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PATENTED MAY 12, 1908.

M. W. O'BRIEN.
GRIP CLUTCH MECHANISM.
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Fig. 1.

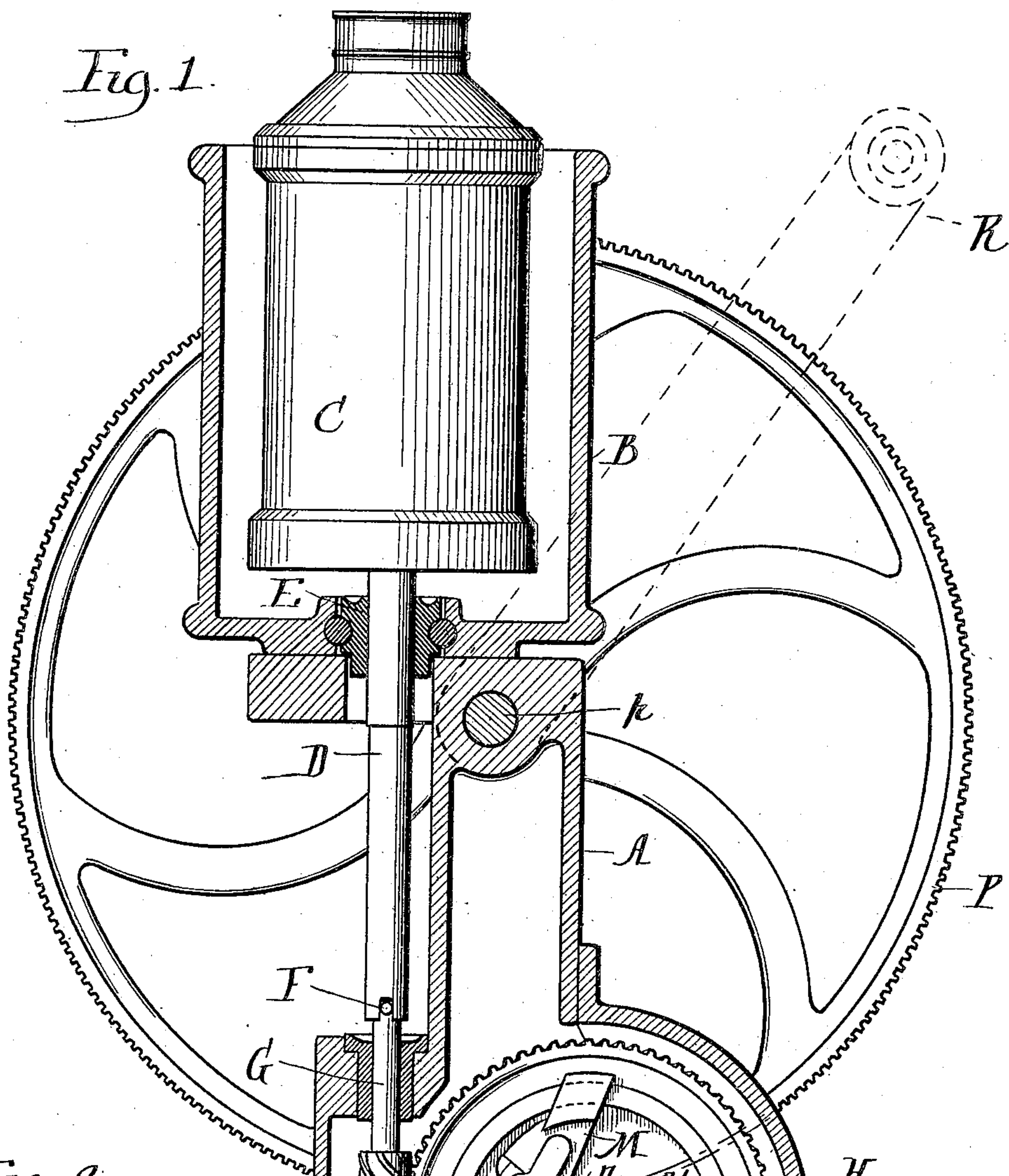
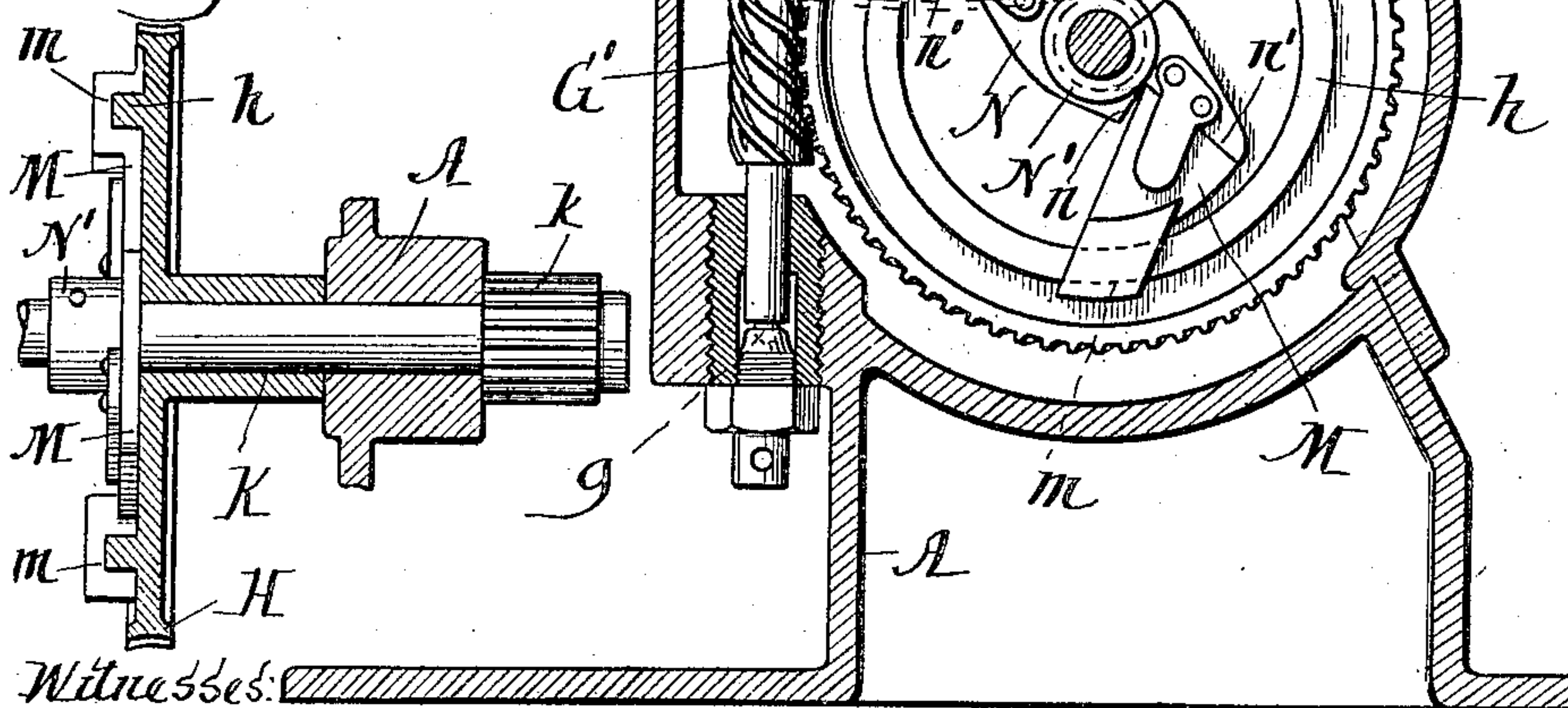


Fig. 2.



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UNITED STATES PATENT OFFICE.

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GRIP-CLUTCH MECHANISM.

No. 887,114.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed April 14, 1904. Serial No. 203,059.

To all whom it may concern:

Be it known that I, MILES W. O'BRIEN, a citizen of the United States, and a resident of the city of Ottawa, in the county of Lasalle, State of Illinois, have invented certain new and useful Improvements in Grip-Clutch Mechanism, of which the following is a full, clear, and exact description.

The present invention has for its object to provide an improved construction of grip clutch, which, while susceptible of use in other situations, is more particularly designed as a connection intermediate between the main gear wheel and the bowl spindle of a centrifugal separator.

In centrifugal machines for separating cream from milk it is highly desirable that a grip clutch be employed between the main gear wheel and the bowl spindle for a variety of reasons well recognized by those familiar with this class of centrifugal separators. Thus, in starting the machine, it is desirable that the operator be able by a "pumping" or vibratory motion of the crank (if the machine be a hand machine) to gradually set the bowl in motion. So also, after the bowl has acquired the necessary speed, it is highly important that no sudden interference should be had with the running of the mechanism, as serious injury would be apt to result therefrom. Hence, the need of an efficient clutch mechanism between the driving gear and the bowl spindle in order to prevent danger of accident or injury by reason of the sudden interference or stoppage of the machine.

The object of the present invention is to provide a simple and effective grip clutch, and the invention consists in the features of improvement hereinafter described, illustrated in the accompanying drawing, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view in vertical section through a centrifugal cream separator embodying my invention. Fig. 2 is a detail view in vertical section through the clutch mechanism, parts being shown in elevation.

The main frame A of the machine may be of the usual or any suitable construction. As shown, the main frame A carries at its top a casing or jacket B within which sets the separator bowl C that is secured to the upper

end of the vertical bowl spindle D. A yielding bearing E is interposed between the bowl spindle D and the casing or jacket B and the lower end of the bowl spindle D is connected as at F to the upper end of the worm spindle C. This worm spindle C is held within suitable bearings in the main frame, the lower end of the spindle G being mounted upon a ball-bearing g. With the worm G' of the spindle G engages the worm wheel H that is mounted upon a shaft K suitably journaled in the main frame A of the machine. The hub of the worm wheel H sets loosely upon the shaft K and upon the side of this worm wheel H is formed an annular flange or shoulder h. The wheel H with its annular shoulder h comprises one member of my improved clutch and the other member of this clutch consists of one or more grip arms M (two of such arms being preferably employed), that have jaws at their outer ends to engage with the annular flange or shoulder h of the wheel H.

As shown, each of the grip arms M has its outer end formed with a channel or recess m between the inner and outer jaws of the arm, and the annular flange or shoulder h of the wheel H sets within the elongated channel m of each of the arms M. The channel m is of slightly greater width than the flange h and preferably each of the grip arms M is shaped substantially as shown, and is adapted to set loosely within a V-shaped recess that is formed in an extension N of a hub N' that is fixed to the drive-shaft K.

Each of the diametrically disposed extensions N of the hub N' is formed with a radial shoulder or offset n' and a tangential shoulder or offset n. The radial shoulders extend outwardly to points closely adjacent the annular flange h and are arranged to engage the ends of the grip arms M while the shorter tangential shoulders are arranged to engage the inner portions of the sides of the grip arms. The flat inner ends of the grip arms M are provided with straight edges that are disposed between the hub N' and the flange h and extend in radial direction from the hub outwardly to points adjacent the flange, so as to have a firm bearing upon the radial shoulders of the hub extensions. The grip arms are set loosely between the shoulders

of the hub extensions and are freely movable to a limited extent between the same. When the shaft K is rotated in proper direction to bring the short tangential shoulders *n* against the inner portions of the sides of the arms M, a twisting or lateral thrust will be exerted upon the arms and the jaws thereof will firmly engage the flange *h* of the wheel H so that the latter will rotate with the shaft. If the movement of the shaft is arrested or moved at a slower speed than the wheel, the radial arms N' of the hub will be brought to bear against the outer portions of the inner ends of the arms to exert a pressure thereon at points adjacent the annular flange and in a direction substantially in line with the slots or channels of the gripping jaws and the latter will be instantly released from binding engagement with the flange *h* so that the wheel H may rotate independently of the shaft K.

The shaft K carries at its outer end a pinion *k* that meshes with the teeth of the main gear wheel P that is mounted upon a shaft *p* that is journaled in the top of the main frame A. The opposite end of the shaft *p* has connected thereto a crank handle R, shown by dotted lines in Fig. 1, by which revolution will be imparted to the centrifugal bowl through the gearing connecting the crank handle therewith.

From the foregoing description it will be seen that in starting the machine, the operator can at the outset vibrate the crank arm R in vertical direction until the inertia of the parts is overcome, this vibration or "pumping" action of the crank handle R being permitted because as the handle R is raised, the off-sets or shoulders *n* will, as hereinbefore described, cause the grip arms to engage and drive the wheel H and parts connected therewith, whereas when the crank arm R is lowered, the grip arms M will be released from gripping engagement with the wheel H. When the inertia of the parts is overcome, the operator will revolve the crank handle R and when the separation of the cream from the milk has been effected, the operator will allow the crank handle to remain idle and at such time the grip arms M will automatically release the flange *h* of the wheel H so that the revolution of the bowl C, the spindle G and the wheel H will continue independently of the shaft K, the gear wheel P or the crank R. Hence it will be seen that any accidental interference or stoppage of the exposed gear wheel P or the crank handle R will have no effect upon the movement of the centrifugal bowl or of the spindle and worm gear connected therewith.

I wish it understood that while I have described what I regard as the preferred embodiment of my invention, the precise details of construction above set out may be

varied by the skilled mechanic without departing from the spirit of the invention. I prefer to provide the clutch with two gripping arms, as shown, since a more uniform and effective driving of the gear wheel can thus be had.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In grip clutch mechanism, the combination with a drive shaft, of a wheel loosely mounted on said shaft and provided on one side with a projecting, annular flange, a hub fixed to said shaft, and a pair of arms having slotted gripping jaws at their outer ends for engaging said flange, said arms having straight inner ends arranged between said hub and said flange and extending radially from said hub to points adjacent said flange, said hub being provided with oppositely arranged extensions having radial and tangential shoulders for engaging the ends and sides of said arms respectively, said arms being loosely set between said shoulders and free to move to a limited extent between the same, the radial shoulders of said extensions being arranged to engage the ends of said arms at points adjacent said annular flange and to exert a pressure thereon substantially in line with the slots of the jaws and the tangential shoulders of said hub being arranged to engage the sides of said arms at points adjacent the axis of revolution, substantially as described.

2. In grip clutch mechanism the combination with a drive shaft, of a wheel loosely mounted on said shaft and provided on one side with a projecting, annular flange, a hub fixed to said shaft, and a pair of arms having slotted gripping jaws at their outer ends for engaging said flange, said arms having straight inner ends arranged between said hub and said flange and extending radially from said hub to points adjacent said flange, said hub being provided with oppositely arranged extensions having radial and tangential shoulders for engaging the ends and sides of said arms respectively, said arms being loosely set between said shoulders and free to move to a limited extent between the same, the radial shoulders of said extensions being arranged to engage the ends of said arms at points adjacent said annular flange and to exert a pressure thereon substantially in line with the slots of the jaws and the tangential shoulders of said hub being arranged to engage the sides of said arms at points adjacent the axis of revolution, the extensions of said hub having projections overlapping said arms to hold the latter in place, substantially as described.

3. A grip clutch one member whereof

comprises a wheel provided upon one side
with an annular flange and the other mem-
ber whereof comprises a grip arm having
jaws engaging the inner and outer faces of
5 said flange, a hub having a radial shoulder
to engage the end of the grip arm and a
shoulder extending at an angle to said ra-
dial shoulder to engage the side of the

grip arm, and a retaining device serving to
retain the grip arm in position when 10
shifted.

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