

No. 666,487.

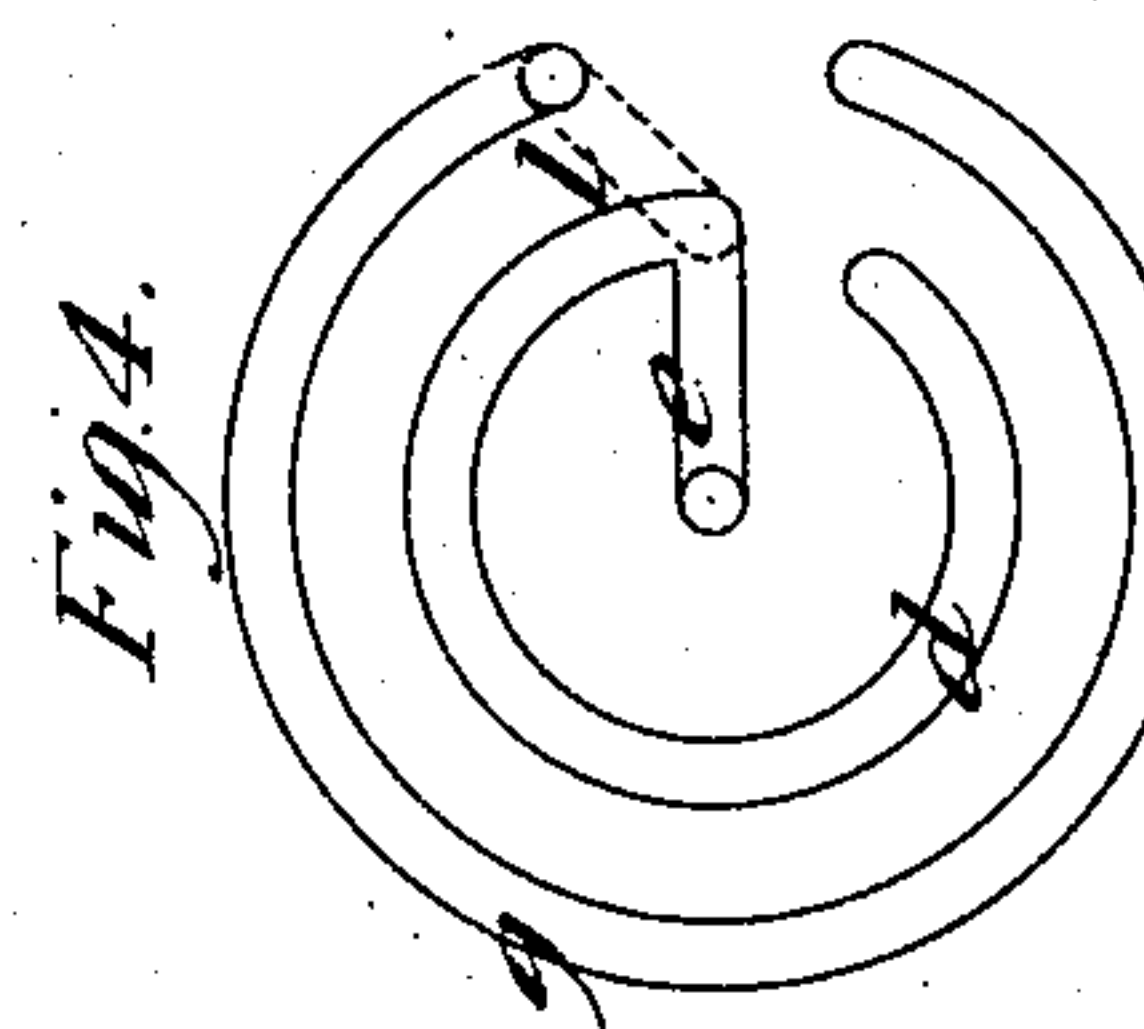
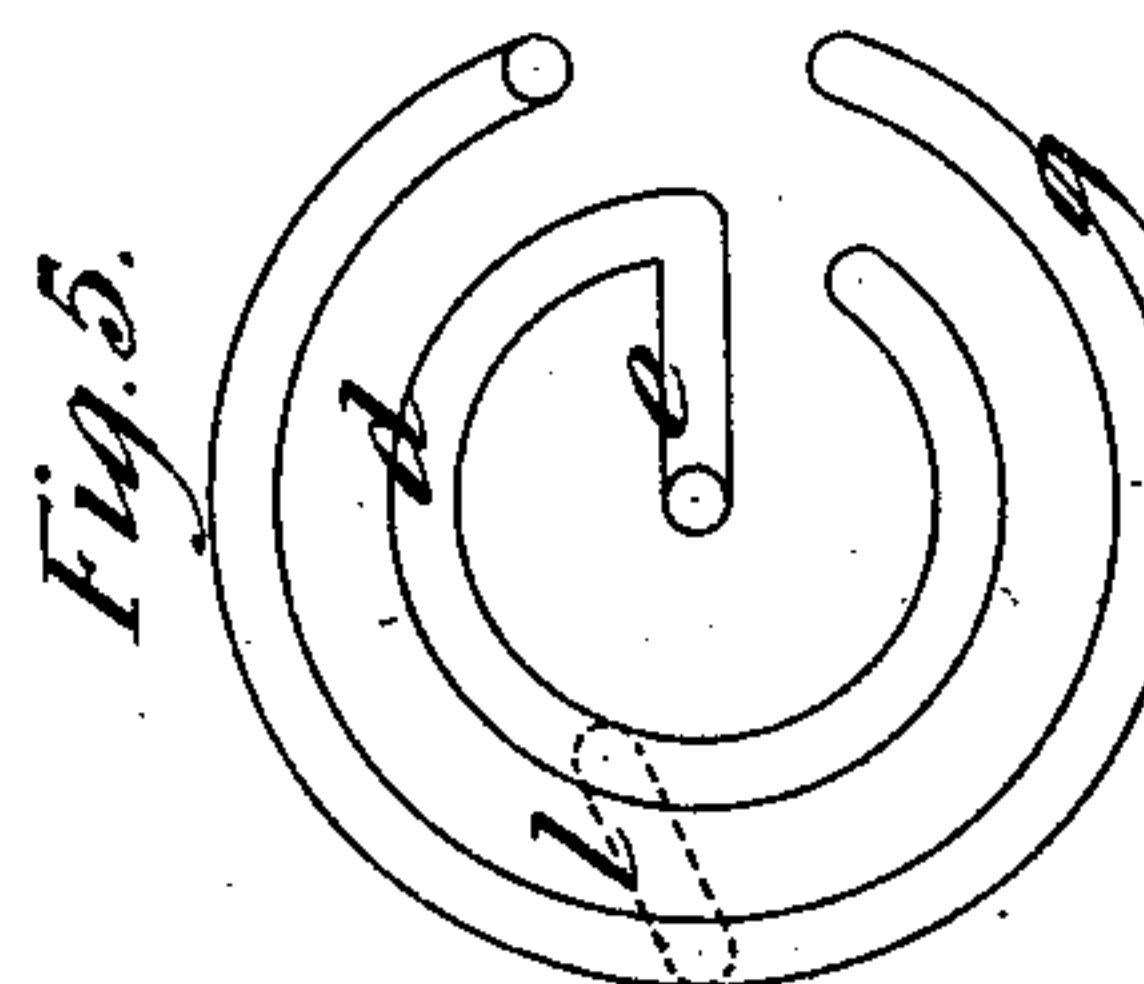
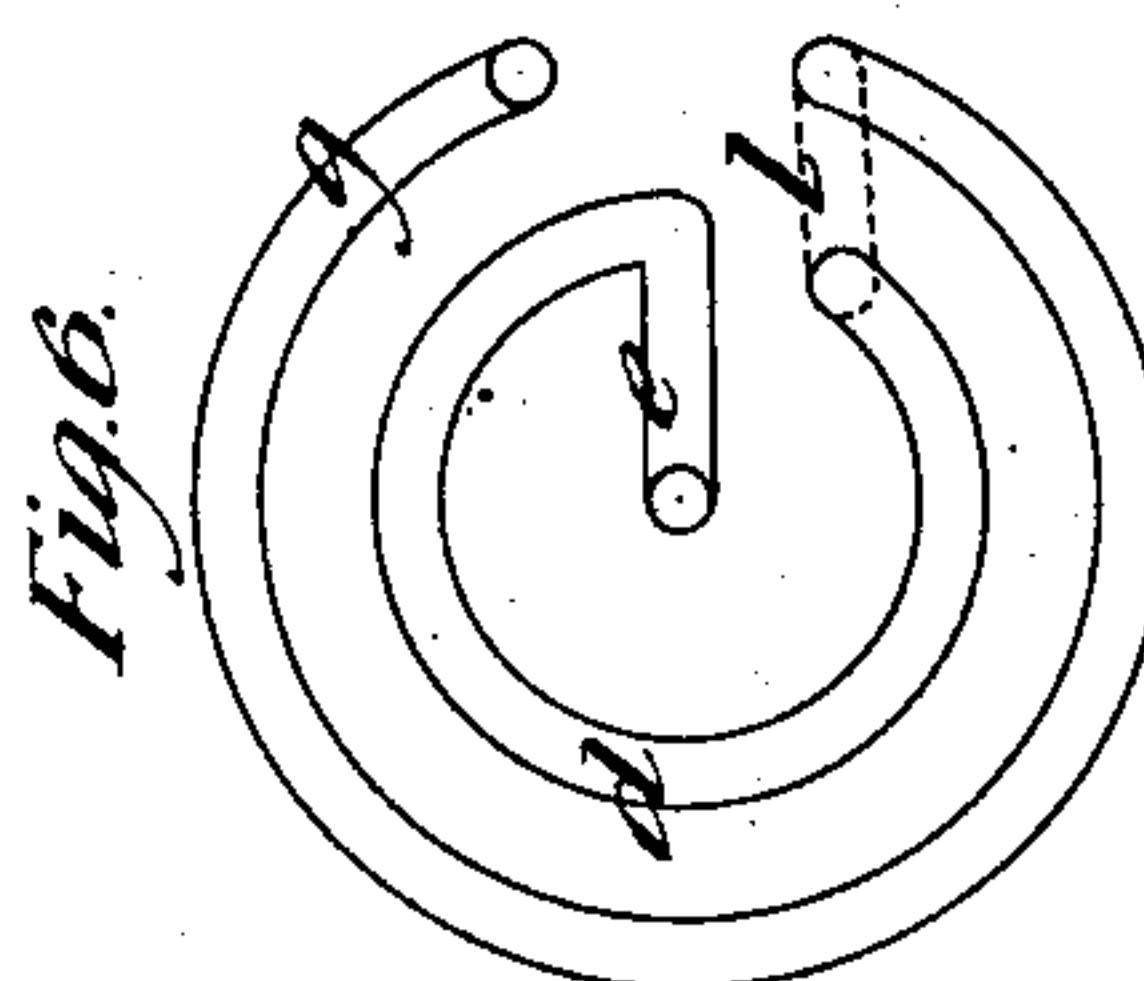
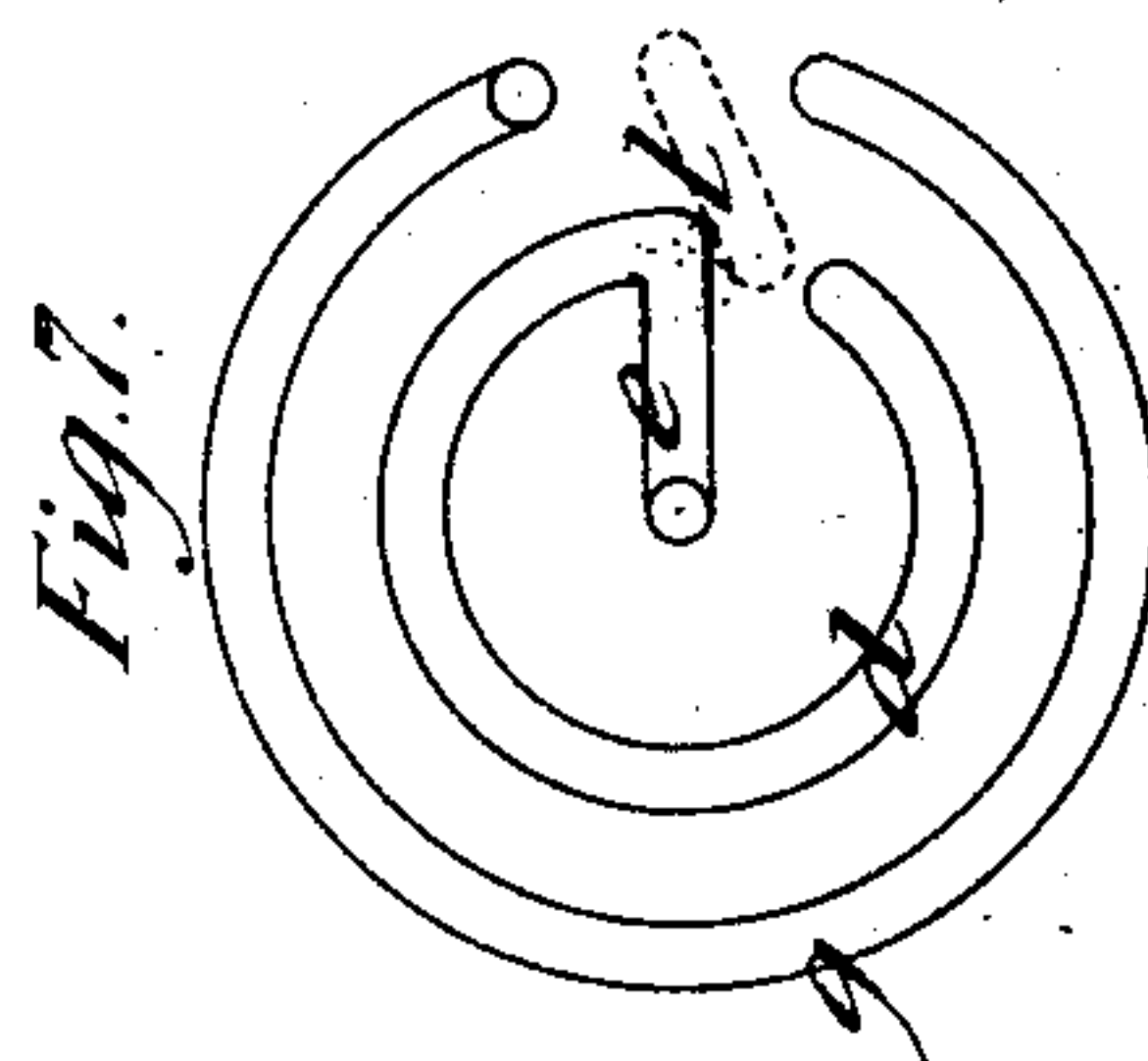
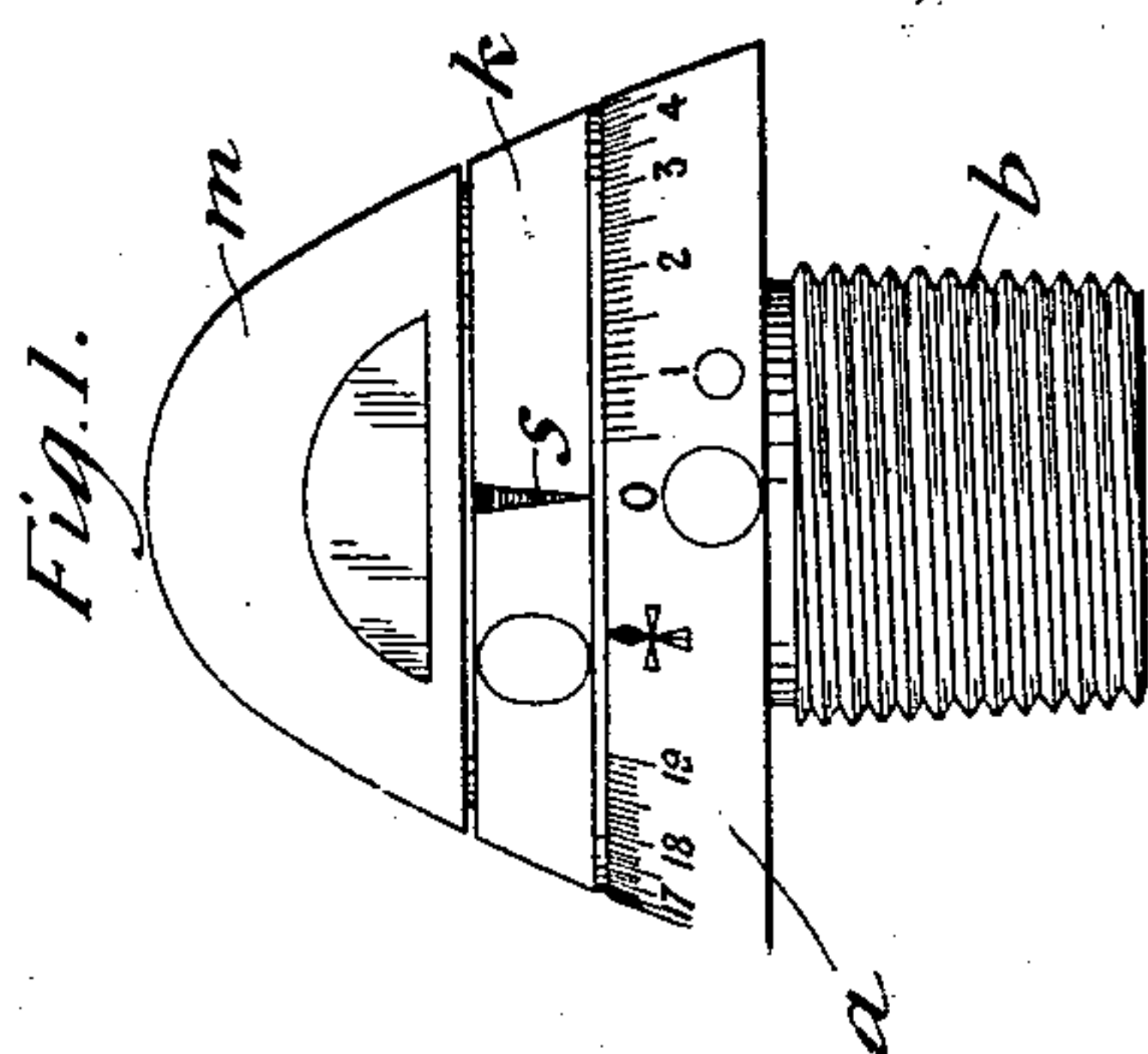
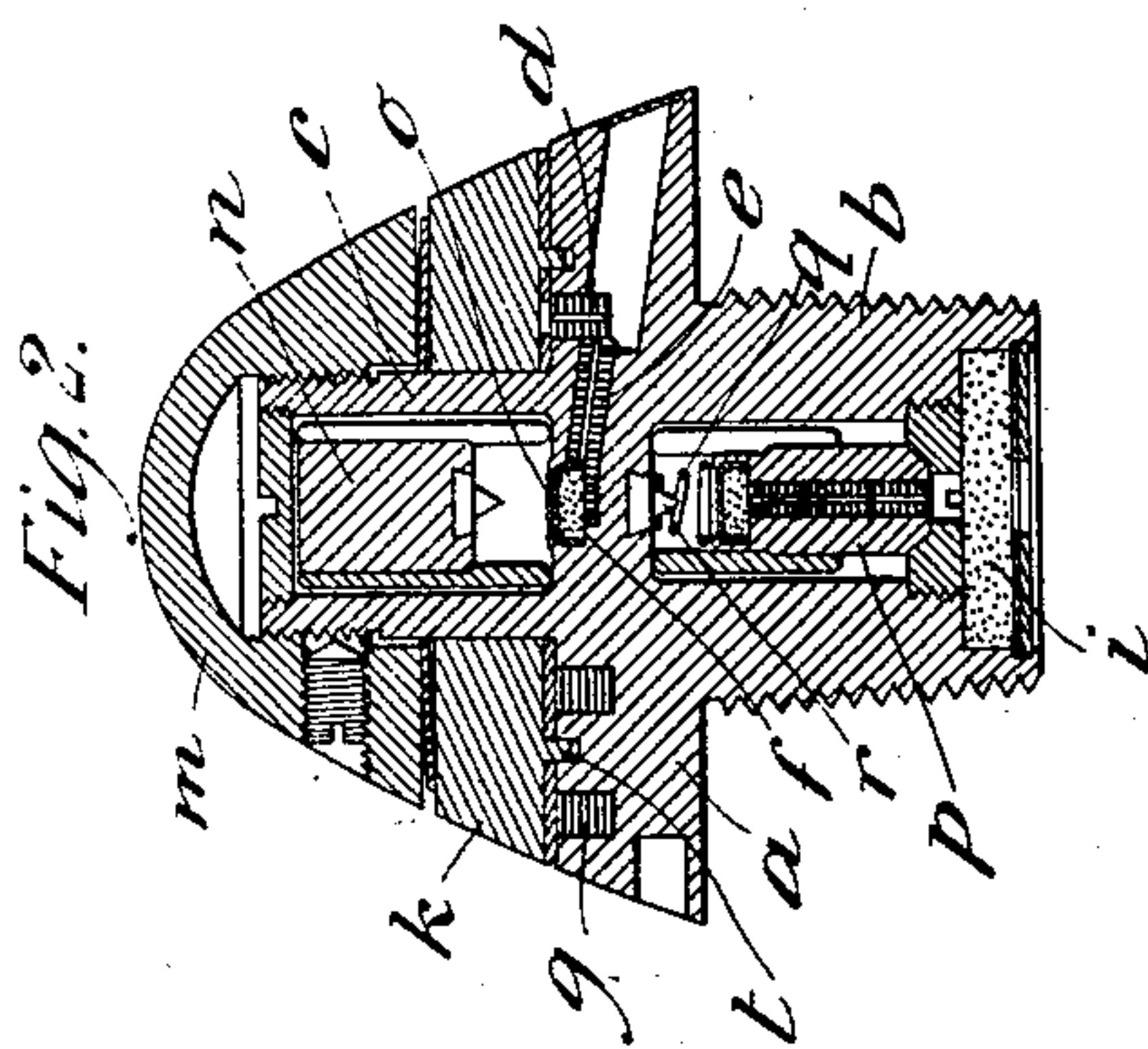
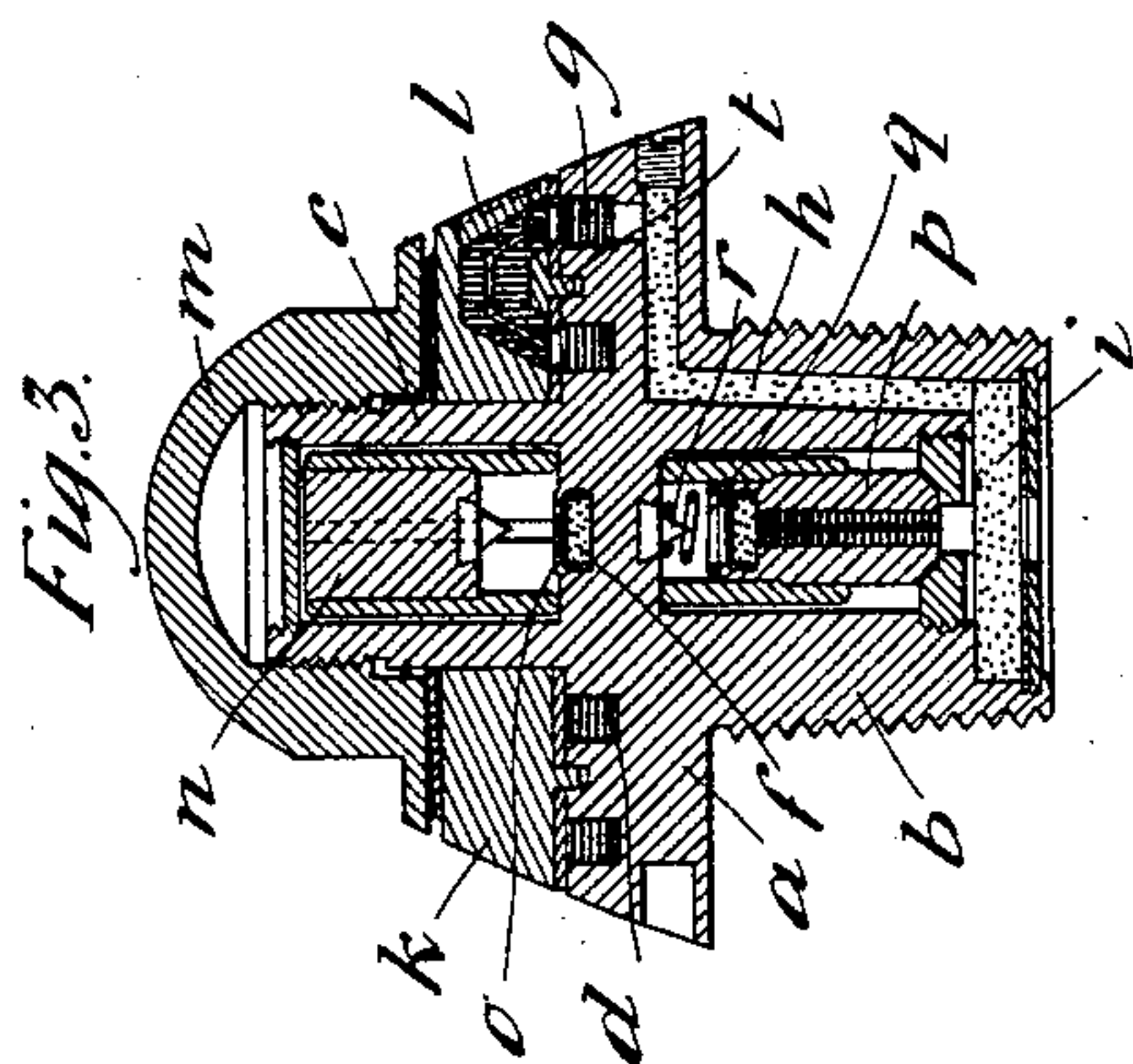
Patented Jan. 22, 1901.

G. T. BUCKHAM & S. V. DARDIER.

FUSE FOR FIRING SHELLS.

(Application filed Sept. 6, 1900.)

(No Model.)



Witnesses  
J. B. Keiser  
J. C. Meyer

Inventors  
George T. Buckham  
Samuel V. Dardier  
By James L. Norris  
att'y



# UNITED STATES PATENT OFFICE.

GEORGE T. BUCKHAM AND SAMUEL V. DARDIER, OF LONDON, ENGLAND,  
ASSIGNORS TO VICKERS, SONS & MAXIM, LIMITED, OF SHEFFIELD,  
ENGLAND.

## FUSE FOR FIRING SHELLS.

SPECIFICATION forming part of Letters Patent No. 666,487, dated January 22, 1901.

Application filed September 6, 1900. Serial No. 29,199. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE THOMAS BUCKHAM and SAMUEL VICTOR DARDIER, citizens of England, residing at 28 Victoria street, Westminster, London, England, have invented a certain new and useful Improvement in Fuses for Firing Shells, (for which application has been made for a patent in Great Britain, dated February 6, 1900, No. 2,359,) of which the following is a specification.

This invention relates to the construction of a fuse for firing a shell in such a manner that it operates as a time-fuse and as a percussion-fuse—that is to say, it ignites the bursting charge of the shell a longer or shorter time after it is fired from the gun, according to adjustment of a setting-ring, and it also ignites the shell by percussion when the motion of the shell is arrested if it has not been previously ignited by the time igniting device.

The accompanying drawings represent a fuse according to this invention.

Figure 1 is an external elevation of the fuse. Figs. 2 and 3 are sections on planes at right angles to each other. Figs. 4, 5, 6, and 7 are plans showing several different conditions of the timing device.

$a$  is the body of the fuse, having a downwardly-extending screw-threaded hollow plug  $b$ , by which it is screwed into the shell on a packing-washer, and having an upwardly-extending sleeve  $c$ . In the face of  $a$  are formed two annular segmental grooves—an inner groove  $d$ , which at its one end is closed and at its other end communicates by a radial groove  $e$  with a central recess  $f$ , and an outer groove  $g$ , which at its one end is closed and at its other end communicates with a passage  $h$ , leading down to a recess  $i$  in the end of the plug  $b$ . Above the grooved face of  $a$  a ring  $k$  is fitted to revolve on the sleeve  $c$  as an axis, and in this ring there is formed an arched passage  $l$  of such span that its lower mouths are immediately over the two grooves  $d$  and  $g$ . This arched passage  $l$  is not radial, but is formed at an inclination to the radius, as indicated by the dotted lines in Figs. 4, 5, 6, and 7. The head of the fuse is a nut  $m$ , which is screwed on the sleeve  $c$  and is prevented from unscrewing by a lateral setting-screw.

Between this nut and the upper surface of the ring  $k$  there is a washer, of elastic material, which when the nut  $m$  is screwed on gives sufficient frictional hold to prevent the ring  $k$  from turning unless some force be applied to it.

In order to prevent communication of fire from one of the grooves  $d$   $g$  to the other, the ring  $k$  has fixed on it an elastic washer and may have an annular projecting rib  $t$ , fitting in a groove formed in the upper face of  $a$ .

In the hollow of the sleeve  $c$  is fitted in a split safety-sleeve a pellet  $n$ , the needle-point of which is some distance above a button  $o$ , of detonating material, in the recess  $f$ . Also in the hollow of the lower plug  $b$  is fitted in a split safety-sleeve another pellet  $p$ , which is bored through lengthwise and primed with fuse composition and has in a recess in its top a button, of detonating material. Above this and separated from it by a spring  $q$  is a point  $r$ , fixed in the fuse-body.

The ring  $k$  has on it an index-mark  $s$ , pointing to time-divisions on the body of the fuse. The recess  $i$  in the lower part of the plug  $b$  being charged with gunpowder and the grooves  $d$  and  $g$  and the arched passage  $l$  and the passage  $h$  being charged with suitable fuse composition, the fuse is screwed into the shell and the ring  $k$  is turned to a position where its index points to the time which is desired to elapse between the firing of the shell from the gun and the explosion of the shell. In order that the effect of such adjustment of the ring may be better understood, reference is here made to Figs. 4, 5, 6, and 7, representing different positions of the arched channel  $l$  relatively to the ends of the annular channels  $d$  and  $g$ , the central recess  $f$ , and the passage  $h$ . - When  $l$  is in the position shown in Fig. 4, fire from  $f$  passes through  $l$  directly to  $h$  and down to the gunpowder in  $i$ , by which the charge of the shell is immediately ignited. When  $l$  is in the position shown in Fig. 5, the fire from  $f$  has first to pass about half around  $d$  and then about half around  $g$  before reaching  $h$ , about half the maximum time being thus occupied. When  $l$  is in the position shown in Fig. 6, the fire from  $f$  has to pass entirely around  $d$  and



then entirely around *g* before it reaches *h*, and thus occupies the maximum time. When *l* is in the position shown in Fig. 7, it does not make any communication between the grooves *d* and *g*, and therefore the fuse cannot act as a time-fuse. The fire at *f* is occasioned when the shell is fired by the inertia of the pellet *n* causing its point to strike the detonator *o*.

When the shell is stopped before the time-fuse has effected ignition of the charge or when the ring *k* is set so that the fuse does not operate as a time-fuse, then it operates as a percussion-fuse in the following manner: On firing the shell the split safety-sleeve inclosing the pellet *p* owing to its inertia flies back, and then when the motion of the shell is arrested the pellet, along with its sleeve, owing to its momentum flies forward, so that the detonating material is fired by the point *r* and the fire passes down the pellet to the gunpowder at *i*, whereby the shell charge is fired.

Having thus described the nature of this invention and the best means we know of carrying the same into practical effect, we claim—

In a fuse for firing a shell, the combination of the fuse-body provided with an upwardly-extending sleeve and a downwardly-extend-

ing hollow plug, the latter formed with a recess, said body having its upper face formed with a central recess and a pair of annular grooves, one of which communicates with said central recess and the other with the recess in said plug, a ring mounted upon said sleeve and provided with an arch-passage for establishing communication between said annular grooves, a projecting rib carried by said ring and adapted to engage in said shell-body to prevent communication of fire from one groove to the other, a cap mounted upon said sleeve, a pellet and a safety-sleeve in said sleeve, a bored pellet and safety-sleeve in said plug, a spring above the said bored pellet, and a suitable combustible material in said grooves and passage, substantially as described.

In testimony whereof we have hereunto set our hands in presence of the subscribing witnesses.

GEORGE T. BUCKHAM.  
SAMUEL V. DARDIER.

Witnesses:

WALTER HODGES RAYNER,  
HENRY KING,  
CYRIL J. CUMBERBATCH,  
ANDREW RYAN.