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PATENTED DEC. 5, 1905.

G. B. SELDEN, JR.
STARTING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED NOV. 18, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

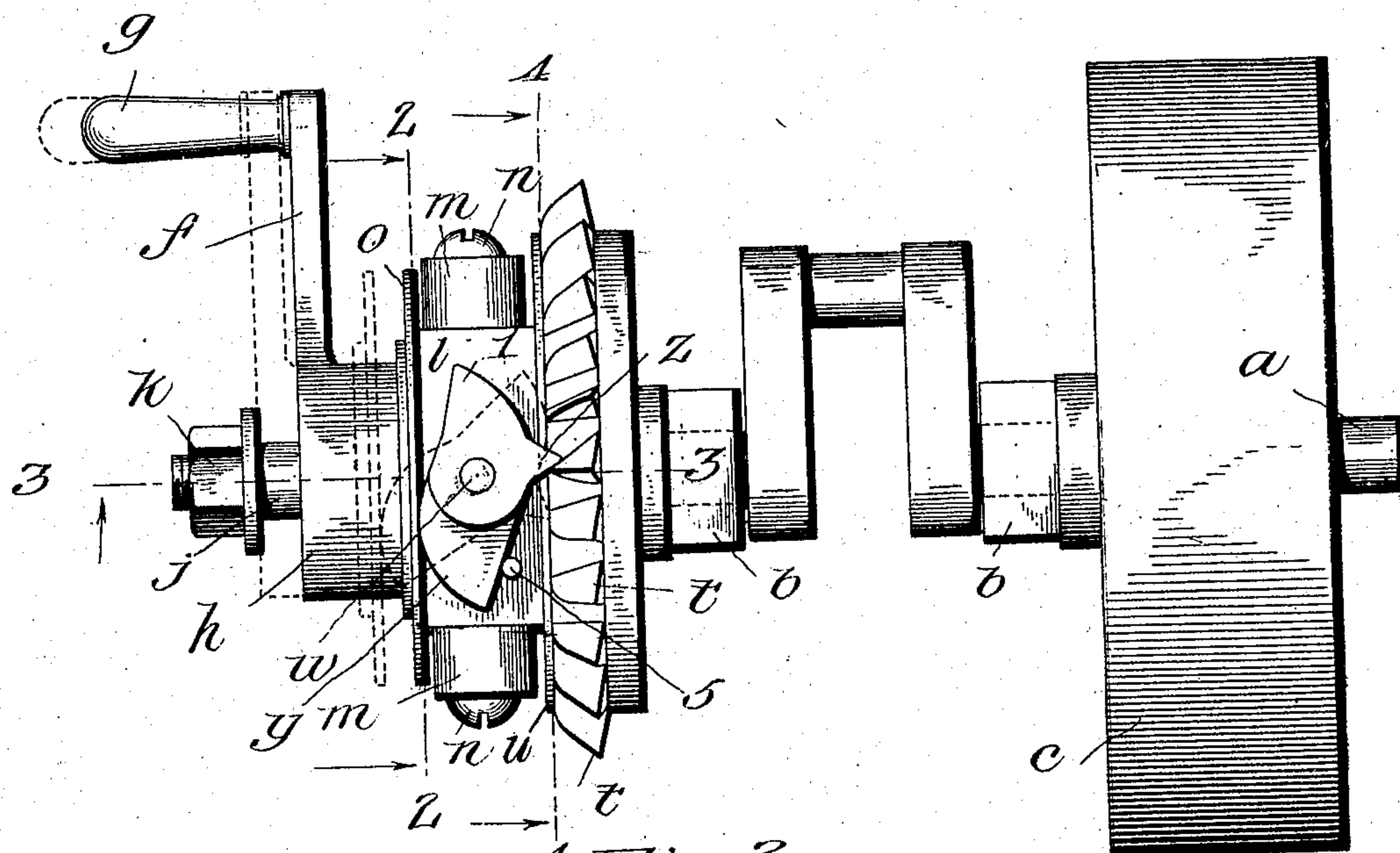
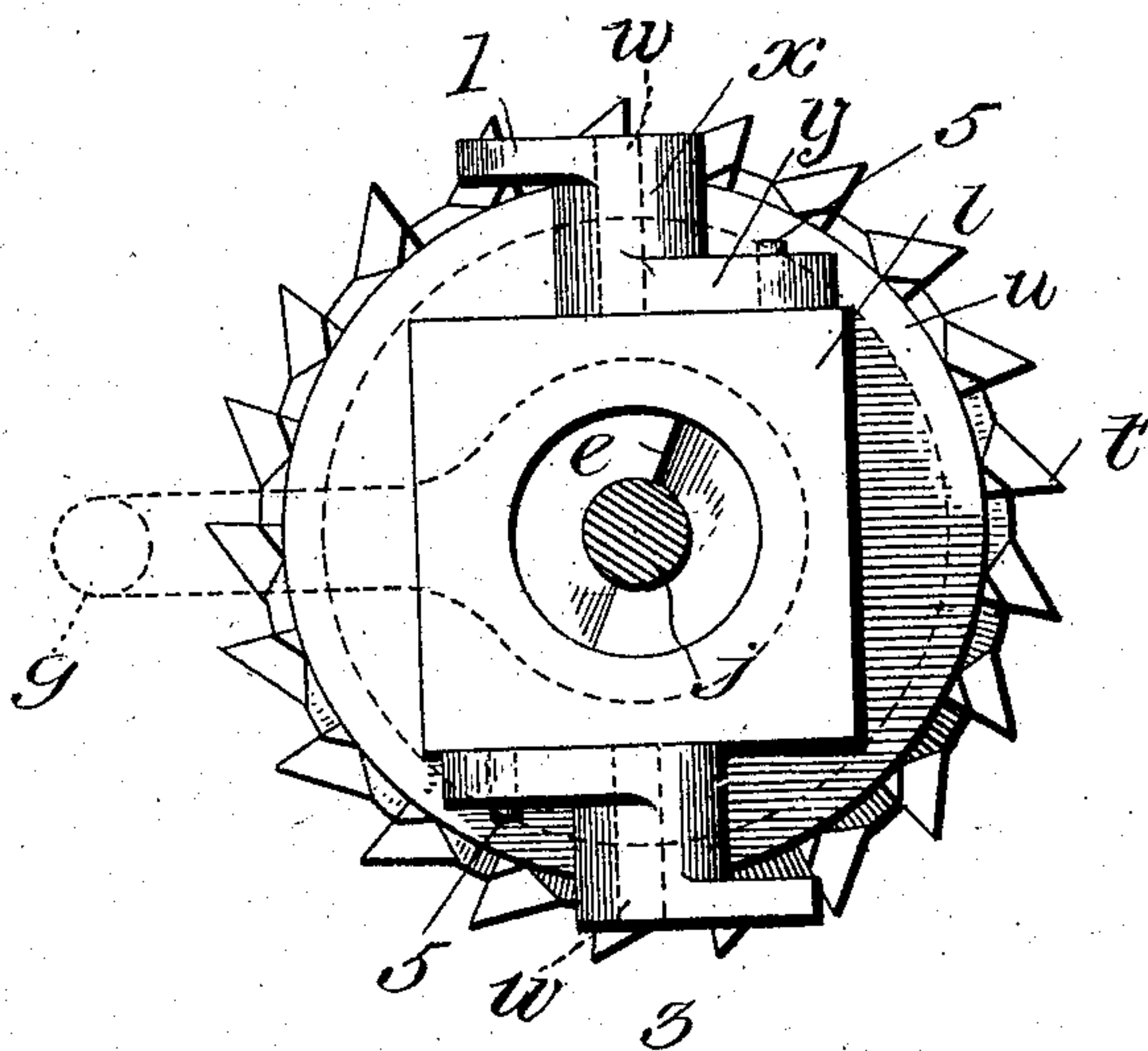


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

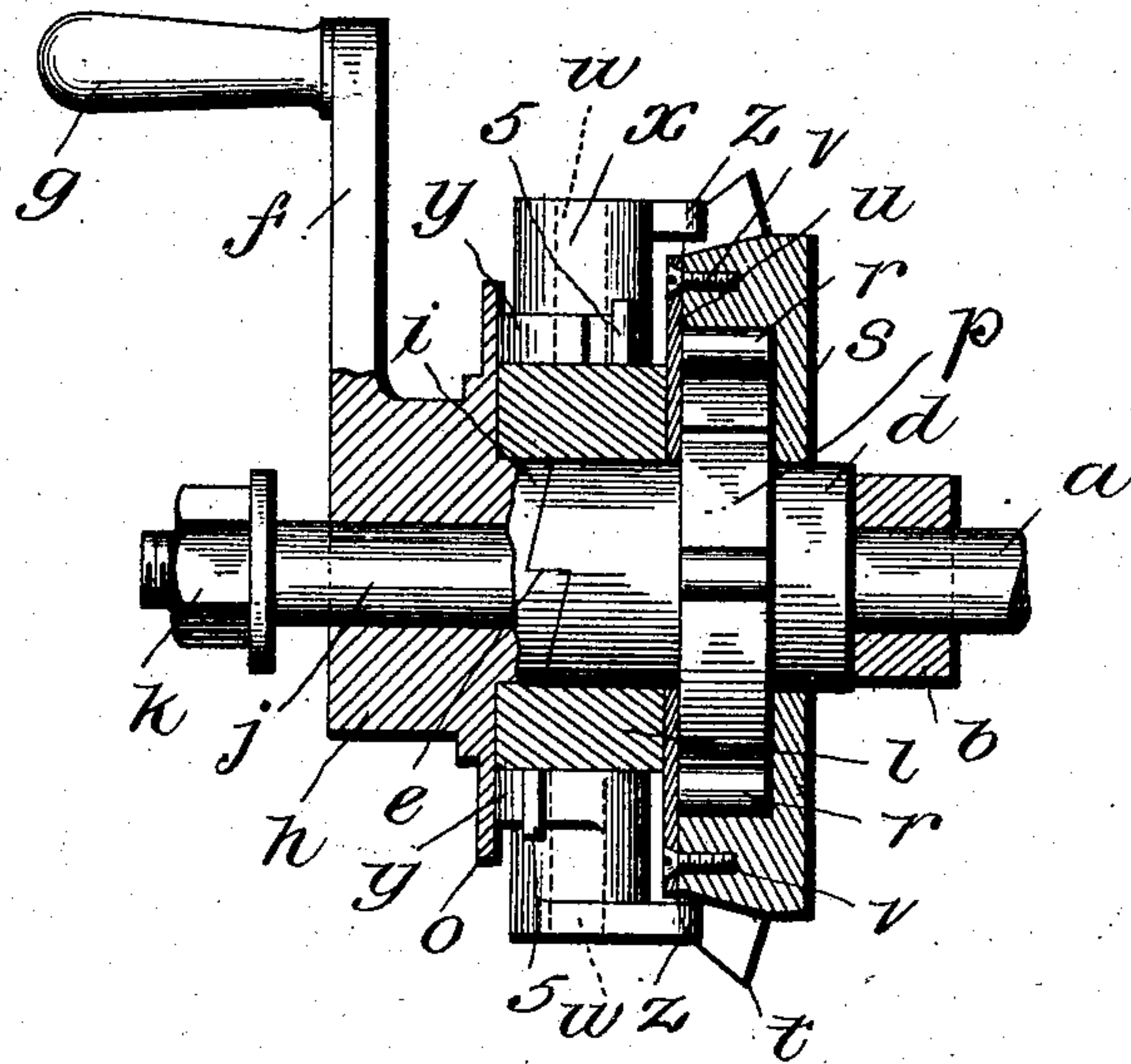
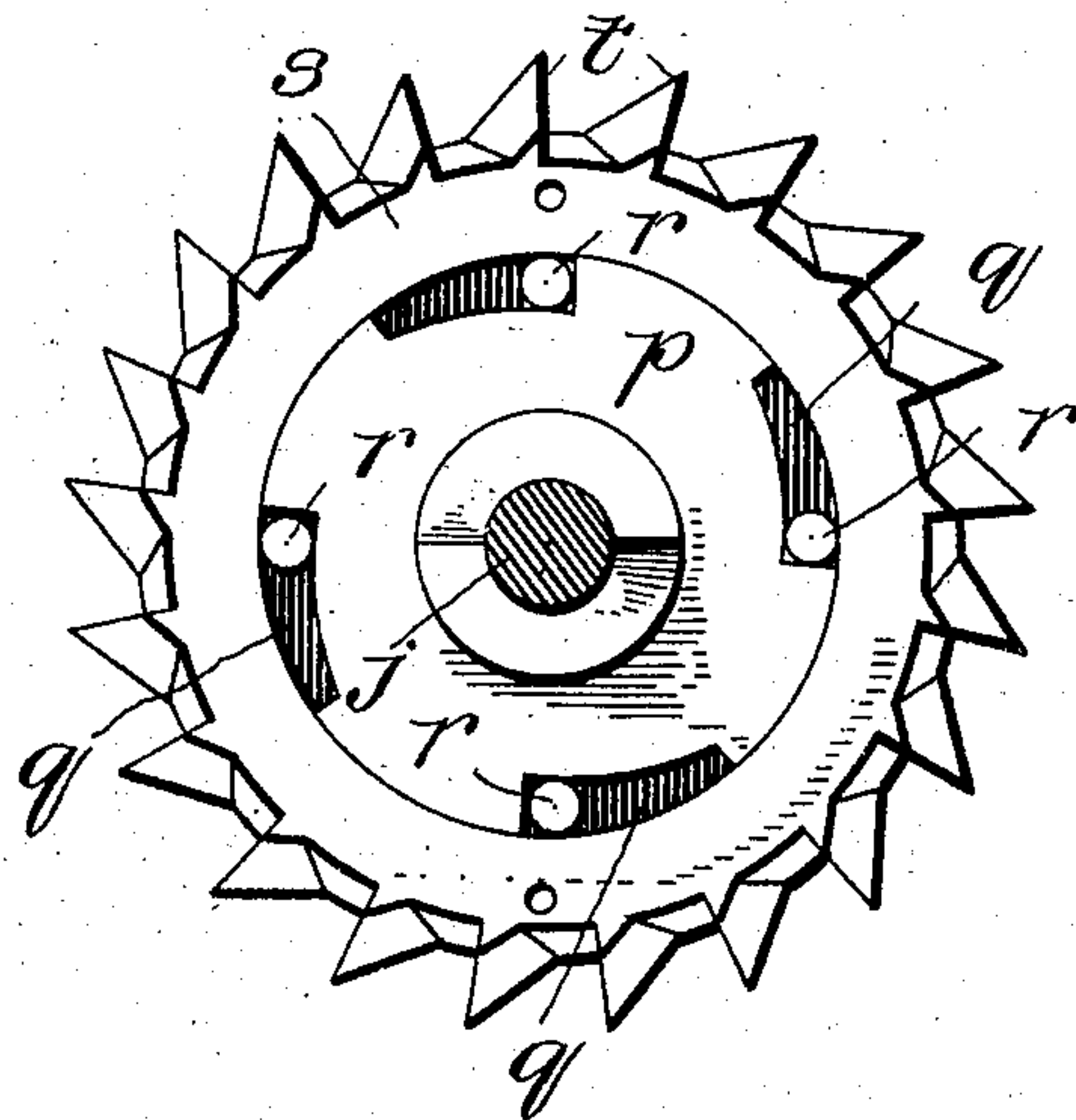


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE B. SELDEN, JR., OF ROCHESTER, NEW YORK.

STARTING MECHANISM FOR EXPLOSIVE-ENGINES.

No. 806,583.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed November 18, 1904. Serial No. 233,334.

To all whom it may concern:

Be it known that I, GEORGE B. SELDEN, JR. a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Starting Mechanism for Explosive-Engines; 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.

My invention relates to improvements in starting mechanism for explosive-engines; and its object is to provide a simple means whereby such an engine may be started by hand and which at the same time will prevent the operator from being injured by a back kick if the ignition should take place too early, an accident which often occurs.

The ordinary starting mechanism for explosive-engines is so arranged that the engine can be started by a crank by means of a clutch mechanism, which clutch mechanism is automatically disengaged when the engine begins to run. My invention is designed to provide means whereby the disengagement of the starting-crank is instantly effected automatically in case the engine should give a back kick or commence to run backward.

With these objects in view my invention provides means whereby a member movable relative to and operatively associated with the shaft coöperates with a cam member operatively associated with the starting-crank; and it consists in the construction and combinations of parts, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a top view of my improved starting mechanism. Fig. 2 represents a cross-section thereof on the line 2 2 of Fig. 1 looking in the direction of the arrows. Fig. 3 is a longitudinal section on the line 3 3 of Fig. 1 looking in the direction of the arrows, and Fig. 4 is a section on the line 4 4 of Fig. 1.

a represents the ordinary crank-shaft of an explosive-engine mounted in bearings *b* and provided with a fly-wheel *c*. Keyed or otherwise secured in any suitable way to the shaft *a* is a collar or sleeve *d*, provided with a ratchet-faced clutch *e*.

f represents the starting-crank, provided with a handle *g*, which crank is provided with a sleeve *h*, having a ratchet-face *i*, which face engages the ratchet-face *e*, these parts being of the usual construction. The sleeve

h is perforated and is adapted to slide and move freely on an extension *j* of the shaft *a*. A removable nut *k* is provided to keep the starting-crank from slipping off the extension *j*; but of course this may be dispensed with and the starting-crank may be made removable, if desired.

The sleeve *d* is mounted in a suitable bearing *l*, which is supported in posts *m* by means of screws *n*, these posts and screws being omitted from some of the figures. These posts are permanently attached to the casing of the engine.

The sleeve *h* on the starting-crank is provided with a circular plate or extension *o*, which fits up against the face of the bearing *l*.

Keyed or otherwise fastened to the shaft *a* or the sleeve *d* is the member *p* of a clutch, which is provided with inclined recesses *q* and rollers or balls *r*. Surrounding the part *p* and closely fitting it, but yet revoluble freely thereon, is the coöperating clutch member or ring *s*, provided with teeth *t*. This clutch member or ring *s* corresponds in function in the construction illustrated to the member hereinbefore referred to as movable relative to the shaft. The teeth *t* are shown in the drawings as approximately pyramidal in shape. I do not limit myself to this specific construction, however, as various forms of teeth may be used. Indeed, projecting pins might be employed instead of said teeth. The arrangement is such that the part *p* can revolve freely in one direction without moving the toothed ring *s*, which condition obtains when the engine is running forward; but if a backward rotation occurs the ring *s* is rotated along with the part *p* and sleeve *d* by the shaft *a*. It will be seen from the drawings that my invention is herein shown as applied to an engine which normally runs left-handed.

u represents a plate held by screws *v* onto one face of the clutch member or ring *s* to keep the clutch members in their proper relative positions.

The teeth *t* of the ring *s* are adapted to engage with the tooth *z* of a cam or cams *y*, one of which is mounted on a pin *w* on the bearing *l* and the other of which is similarly mounted on the opposite side of the bearing *l*, if two cams can be used. This cam consists of a sleeve *x*, mounted on its supporting pins and provided with the arm *y* and also with the tooth *z*, and the cam is also provided with an extended curved portion 1

To one end of the sleeve *x* is attached the arm *y*, provided with a curved surface which bears against the plate *o* on the sleeve *h*. Pins 5 may be used to limit the movement of these cams in one direction; but such limitation may be secured by making the arm *y* wider. The arm 1 also serves to limit the movements of the cam by coming in contact with the clutch member or ring *s* or the plate *u*. The arm *y* and its projecting teeth *z* and 1 are so arranged that the backward movement of the engine will, by means of the teeth *t* engaging the teeth *z*, turn the cams into the position shown in dotted lines in Fig. 1, which will immediately shift the starting-crank lengthwise of the shaft *a* into the position shown by dotted lines in said figure, thereby disengaging the ratchet-faces *e* and *i* and allowing the engine to run backward freely without revolving the starting-crank. When the engine has been stopped, to start it again the starting-crank is pushed in by the operator, so as to engage the main clutch, having the ratchet-faces *e* and *i*, and the engine is then turned over by the starting-crank until it begins to run. If a back kick occurs, the part *p*, through the interposed rollers *r*, clutches and rotates the ring *s*, and the teeth *t*, engaging with the tooth or teeth *z*, turn the cam or cams on their pivots, and the starting-crank is thereby shifted lengthwise of the crank-shaft, thus disengaging the main clutch and preventing the reverse rotation of the starting-crank.

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

1. In starting mechanism for explosive-engines, the combination of a driving-shaft, a starting-crank loosely mounted thereon, a member movable relative to said shaft and adapted to remain stationary when the engine is running forward and to be driven when the engine is running backward, and a cam operable by said member for disengaging the starting-crank from the driving-shaft, substantially as described.

2. In starting mechanism for explosive-engines, the combination of a driving-shaft provided with a ratchet-face, a starting-crank also provided with a ratchet-face, a member movable relative to and supported by said shaft and adapted to remain stationary while the engine is running forward, but to be driven when the engine is running back-

ward, and a toothed cam adapted to be driven by said member and when so driven to disengage said ratchet-faces from each other, substantially as described.

3. In starting mechanism for explosive-engines, the combination with a driving-shaft provided with a ratchet mounted thereon, a starting-crank also provided with a ratchet, a member movable relative to and supported by said shaft and adapted to remain stationary while the engine is running forward and to be driven when the engine is running backward, a pivoted cam adapted to be driven by said member and when so driven to disengage said ratchets, and means for limiting the movement of said cam, substantially as described.

4. In starting mechanism for explosive-engines, the combination of a driving-shaft, a ratchet thereon, a ratchet-faced starting-crank adapted to be loosely carried by said shaft, clutch mechanism on said shaft comprising one member fixed thereto and another member loosely mounted on said first-named member, whereby said second member is left stationary when the engine is running forward but is moved when the engine is running backward, and a pivoted cam with which said second member is adapted to engage and when so engaged to throw said ratchets out of engagement with each other, substantially as described.

5. In starting mechanism for explosive-engines, the combination of a driving-shaft, provided with a ratchet, a starting-crank having a ratchet-face and adapted to be loosely carried by said shaft, a clutch mounted on said shaft consisting of an inner member secured thereto and provided with inclined recesses, a second member provided with projections on its outside encircling said first-named member, movable engaging means between said members, and a pivoted cam provided with projections adapted to engage the projections on said second-named member and when so engaged to disengage said ratchets, and means for limiting the movement of said cam, substantially as described.

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

GEORGE B. SELDEN, Jr.

Witnesses:

HENRY B. SELDEN,
HERMANN F. CUNTZ.