

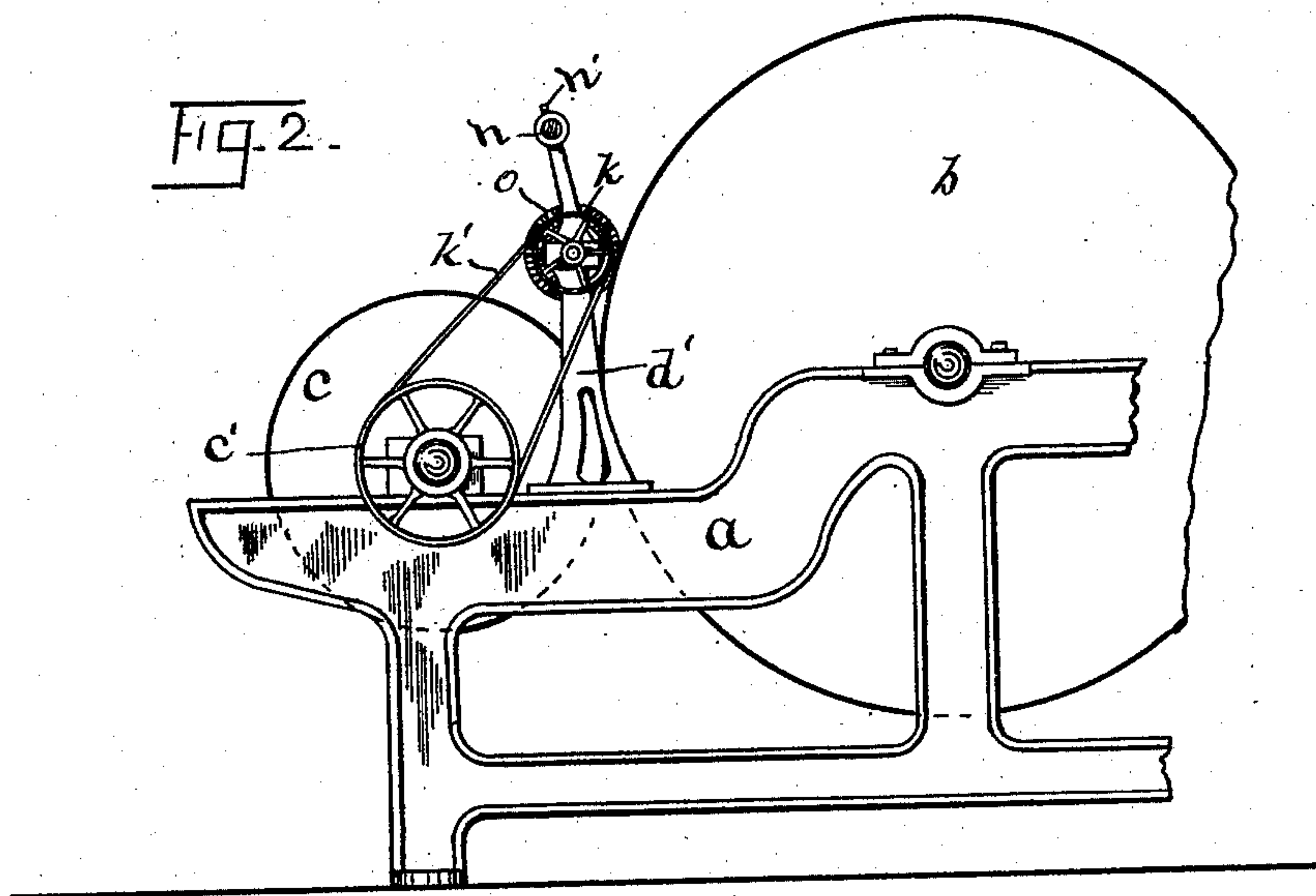
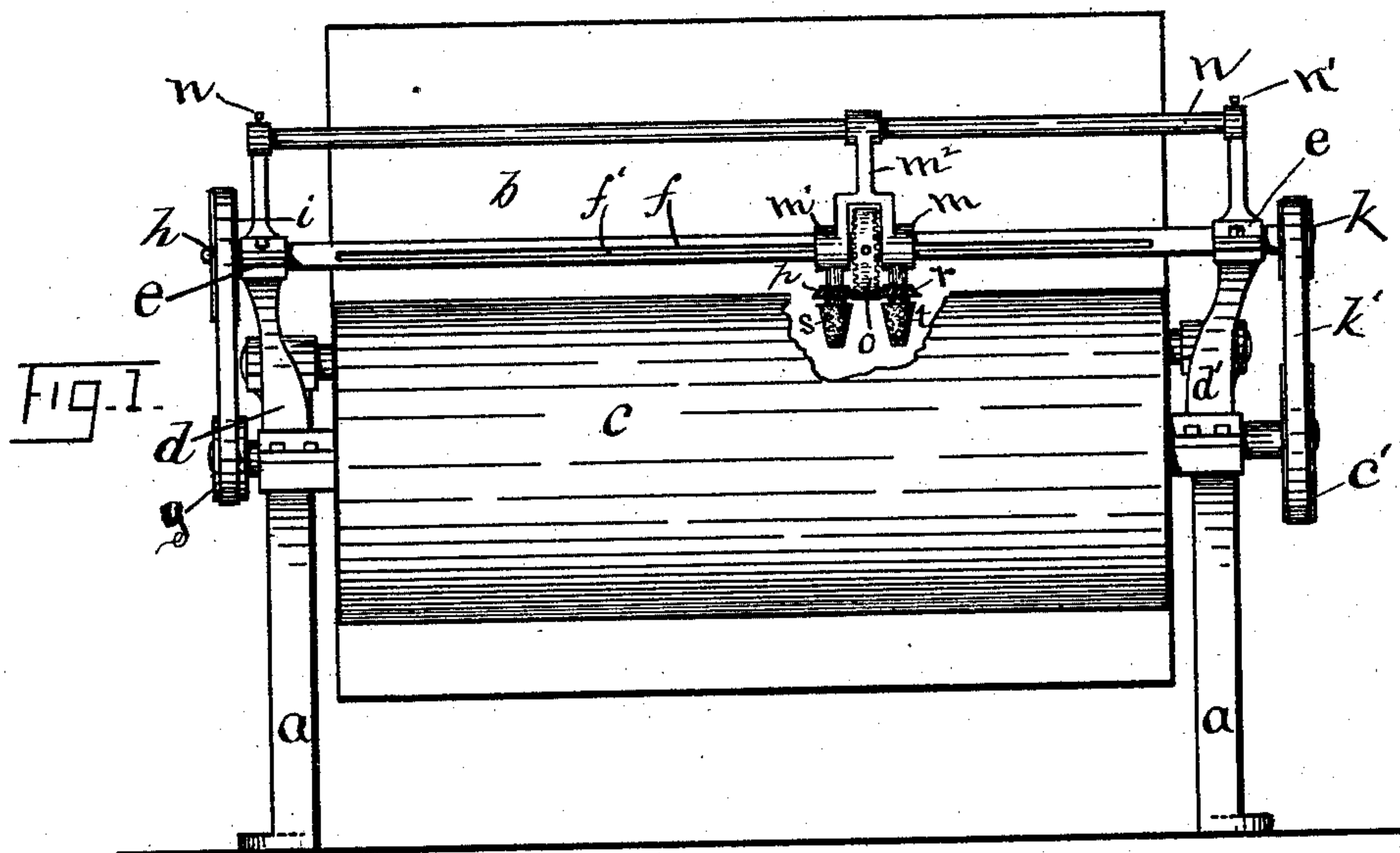
(No Model.)

2 Sheets—Sheet 1.

F. L. RICHMOND.
CARD GRINDING MACHINE.

No. 406,537.

Patented July 9, 1889.



Witnesses

Allen Tennyson
John L. Smith

Inventor

Frank L. Richmond
By his Attorney
Frank H. Allen

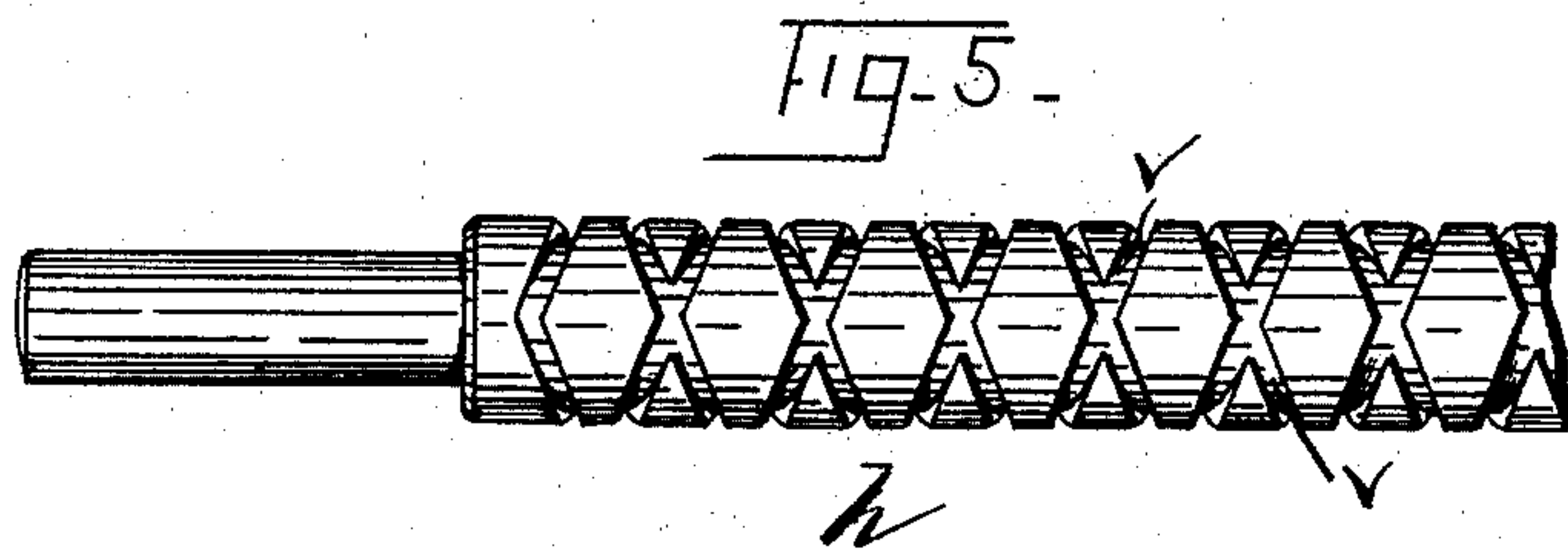
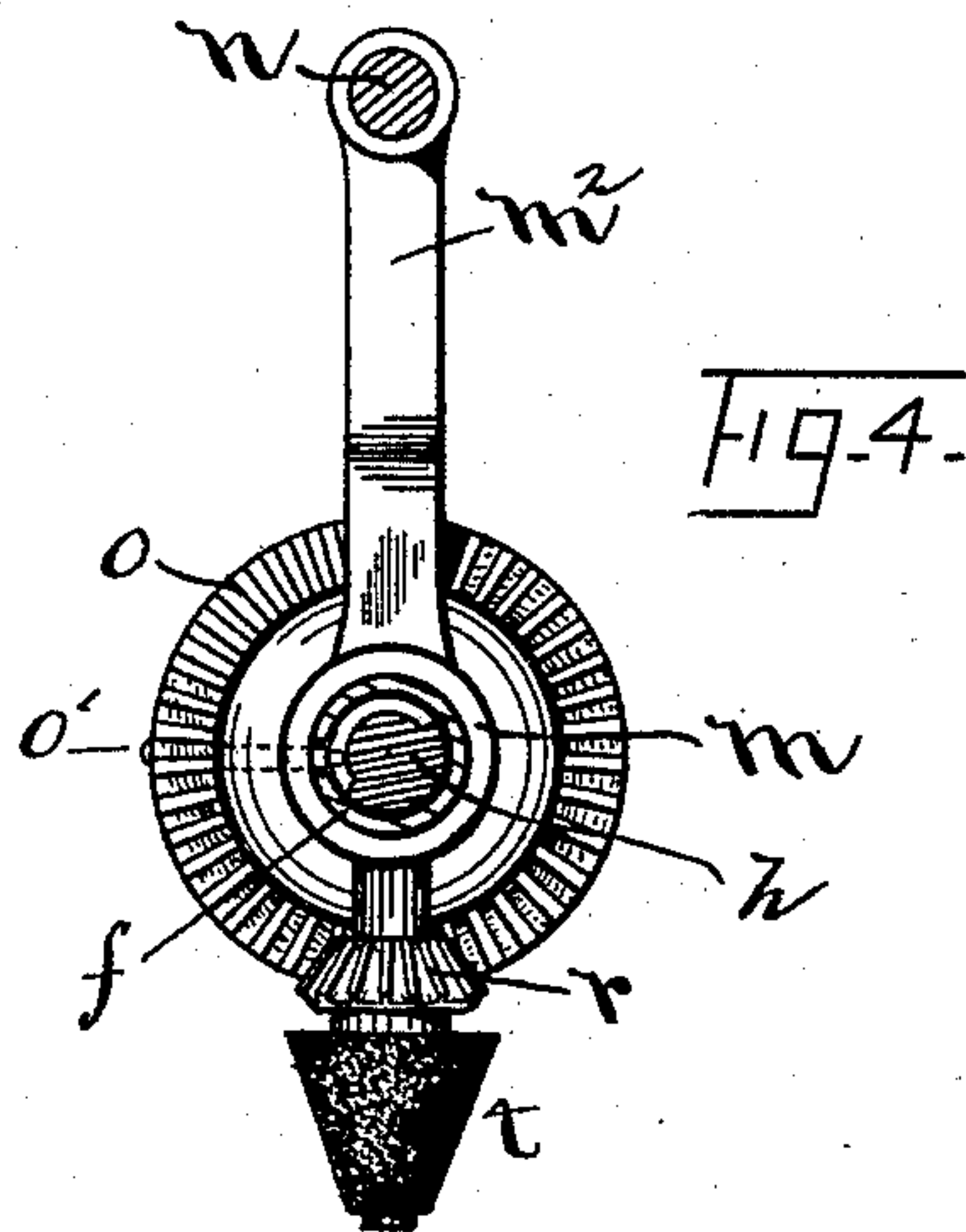
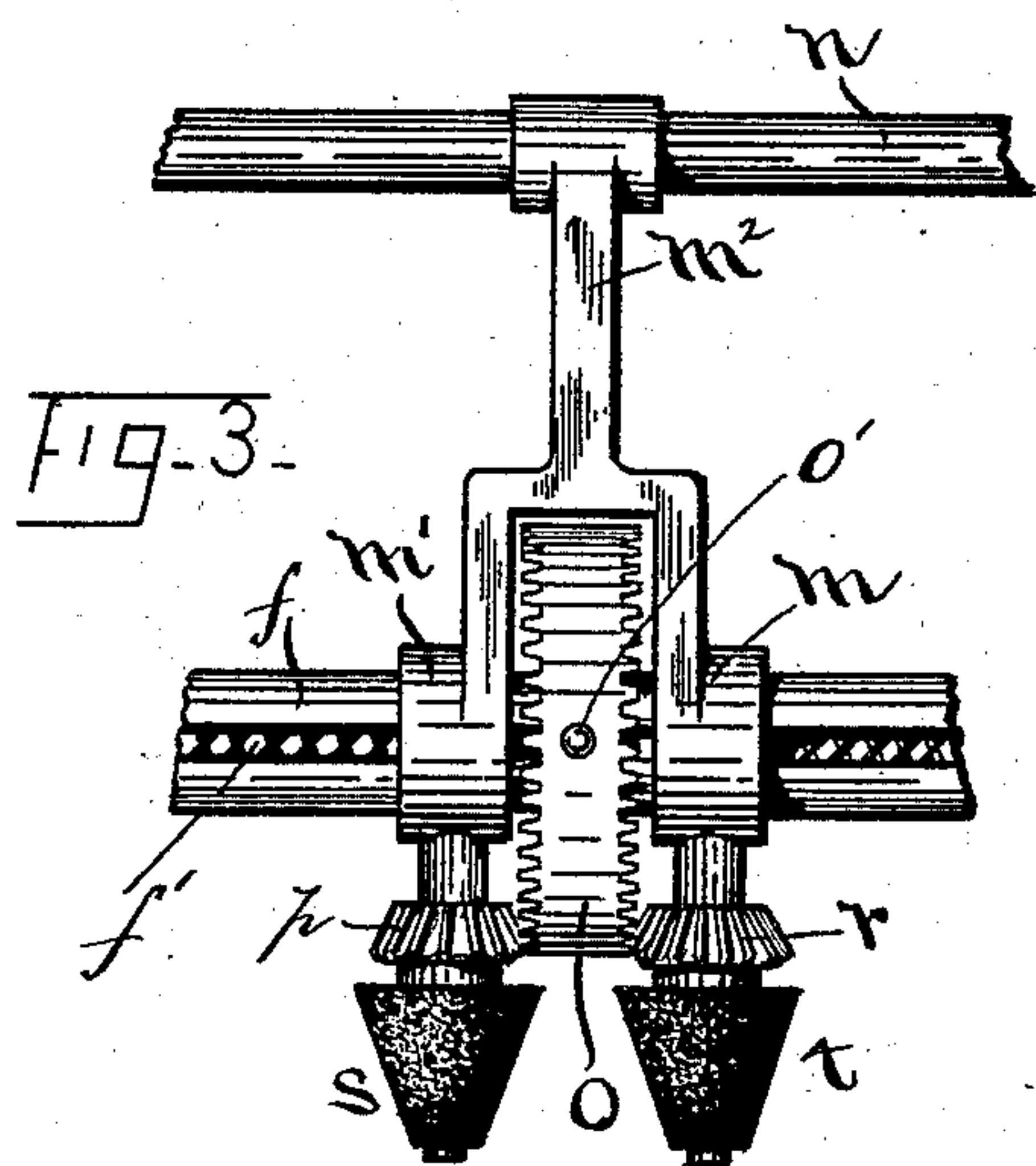
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UNITED STATES PATENT OFFICE.

FRANK L. RICHMOND, OF CENTRAL VILLAGE, CONNECTICUT.

CARD-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 406,537, dated July 9, 1889.

Application filed June 12, 1888. Serial No. 276,859. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. RICHMOND, a citizen of the United States, residing at Central Village, in the county of Windham and State of Connecticut, have invented certain new and useful Improvements in Card-Grinding Machines, which improvements are fully set forth and described in the following specification, reference being had to the accompanying drawings.

This invention is in the class of grinders used in sharpening the so-called "card-clothing" covering the main cylinder and doffer of carding-machines; and said invention has for its immediate object the production of grinding mechanism by means of which the card-teeth may be "needle-pointed" instead of simply ground to a "chisel-point," as commonly practiced heretofore.

In carrying into practice my improvements I have utilized a traverse movement common to this class of devices, and therefore make no claim to said traverse mechanism in itself.

To assist in explaining those portions of the complete device that are believed to be novel and useful, I have annexed hereto two sheets of drawings, in which—

Figure 1 is a side elevation of the frames of a carding-machine, with the main cylinder and doffer-roll hung therein and having attached thereto my new form of grinder, a portion of the doffer being cut away to expose to view said grinder. Fig. 2 is an end view of said cylinder and doffer and such other connected parts of a carding-machine as are necessary to illustrate the manner of attaching the grinding mechanism. Fig. 3 is an enlarged detached front view of the grinder proper. Fig. 4 is an end view of the same. Fig. 5 is an enlarged view of one end of the shaft that causes the grinder to traverse back and forth during the act of grinding.

Referring to said drawings, the letters *a* indicate the supporting-frames of the carding-machine, *b* the main card-cylinder, and *c* the doffer-roll, said elementary parts being constructed and located relatively to each other as in machines of this class.

d d' indicate stands secured to frames *a*, between the bearings of the cylinder and doffer. These stands have bearings *e*, that support a

hollow shaft *f*, on which my grinder travels, and also the shaft *h*, by means of which said grinder is made to traverse steadily from side to side of the machine, as hereinafter explained. The arrangement of these shafts should be such that the inner one *h* travels very slowly, while the outer shaft or tube *f* revolves on or around it. This result may be accomplished by belting from a pulley *g* on the doffer-roll shaft to a pulley *i* on shaft *h*, as shown in Fig. 1, and by rotating the tubular shaft by means of a similar system of pulleys *c' k* and connecting belt *k'* at the opposite end of the machine.

The carriage that supports my grinder proper is formed preferably of metal, with its lower portion forked, as at *m m'*, and bored to fit loosely on the tubular shaft *f*. Projecting upward from said forked portion is an arm *m²*, that is bored to fit and slide on a fixed rod *n*, that is supported at its ends by extensions on stands *d d'* and held in place by set-screws *n'*. This rod *n* is parallel with the shaft *f* on which the grinder-carriage travels, and is provided to steady said carriage and prevent it from rocking or rotating with the hollow shaft. Between the sections *m m'* of said carriage is a double crown-wheel *o*, having on its opposite faces teeth that mesh with bevel-gears *p r*, hung on spurs or studs projecting downward from said carriage. These bevel-gears carry with them cone-shaped wheels or rolls *s t*, covered with or made of emery or other suitable grinding material, the pitch or inclination of said emery-rolls being so calculated that the proper bevel may be given to the card-teeth. The hollow shaft *f* is channeled longitudinally, as at *f'*, and the gear *o* is provided with a pin or screw *o'*, that projects into said channel and serves as a spline or feather that causes said gear to rotate with its shaft, yet allows it (the gear) to travel from end to end of said shaft. When the several parts thus far described are properly assembled and power is applied to rotate shaft *f*, the emery-rolls *s t* will be rapidly rotated, and in order to cause said rolls to simultaneously travel back and forth across the card-teeth the inner shaft *h* is formed with an endless channel or double spiral groove *v*, that leads backward at each end of

the shaft and is interlaced with itself, as shown in Fig. 5 of the drawings. The end of pin *o'* extends into and follows the spiral groove *v* as gear *o* rotates, thus moving the grinder-carriage laterally until the end or turning-point of said groove is reached, when the movement is reversed and said carriage travels in the opposite direction, this traversing movement being continued automatically so long as shaft *f* is kept in motion.

During the operation of grinding, the cylinder *b* and doffer-roll are kept in rotary motion in the direction opposite to that practiced when they are performing their functions as elements of a carding-machine, and the bent ends of the wire card-teeth are brought into such an acute angle of contact with the vertical emery-rolls that the ends of said teeth are ground to nearly a needle-point instead of simply flattened, as invariably results when horizontal grinders of the common form are employed.

My new form of grinder is not expensive to manufacture, and could be added to many of the traverse movements in common use without any material changes.

The peculiar manner employed by me to transmit rotary motion to the emery-rolls allows the shaft *f* and gear *o* to be run at a comparatively slow speed and yet attain the necessary high speed of said emery-rolls.

Having described my invention, I claim—

1. In combination with a longitudinally-channeled shaft and mechanism for rotating the same, a forked grinder-carriage, a double crown-wheel splined on said shaft between the forks of said carriage, bevel-gears supported by said carriage engaging said crown-wheel and carrying emery-rolls, as set forth, and mechanism for moving said grinder laterally on its shaft, substantially as and for the purpose specified.

2. In combination with a longitudinally-channeled shaft and mechanism for rotating the same, a fixed rod parallel with said shaft and adjacent thereto, a forked grinder-carriage fitted at one end to slide on said channeled shaft and at the opposite end to slide on said parallel rod, a double crown-wheel embraced by the fork of said carriage and splined on said channeled shaft, bevel-gears supported by said carriage meshing with said crown-wheel and carrying conical emery-rolls, as set forth, and mechanism for moving said grinder laterally on its shaft, substantially as and for the purpose specified.

FRANK L. RICHMOND.

Witnesses:

K. H. LEOVENS,
H. TRUESDELL.