(No Model.)

P. BLACKIE & J. NISBET.

MECHANICAL MOTION.

No. 458,746. Patented Sept. 1, 1891.

Fig. 1.

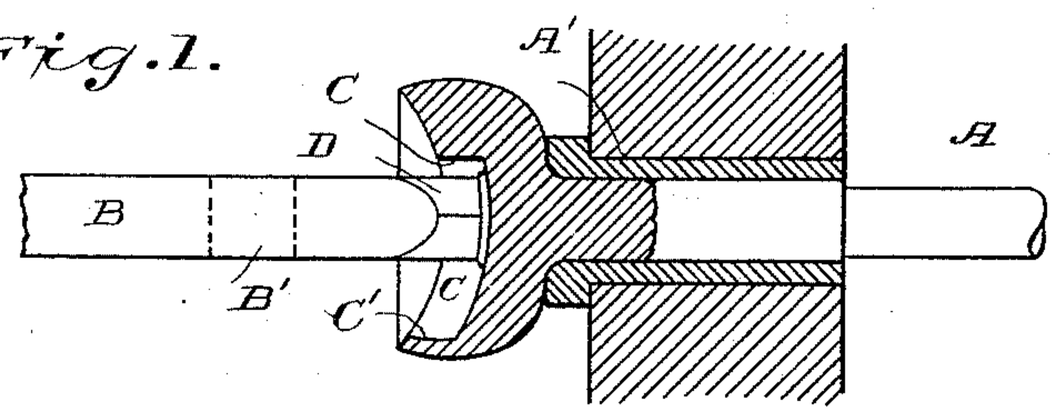


Fig. 2.

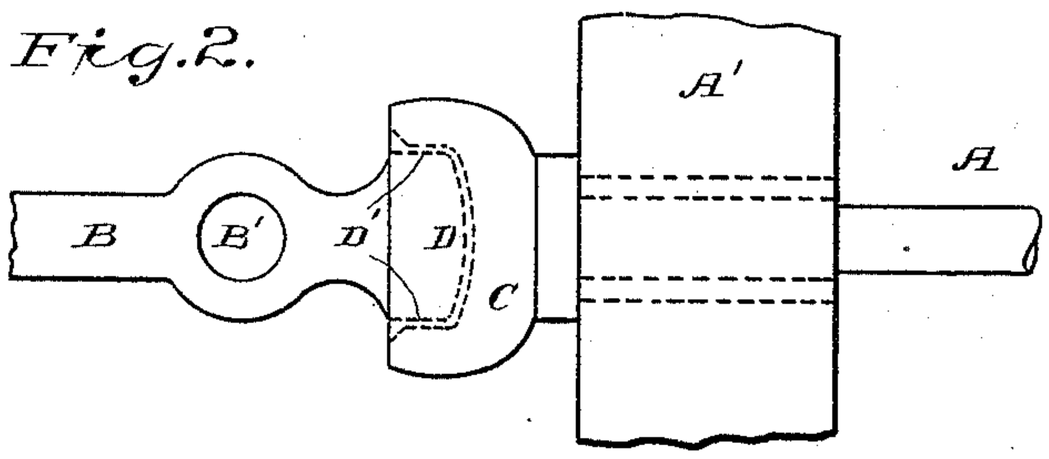


Fig. 3.

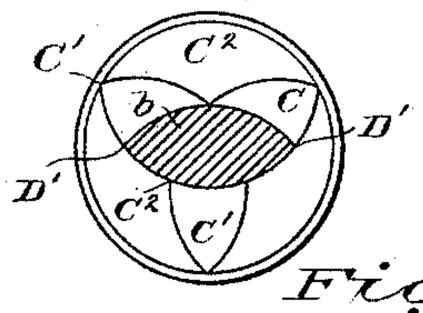


Fig. 6.

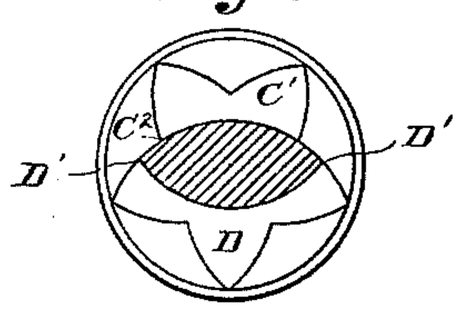


Fig. 7.

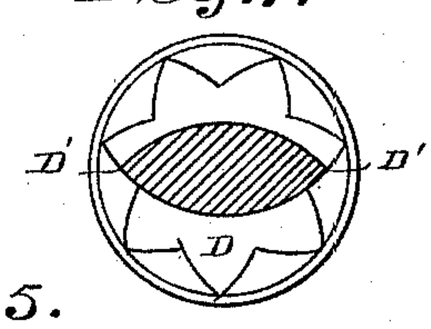


Fig. 4.

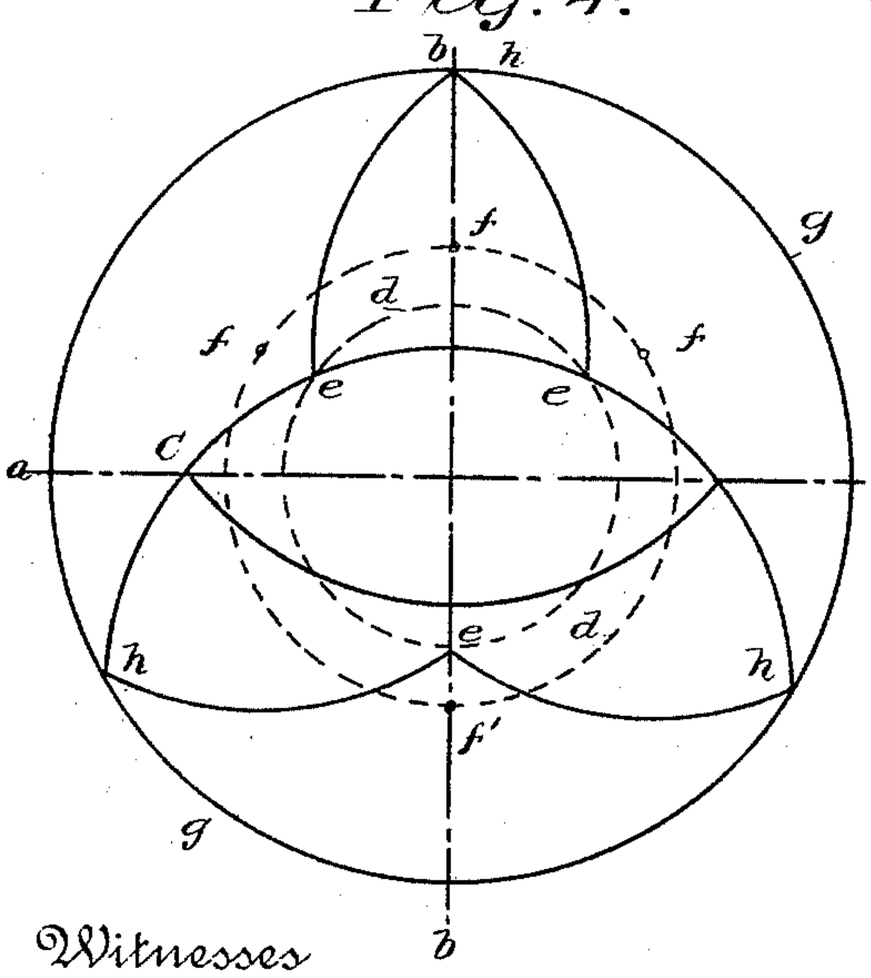
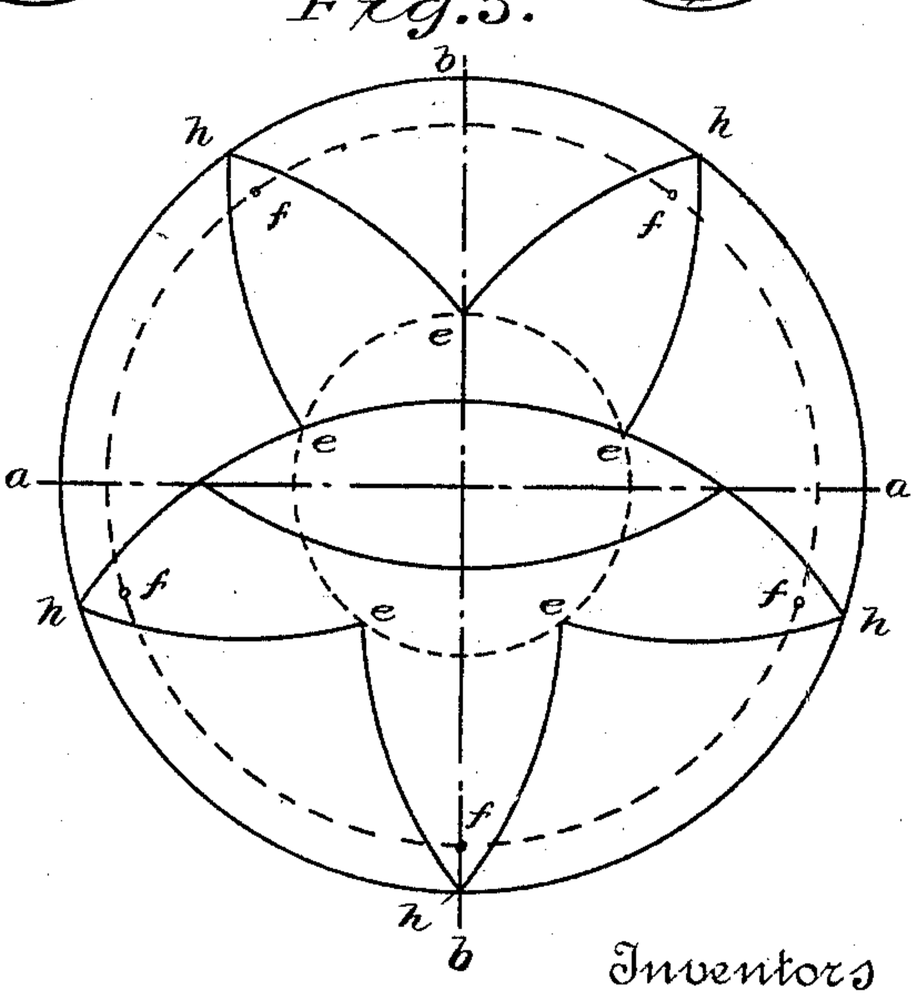


Fig. 5.



Witnesses
H. F. Lamb
C. L. Sturtevant.

Inventors
Patrick Blackie
John Nisbet
By Richards & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

PATRICK BLACKIE, OF REDFERN, NEAR SYDNEY, AND JOHN NISBET, OF COOLABAH, NEW SOUTH WALES.

MECHANICAL MOTION.

SPECIFICATION forming part of Letters Patent No. 458,746, dated September 1, 1891.

Application filed October 13, 1890. Serial No. 368,047. (No model.)

To all whom it may concern:

Be it known that we, PATRICK BLACKIE, engineer, residing at Redfern, near Sydney, in the British Colony of New South Wales, and JOHN NISBET, grazier, residing at Coolabah, in the said British Colony, both subjects of the Queen of Great Britain, have invented a new and useful mechanical motion entitled "An Improved Mechanical Motion," of which the following is a specification.

This invention relates to an improved mechanical motion which has been devised specially to provide compact gear for converting rotary into reciprocating motion and at the same time multiplying or increasing the speeds or number of strokes of the one in relation to the number of revolutions of the other. While this motion is suitable for converting rotary into reciprocating motion, yet it may be found useful for the conversion of reciprocating into rotary motion if the latter be provided with means for overcoming dead-points or dead-centers. This motion is especially useful for converting the motion of the revolving spindle into the reciprocating motion of the cutters in sheep-shearing machines; but it may also be applied in machines for other purposes.

This improved mechanical motion is comprised in the combination and arrangement, with a female star or peculiarly-recessed disk, or, as we term it, a "femestar," of a male or tongue, or, as we term it, a "diametang," gearing in and with the recesses of the female star, and adapted the former to revolve and the latter to have reciprocating motion.

In order that this invention may be clearly understood, we will now describe the same with reference to the drawings herewith, in which—

Figures 1 and 2 are a section and a plan, respectively, of the improved mechanical motion, the reciprocations being to the revolutions as three to one. Fig. 3 is a face view of the femestar and a section of the diametang of the same. Figs. 4 and 5 are diagrammatic plans showing designs or drafts of the improved mechanical motion; and Figs. 6 and 7 are views similar to that in Fig. 3, but in these cases the ratios of speed of reciprocations and revolutions are five to one and seven to one, respectively.

A is the revolving spindle; B, reciprocating lever; C, femestar, and D diametang.

A′ is the bearing; B′, fulcrum; C′, outer angles; C^2, inner angles, and D′ extremes.

In operation, should spindle A be revolved, the lever B will be reciprocated on fulcrum B′ by the action of the inner angles C^2 upon the curved surfaces of the diametang D, impelling it to turn or revolve; but as it can only move horizontally it is thrust backward and forward by the wedging action of the contact of said inner angles C^2.

The peculiar recesses of the femestar are set out as follows: The stroke and length of the diametang being determined, we draw two straight lines *a* and *b* at right angles, and upon one of them *a* set out the length of the diametang, as at points *c*. Now with a radius equal to half the length of diametang less half the stroke a circle *d*, termed the "motion circle," is drawn, which circle is equally divided into the same number of parts (as three, five, seven, &c., or other uneven number) as angles are required in the femestar. These divisions, one of which must be upon line *b* at right angles to the length of the diametang, are marked *e* and fix the internal points of the femestar. The curve of the diametang is now ascertained by drawing a circle cutting the extremes or points *c* and the two of the points *e*, respectively, nearest to points *c* on either side of line *b*, and thus obtaining center *f*′. With the same radius and from centers *f* equidistant from the main center and equidistant from each other the remaining curves of the femestar and diametang are drawn and the whole finished with a circumference *g*, drawn through the outside points *h*, where the circles meet.

The design or draft just described is correct where the reciprocation is in a straight line, and is also suitable where reciprocation is a rocking motion from a near center, as in small gears, in which case the necessary concavity of the disk is small and would give little variance; but where there is longer reciprocation or more concavity of disk in designing and drafting the femestar allowance would have to be made for the same.

Having now particularly described and explained the nature of our said invention and

the manner in which the same is to be performed, we declare that what we claim is—

1. The improved mechanical motion comprised in the combination and arrangement, with a shaft A, of the star-recessed disk or femestar *c*, adapted to revolve with said shaft, the reciprocating lever B, and the tongue or male or diametang D, fastened to said lever B and adapted to gear in said femestar and to reciprocate the lever B, substantially as set forth.

2. The improved mechanical motion comprised in the combination and arrangement, with a shaft A, of the star-recessed disk or femestar *c*, adapted to revolve with said shaft, the reciprocating lever B, and the tongue or male or diametang D, fastened to said lever B in line with said shaft A and adapted to gear in said femestar and to reciprocate the lever B, substantially as set forth.

3. In an improved mechanical motion, the combination consisting of the shaft A, the star-shaped disk or femestar *c*, fastened to said shaft and having angular projections, and the male or diametang D, having elliptically-shaped surfaces geared in said femestar and adapted to be moved laterally by the action of the angular projections upon the elliptically-shaped surfaces, substantially as set forth.

In witness whereof we have hereunto set our hands in presence of two subscribing witnesses.

PATRICK BLACKIE.
JOHN NISBET.

Witnesses:
N. P. SHERMAN,
THOMAS JAMES WARD.