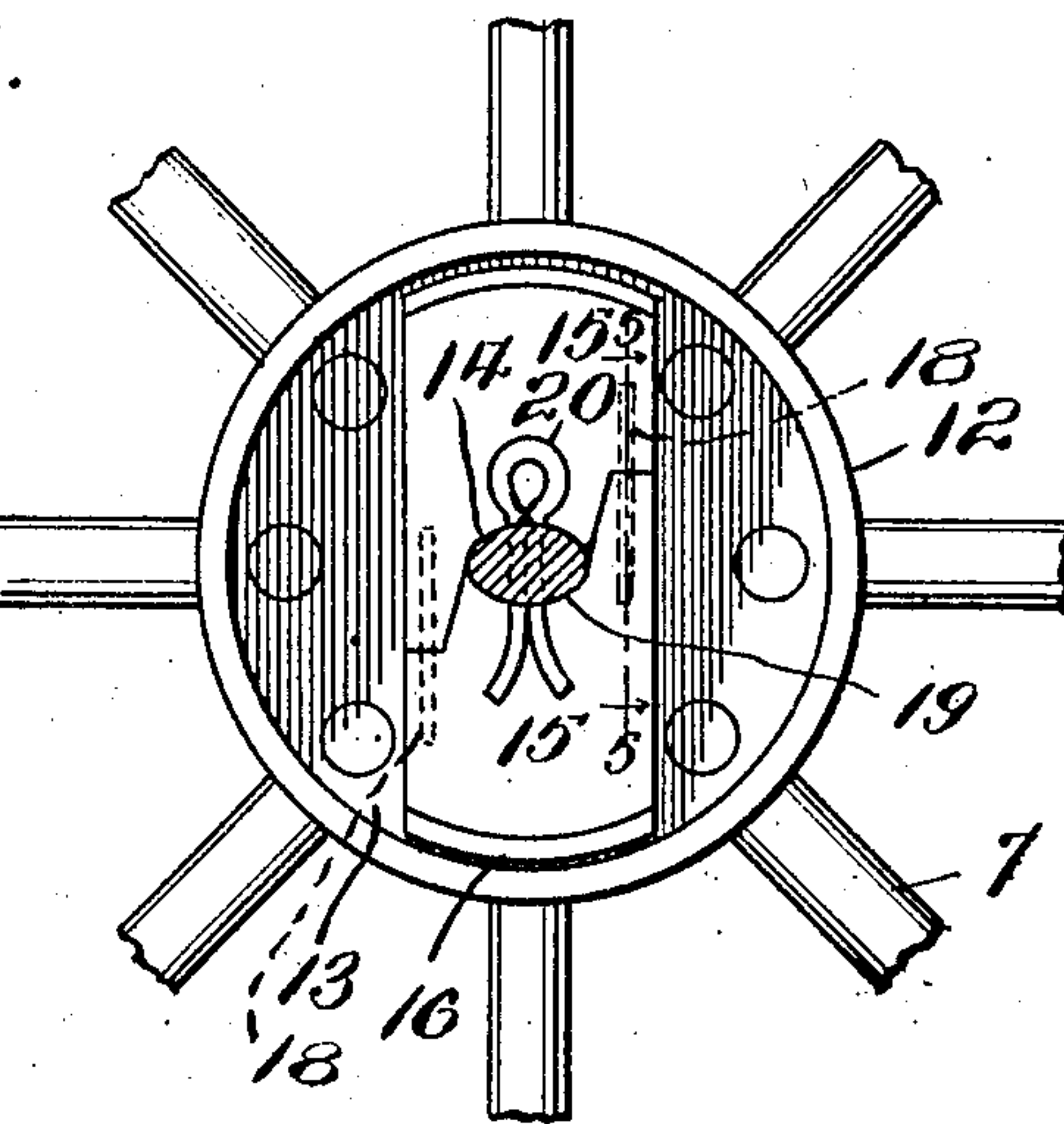
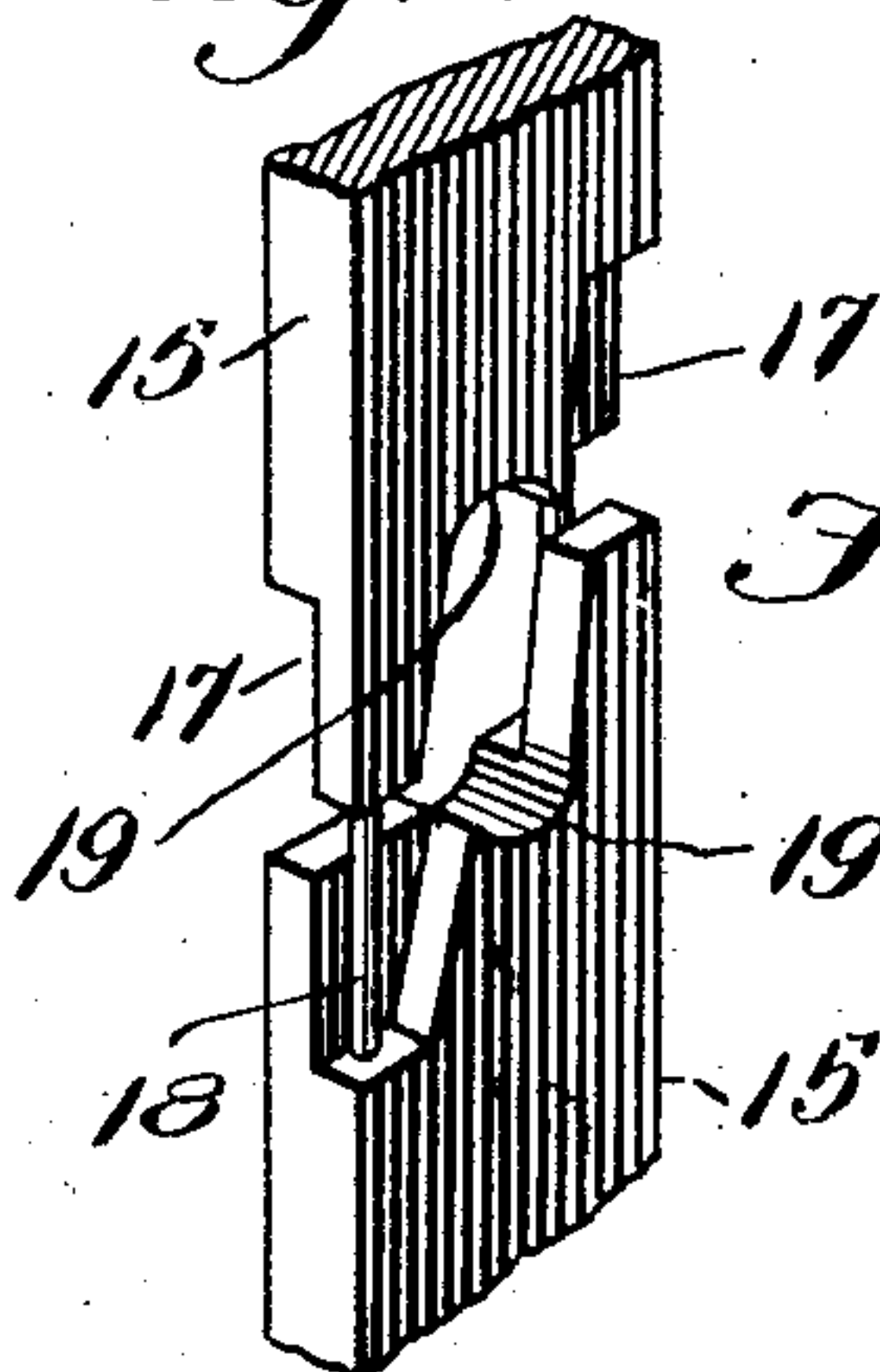
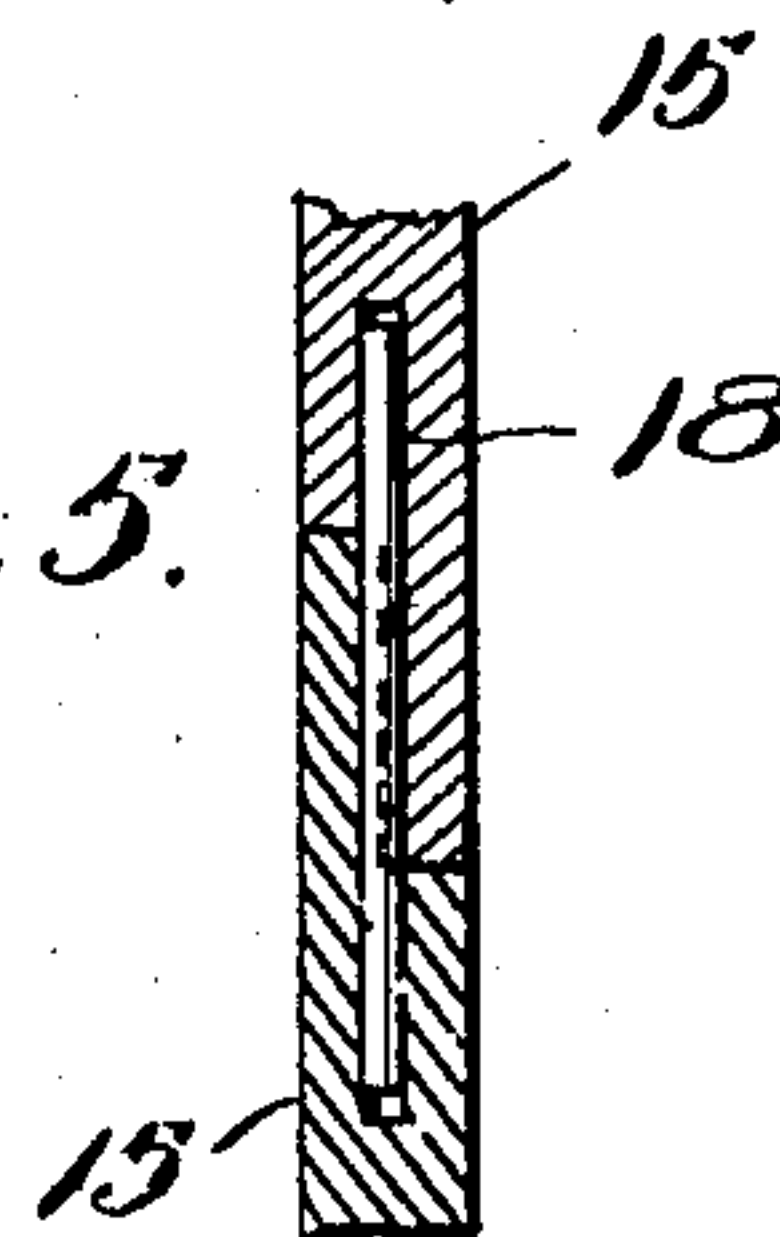


Fig. 5.



Witnesses

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STARTING MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, EDWARD C. GENTZLER, a citizen of the United States, residing at Columbus Junction, in the county of Louisa and State of Iowa, have invented new and useful Improvements in Starting Mechanism for Internal-Combustion Engines, of which the following is a specification.

This invention is an improved starting mechanism for internal combustion engines such as are used on automobiles and on motor boats and for other purposes and in which it is necessary to revolve the crank shaft at least once in order to start the engine and the said invention consists in the construction, combination and arrangement of devices herein after shown and described.

The "cranking" as it is termed of internal combustion engines is somewhat dangerous as well as annoying and the object of my invention is to provide an improved mechanism by means of which an internal combustion engine may be instantly started without the necessity of turning the engine shaft by a crank and without risk of danger or injury to the operator.

In the accompanying drawings:—Figure 1 is an elevation of an internal combustion engine provided with a starting mechanism constructed in accordance with this invention. Fig. 2 is a detail view partly in elevation and partly in section of the starting mechanism. Fig. 3 is a detail elevation of the same partly in section on the plane indicated by the line 3—3 of Fig. 2. Fig. 4 is a detail perspective view of the clutch blocks. Fig. 5 is a detail sectional view of the same.

The usual internal combustion engine is indicated at *a* in Fig. 1, its crank shaft being indicated at *b*. In accordance with my invention, I provide the crank shaft with a gear which is here indicated as a spur pinion 1. On one end or side of the engine is secured a base or bracket 2 which is provided with a socket piece 3 for the reception of a ball 4 on one end of a starting shaft 5. The said starting shaft is provided at its outer end with a hand lever 6. On the said shaft at a point about midway is loosely mounted a gear 7 which is free to revolve independently of the said shaft and is held from longitudinal movement thereon by a shoulder 8 which bears on one side of said

gear and a collar 9 which bears on the other side of said gear and is screwed on said shaft as at 10 and further held by a pin 11.

Secured concentrically to the gear 7 on one side thereof and revoluble therewith is a clutch element 12 which is cylindrical in form, and provided with a flange 13 the inner surface of which is a friction surface. That portion of the shaft 5 which is within the clutch element 12 is formed or provided with a cam 14 which is longitudinal in cross section. A pair of clutch blocks 15 are placed within the clutch element 12 and have rounded outer end surfaces 16 adapted to come in frictional contact with the inner surface of the flange 13. Within the scope of this invention, the said clutch blocks may be connected together by any suitable means for longitudinal movement. They are here shown as having longitudinal matching rabbets 17 and as connected together, slidably, by guide rods 18. The said clutch blocks are also provided at their inner ends with rounded surfaces 19 to match the cam 14. The said clutch blocks are kept in place on the shaft 5 by a pin 20.

The operation of the invention is as follows:—By grasping and moving the lever 6, the operator may put the gear 7 either in or out of engagement with the gear 1. Initially the clutch blocks are out of engagement with the flange of the clutch element 12 so that gear 7 is free to revolve independently of the shaft 5. Having engaged the gear 7 with the gear 1, as herein before stated, the operator in order to start the engine has only to turn the shaft 5 partly in one direction by means of the lever 6 to cause the cam 14 by coaction with the inner ends of the clutch block to move the latter outwardly in opposite directions so as to engage such clutch blocks with the clutch element 12 and thereby lock the gear 7 of the shaft 5 so that the said gear and shaft will turn together while the hand lever 6 is being operated and owing to the fact that the diameter of the gear 7 very greatly exceeds that of the gear 1, a partial rotation of said gear 7 will cause crank shaft *b* to be revolved and the engine to be started.

It is obvious that by means of my improved starting mechanism, the engine can be started almost instantly and at no danger whatever to the operator.

What is claimed is:—

1. An engine starting mechanism of the class described comprising in combination with a gear on the engine crank shaft, a starting shaft having an operating lever, a support for said starting shaft, said support admitting of said starting shaft being moved toward and from the engine shaft, a gear loose on the starting shaft for engagement with the gear of the engine crankshaft and disengagement therefrom, a cam on the starting shaft and a clutch comprising an element revoluble with the gear on the starting shaft and an element movable by said cam into engagement with the first mentioned clutch element.

2. Starting mechanism for an internal combustion engine comprising a starting shaft movable toward and from the crank shaft of the engine and having means whereby it may be so moved and may also be partly turned, a gear loose on said starting shaft and adapted to be engaged with and disengaged from a gear on the engine crank shaft, a cam on said starting shaft, a clutch element revoluble with said starting gear and having a circular flange and a clutch block movable radially in said clutch element and operable by said cam.

3. Starting mechanism for an internal combustion engine comprising a starting shaft movable toward and from the crank shaft of the engine and having means where-

by it may be so moved and may also be partly turned, a gear loose on said starting shaft and adapted to be engaged with and disengaged from a gear on the engine crank shaft, a cam on said starting shaft, a clutch element revoluble with said starting gear and having a circular flange and a pair of clutch blocks on opposite sides of said cam, movable radially thereby into engagement with said flange and means connecting said clutch blocks together for longitudinal movement.

4. Starting mechanism for an internal combustion engine comprising a starting shaft movable toward and from the crank shaft of the engine and having means whereby it may be so moved and may also be partly turned, a gear loose on said starting shaft and adapted to be engaged with and disengaged from a gear on the engine crank shaft, a cam on said starting shaft, a clutch element revoluble with said starting gear and having a circular flange, and a pair of clutch blocks in said revoluble clutch element movable radially with respect thereto and disposed on opposite sides of said starting shaft, said clutch blocks having coengaging guiding and retaining devices.

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

EDWARD C. GENTZLER.

Witnesses:

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CLARENCE KERN.