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Patented Feb. 18, 1902.

A. C. KREBS.
CONE CLUTCH.

(Application filed Feb. 8, 1901.)

(No Model.)

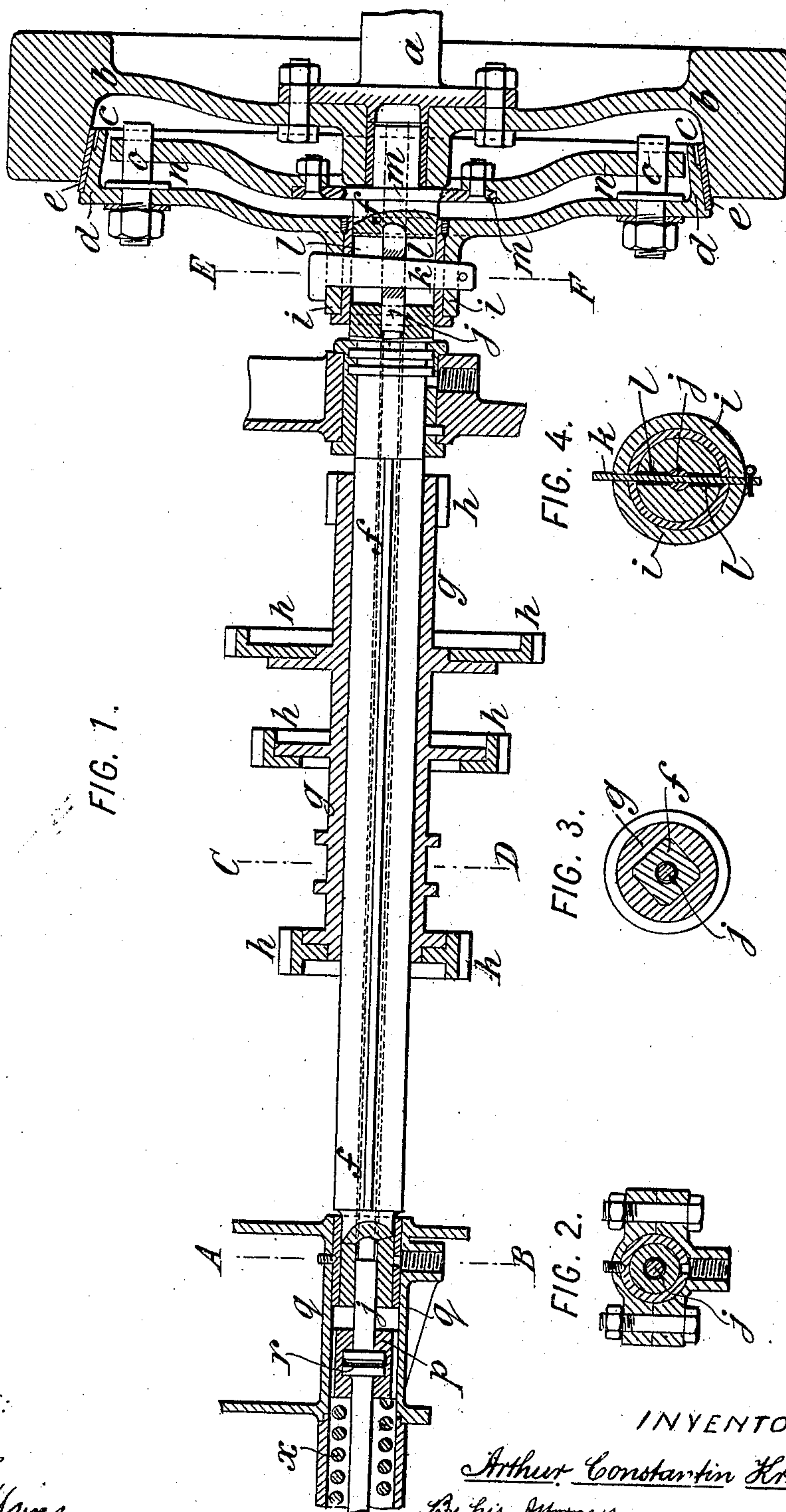


FIG. 1.

FIG. 4.

FIG. 3.

FIG. 2.

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CONE-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 693,551, dated February 18, 1902.

Application filed February 8, 1901. Serial No. 46,471. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR CONSTANTIN KREBS, engineer, a citizen of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Cone-Clutches, of which the following is a specification.

This invention relates to a system of friction-clutch for motor-cars and other purposes, in which the male cone is fitted with a sliding fit on the shaft which it drives and on which it can therefore slide, so as to engage in the female cone under the pushing action of a spring. In the systems of friction-clutches now in use the cone is fixed on the shaft, which must therefore be moved. Consequently when it begins to enter the female cone the shaft is caused to rotate. The resulting rotary force is transmitted from the shaft to the sleeve which carries the driving-gear. At this point the friction is considerable by reason of the fact that the moment-arm of the force applied at the circumference of the cone is much greater than the moment-arm of the resistance at this point. Consequently a considerable force is required to move the shaft through the sleeve to complete the engagement of the conical surfaces of the clutch. Where a spring is employed to accomplish the clutching movement, this is an especially objectionable feature.

In my new system it is not the shaft that is moved longitudinally, but a central rod which is connected by a key to the male cone, and the driving of the shaft is effected by studs which are carried by the male cone and engaged with sliding fit in slots provided at the end of a lever-arm fixed to the driven shaft. As these studs are arranged near the circumference of the friction-cone, the frictional resistance to their longitudinal movement during the final clutching movement is reduced to a minimum, and consequently the clutching is effected without difficulty.

The annexed drawings show in Figure 1 a longitudinal section of my clutch; and Figs. 2, 3, and 4 are transverse sections on the lines A B C D E F, respectively, of Fig. 1.

The motor-shaft *a* carries the fly-wheel *b*, hollowed to form the female cone *c*. The male cone *d*, covered with leather *e*, is mount-

ed with a good sliding fit on the shaft *f*, a squared part of which carries the sliding sleeve *g*, on which are pinions *h*, which serve, for instance, in the case of motor-car gear to vary the speed of the counter-shaft, which is not shown. The cone *d* can slide along the shaft *f*. Its nave *i* is connected to a rod *j*, which slides in the center of *f* by a key *k*, passing through a slot *l* on the shaft. This slot *l* allows lateral play, so that the key is free in it and not subject to lateral friction. On the end of the shaft *f* is a disk *m*, having two or more projecting arms *n*, having slots in which are engaged with a sliding fit studs *o*, fixed to the cone *d*, so that the arms *n* can be driven by the cone without moving the cone longitudinally on the end of the shaft *f*.

When the shaft *a* has to be clutched to *f*, the spring *x* is left free to press the sliding piece *p* in the sheath *q* and push the head *r* of the rod *j*, moving the cone *d* into the female cone *c* by the pressure of the key *k*. The cone *c* then drives *d*, and this, by means of its studs *o* acting in the slots of the arms *n*, drives the shaft *f*. As this shaft has not to be moved lengthwise there is no friction between it and the sleeve *g*, so that the force of the clutching-spring can easily insure good engagement of the cones *c* and *d* and complete contact of their surfaces.

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

1. In a cone-clutch, the combination with a fixed cone and power-shaft, of a movable cone and driven shaft, means for connecting said driven shaft with said movable cone at a point near the circumference of said movable cone, whereby the frictional resistance to further movement of the movable cone relatively to the driven shaft is reduced to a minimum, an operating-rod passing through said shaft, a slot *l* in said shaft, and a key *k* connected to said operating-rod and passing through said slot *l* freely so as to have some play and to avoid friction at this point and connected to said movable cone.

2. In a cone-clutch, the combination with a fixed cone and power-shaft, of a movable cone and driven shaft, means for connecting said driven shaft with said movable cone at a

point near the circumference of said movable cone whereby the frictional resistance to further movement of the movable cone relatively to the driven shaft is reduced to a
5 minimum, comprising arms projecting from said shaft and engaged near their outer ends by said movable cone, and an operating-rod passing through said shaft, a slot *l* in said shaft, and a key *k* connected to said operat-
10 ing-rod and passing through said slot *l* freely so as to have some play and to avoid friction at this point and connected to said movable cone.

3. In a cone-clutch, the combination with a
15 fixed cone and power-shaft, of a movable cone and driven shaft, means for connecting said driven shaft with said movable cone at a point near the circumference of said movable cone whereby the frictional resistance to fur-
20 ther movement of the movable cone rela-

tively to the driven shaft is reduced to a minimum, comprising arms projecting from said shaft and engaged near their outer ends by said movable cone, an operating-rod pass-
25 ing through said shaft, a slot *l* in said shaft, and a key *k* connected to said operating-rod and passing through said slot *l* freely so as to have some play and to avoid friction at this point and connected to said movable cone,
30 and a spring *x* for moving said operating-rod to bring said cones into and out of engagement.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ARTHUR CONSTANTIN KREBS.

Witnesses:

EDWARD P. MACLEAN,
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