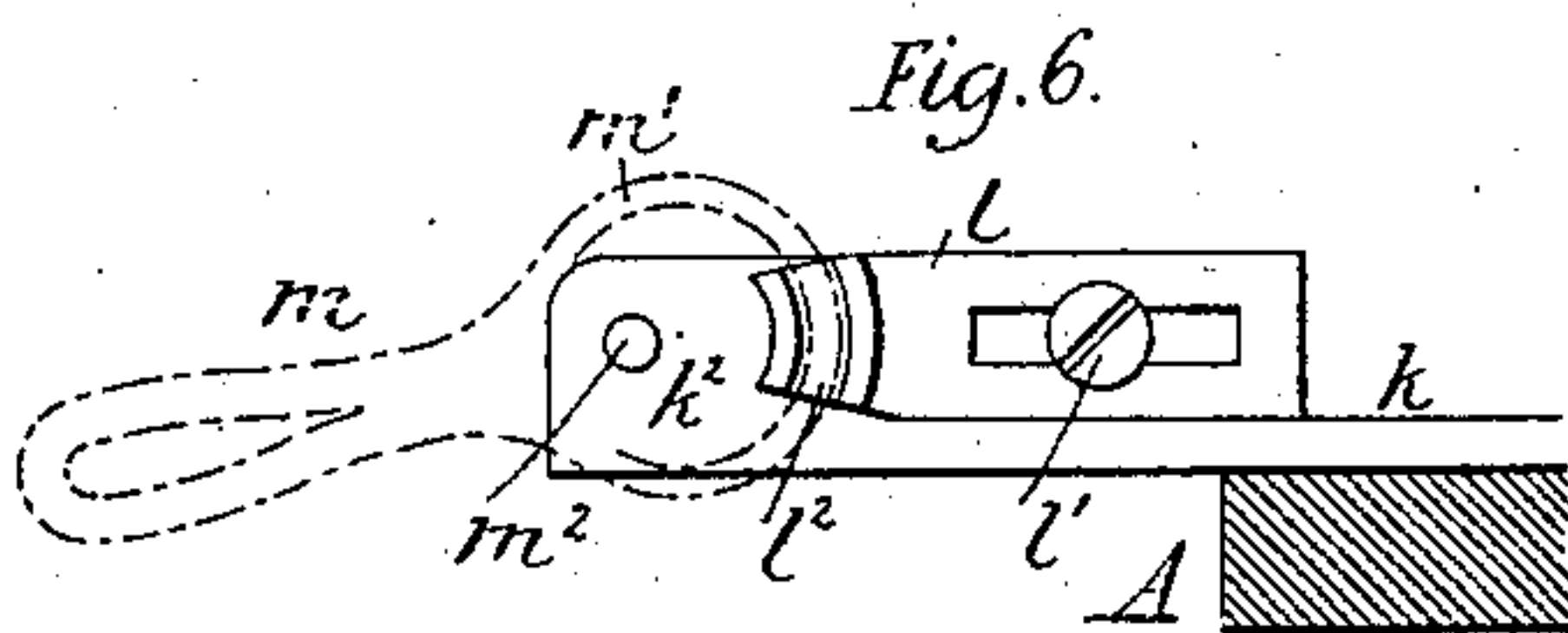
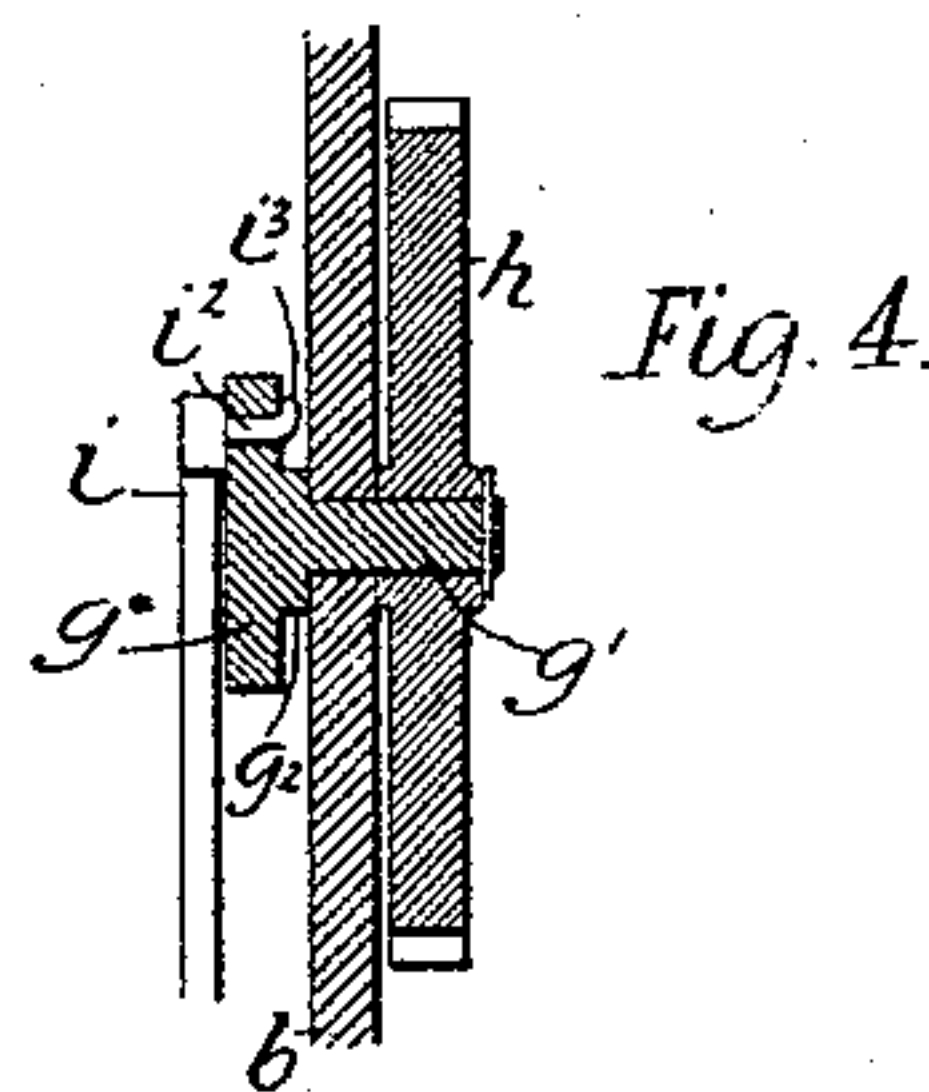
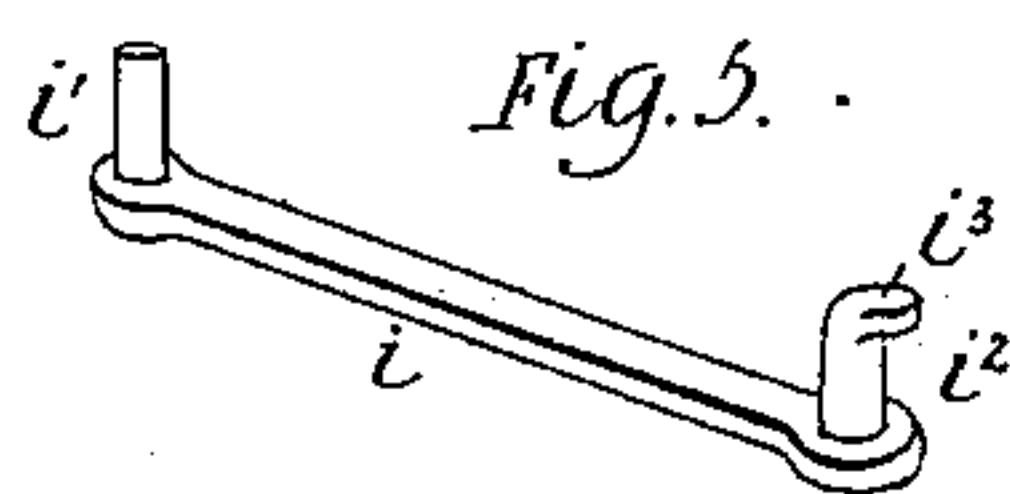
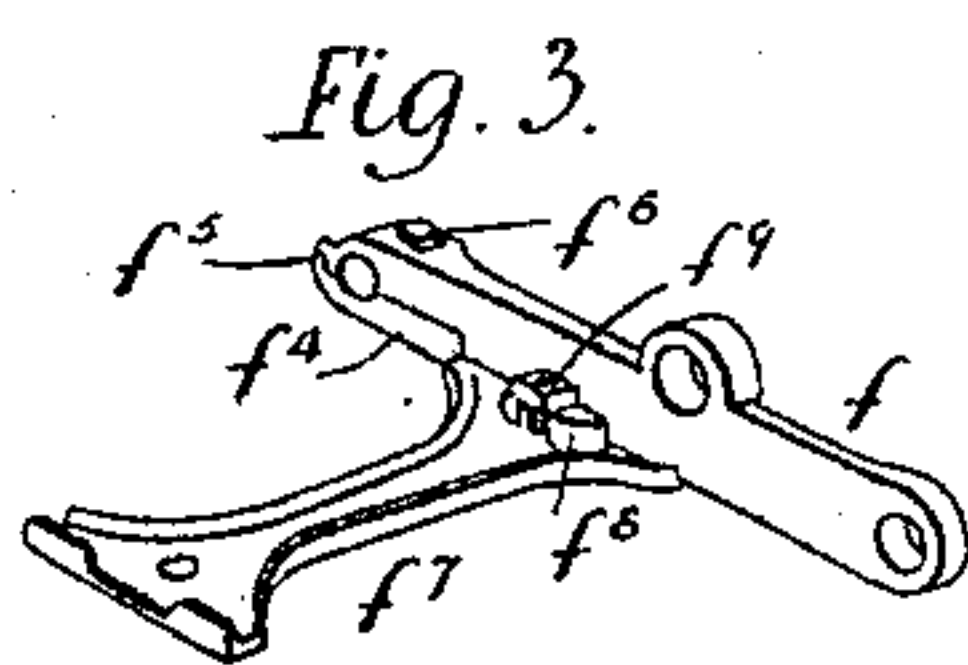
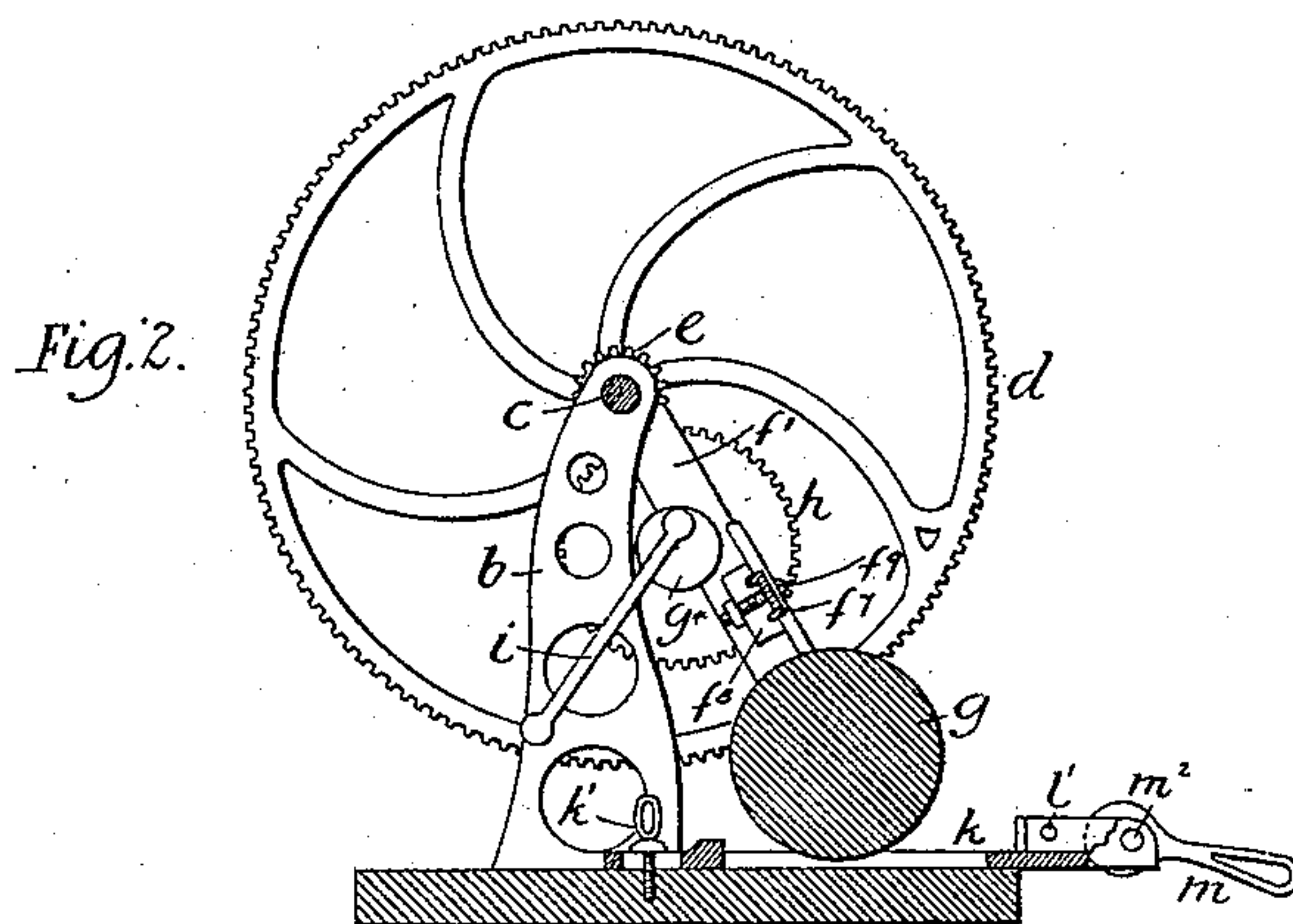
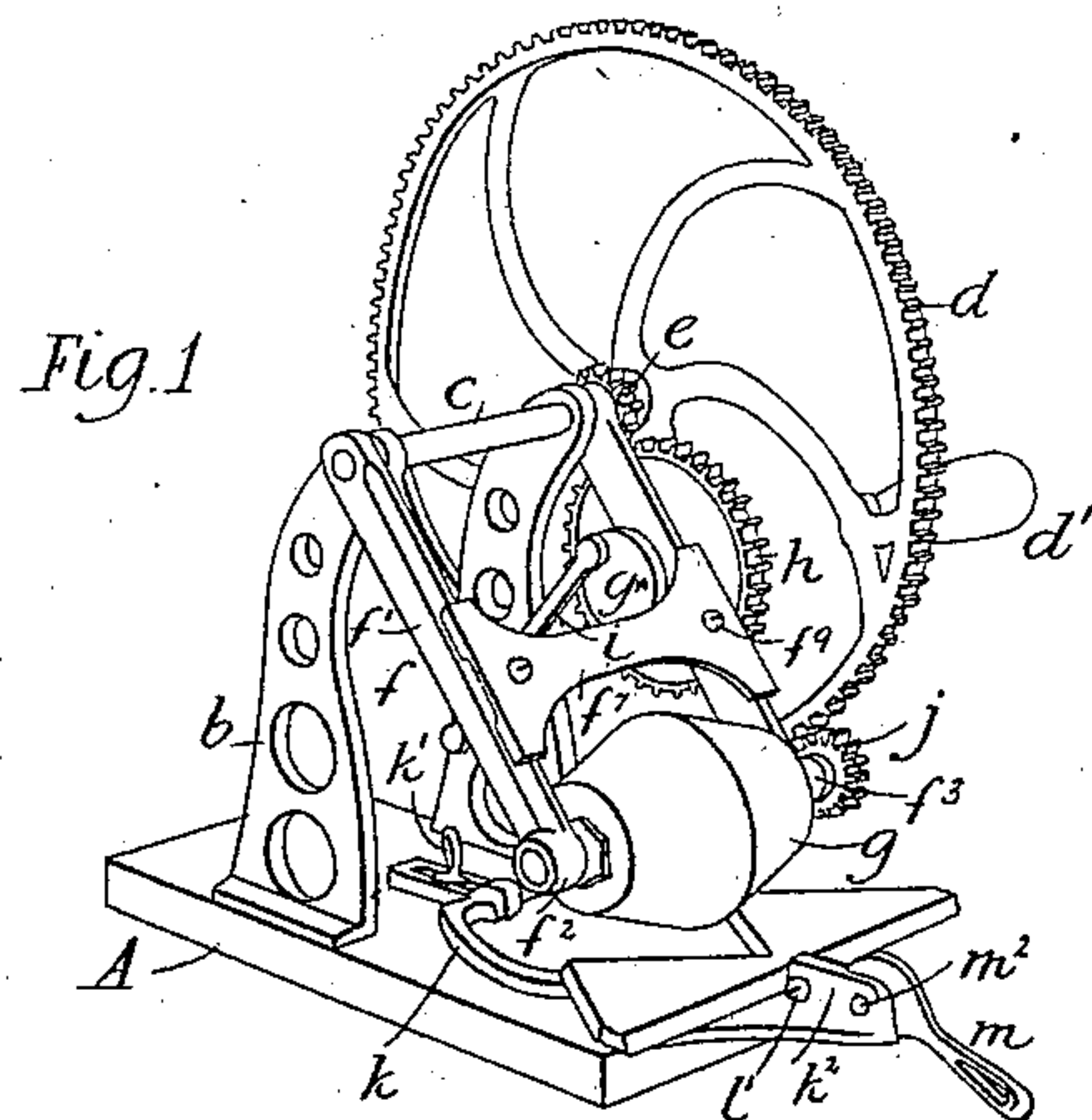


(No Model.)

D. A. DANFORTH.  
GRINDING MACHINE.

No. 575,706.

Patented Jan. 26, 1897.



Witnesses

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Inventor

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his Attorney



# UNITED STATES PATENT OFFICE.

DELOS A. DANFORTH, OF ELKHART, INDIANA.

## GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 575,706, dated January 26, 1897.

Application filed February 20, 1896. Serial No. 580,064. (No model.)

*To all whom it may concern:*

Be it known that I, DELOS A. DANFORTH, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Grinding-Machines; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to grinding-machines, and is directed more particularly to improvements in machines for grinding sickle-knives and the like.

The nature of my invention will clearly appear from a reading of the following detailed description of the same when taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of my improved grinding-machine. Fig. 2 is a vertical longitudinal sectional view. Fig. 3 is a detail perspective view of a portion of the movable frame, showing the means for assembling and securing the parts thereof. Fig. 4 is a detail sectional view, enlarged, showing the manner of mounting the crank-disk and actuating-gearing and also the means employed for attaching the pitman to said crank-disk. Fig. 5 is a perspective view of the pitman detached. Fig. 6 is a detail view of the knife-holding means.

Referring to the said drawings by letter, A denotes the base, from which extend two standards *b b* for supporting the working parts, the standards having at their upper ends bearings for the driving-shaft *c*, on one end of which is mounted the driving gear-wheel *d*, which has a suitable handle *d'*, whereby said gear and shaft may be operated by hand. The gear-wheel *d* is of comparatively large diameter, and adjacent thereto and secured to the shaft is a small gear wheel or pinion *e*.

At *f* is shown the movable frame for supporting and vibrating the grindstone, said frame comprising two arms *f' f'*, the upper ends of which are mounted on the shaft *c*, while the lower ends are provided with bear-

ings for the shaft or spindle of the grinding-stone *g*, which is of the usual double-cone shape. The bearings for the grindstone shaft or spindle are respectively lettered *f<sup>2</sup> f<sup>3</sup>*, and one of said bearings, namely, *f<sup>3</sup>*, is made in two parts or sections, the removable cap portion *f<sup>4</sup>* having a hooked end *f<sup>5</sup>*, which engages the end of the fixed portion, a bolt and nut *f<sup>6</sup>* being employed to connect the parts together after the insertion of the grindstone, the inner end of the cap being held by a cross-brace presently to be referred to. By this arrangement a flat stone may be inserted in lieu of the type shown for grinding tools or knives other than that for which the double-cone stone is employed. The arms *f'* are rigidly connected to a cross-brace *f<sup>7</sup>*, connection being made through the employment of a bifurcated lug *f<sup>8</sup>* on each of the arms and a bolt *f<sup>9</sup>*, which latter is passed through the brace and bifurcation and secured by a nut, as shown. In one of the arms *f'* is a bearing which receives the shaft *g'* of the crank-disk *g\**, said shaft being preferably integral with the disk and serving also as the shaft of the crank-disk-actuating gear *h*, which meshes with the pinion *e* on the driving-shaft. The shaft *g'* is squared at its end for connection with the gear *h*, and at *g<sup>2</sup>* is a flange or shoulder which serves by contact with the arm to provide a space between the latter and the disk.

*i* is the pitman, on one end of which is a pivot *i'*, lodged in one of the standards *b*, and at the other end is a crank-pin *i<sup>2</sup>*, which is offset at its extremity to provide a shoulder *i<sup>3</sup>* to prevent its disconnection from the crank-disk, through an aperture in which it is passed. The crank-pin has a length in excess of the thickness of the disk, the space above referred to allowing of such excess of length, and the offset *i<sup>3</sup>* is therefore beyond the inner face of the disk. The pitman is connected to the disk by first inserting the offset of the pin in the disk-aperture, which is accomplished by inclining the pitman, and as the pin is moved in farther the inclination is decreased until when the pin is entirely inserted the pitman is parallel with the face of the disk and cannot be removed therefrom except by first inclining the position of the pitman. On one end of the shaft of the grind-



stone is a pinion  $j$ , which meshes with the driving-gear and through which latter it is revolved.

$k$  denotes the knife-holding frame, which is of skeleton form and rests on the base, the inner end being slotted and secured to the base by a set-screw  $k'$ . At the outer end of the frame is a vertical plate  $k^2$ , and slidably secured thereto is a follower-plate  $l$ , which is moved to feed the knife to the grindstone. This follower-plate is slotted and connected to the plate  $k^2$  by a screw  $l'$ , passing through the slot, by which arrangement the follower-plate may be slid and held at any desired position. At the outer end of the follower-plate is a curved groove  $l^2$ , which is engaged by the cam-shaped flange  $m'$  on a cam-lever  $m$ , pivoted to the plate  $k^2$  by a screw  $m^2$ . It will be understood that when said lever is raised the follower will be drawn inward, but that as the lever is depressed the follower is moved outward against the knife and the latter is thereby fed to the grindstone. The means employed for connecting the knife-frame to the bed, *i. e.*, the set-screw, passing through a slotted portion of the frame, enables said frame, and consequently the knife, to be moved and firmly secured at any desired position with reference to the grindstone, while the cam and follower are employed as a supplemental adjusting means which is readily controlled during the grinding operation.

Referring now to the operation of my invention, it will be noted that the crank-disk and operating-gear are mounted on the movable frame, and that the latter is reciprocated through the rotation of the disk, aided by the pitman, which has one end pivotally secured at a fixed point on one of the standards. The

gear for the crank-disk and the pinion of the grindstone are always in mesh with their respective actuating parts, namely, the driving-pinion and the driving-gear, despite the range of movement of the frame, as said frame is commonly mounted with said latter pinion and gear.

The means employed for securing the parts of the frame together insure rigidity and strength, and thereby reduce the liability of disorder to the minimum.

The machine as constructed may be inexpensively produced, is durable, and by reason of the improved features great efficiency and accuracy may be obtained.

I claim as my invention—

In a grinding-machine of the class described the combination of the main frame and the driving-shaft mounted in the upper end thereof, a driving gear and pinion on said shaft, a movable frame pivotally connected at its upper end to the shaft and having a grindstone mounted in its lower end, said frame comprising two arms each of which has a bifurcated lug having bolt connection with a cross-brace connecting both arms, a shaft journaled on one of the arms and having thereon a gear-wheel meshing with the pinion, and a crank-disk, a pitman pivotally fixed to the main frame and having pivotal connection with said disk, and a pinion on the grindstone-spindle meshing with the driving-gear.

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

DELOS A. DANFORTH.

Witnesses:

ETHELYN TITUS,  
GEO. T. BARNEY.