No. 781,219. PATENTED JAN. 31, 1905.

G. M. MILLS.

ADJUSTABLE GEAR.

APPLICATION FILED APR. 12, 1904.

Fig. 1

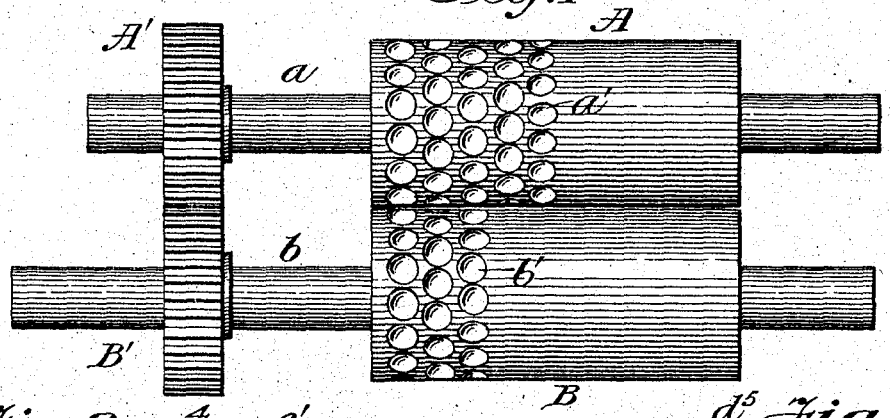


Fig. 2

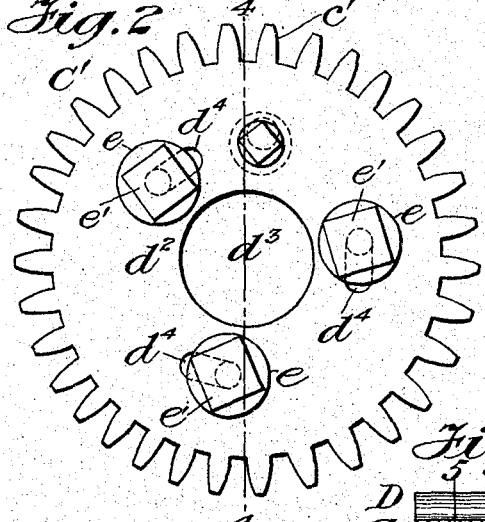


Fig. 3

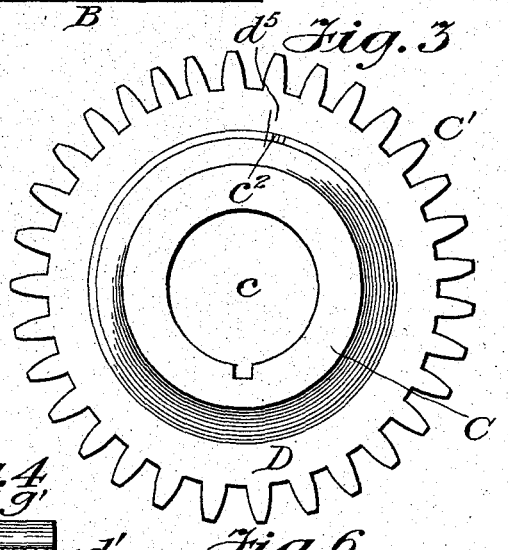


Fig. 4

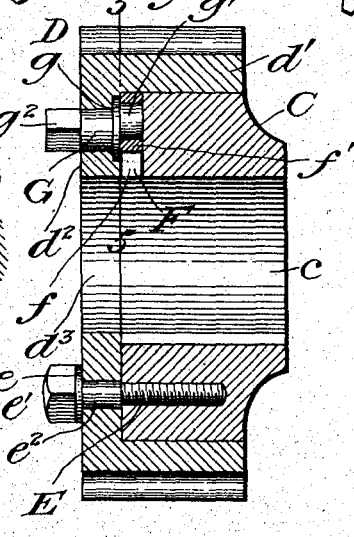


Fig. 5

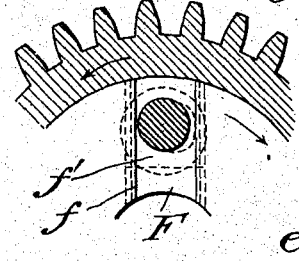


Fig. 6

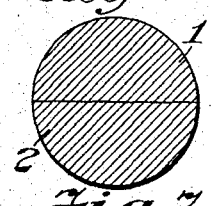
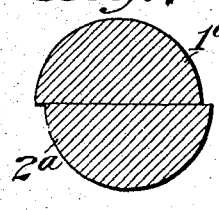


Fig. 7



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No. 781,219. Patented January 31, 1905.

UNITED STATES PATENT OFFICE.

GEORGE M. MILLS, OF JERSEY CITY, NEW JERSEY.

ADJUSTABLE GEAR.

SPECIFICATION forming part of Letters Patent No. 781,219, dated January 31, 1905.

Application filed April 12, 1904. Serial No. 202,838.

To all whom it may concern:

Be it known that I, GEORGE M. MILLS, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Adjustable Gearing, of which the following is a specification.

The subject of my invention is a novel construction of adjustable gearing which while generally serviceable in situations requiring accurate actuative relation of gear-wheels has been found particularly useful by me by being embodied in candy-machines used by confectioners for molding hard-candy designs.

An important object of the invention is to provide a gear-wheel capacitated for revoluble shifting movement relative to its hub, the parts being so conditioned that graduated adjustments ranging from an exceedingly fine to an extended degree can be expeditiously accomplished without difficulty and without involving the employment of screw-threads in the means directly affecting the revoluble adjustment referred to.

With the above purposes in view the improvements primarily comprehend a gear-wheel with a hub relatively rotatable with respect therewith, together with a manually-operated eccentric device revolubly bearing in one of said parts and in sliding engagement with the other, whereby the partial revolution of the journal on which said eccentric device turns will cause the gear-wheel and hub to be relatively shifted the one with respect to the other, and thus compensate for the wearing of the gear-teeth and secure the true actuative relation of the wheel with regard to a companion gear.

There are other important features connected with the invention which, besides those alluded to, are clearly set forth in the subsequent detailed description.

In the accompanying drawings, forming part of this specification, Figure 1 is an elevational view of a pair of geared rollers such as are embodied in a machine for molding hard-candy designs. Fig. 2 is a face view of one of the gear-wheels of said rollers, said gear-wheel embodying my invention and the view indicating by dotted lines the relation of the gear-adjusting device in its initial or primary position. Fig. 3 shows said gear-wheel viewed at the opposite side, the graduations or gage-marks contributing to the accurate adjustment of the wheel being also shown. Fig. 4 is a vertical sectional view of the gear-wheel, the section being in the plane indicated by the broken line 4 4, Fig. 2. Fig. 5 is an enlarged detailed section disclosing more especially the eccentric device, its box, and undercut or dovetailed way in the end of the hub in which said block slides. Fig. 6 is a sectional view illustrating how the sections of a sphere of hard candy should register; and Fig. 7 is a somewhat similar view, but indicating how the candy-sections are out of register when the rollers are not in proper correlation owing to the wearing of the gear-teeth.

Similar reference characters are employed to designate corresponding parts in the several views wherein they occur.

In many machines it is desirable that the operative relation of a gear-actuated roller be accurately maintained, and this is not possible when the teeth of the gearing wear unless either new gearing is substituted or there be some provision for adjusting or resetting the gearing to compensate for said tooth wear. These considerations are especially important in machines for molding hard-candy designs, in which machines are employed a pair of companion rollers the shafts of which have intermeshing gear-wheels, while the surfaces of said rollers contain correspondingly-shaped recesses or cavities for the reception of the hard-candy sections, so that with the rollers properly positioned each and every cavity of each roller will be brought into intimate registration with a cavity of the other roller, thereby resulting in the two sections forming each candy product accurately conforming to each other when pressed together, as indicated by 1 and 2, Fig. 6, wherein is illustrated one product in the form of a candy sphere.

It is generally known to those familiar with the class of candy-machines above mentioned that the hard character of the material operated on in the machine has a tendency to force the rollers apart, thus causing the engaging

contact of the gear-wheels to be borne by the flanks of the teeth, at which parts the latter become worn. Hence such wear obviously throws the cavities of the rolls out of registration, as indicated by 1^a 2^a, Fig. 7, wherein is represented the product resulting from an effort to make a candy sphere when the rollers are out of registration.

The rollers A B are mounted on and turned with shafts *a b*, revolubly supported in suitable bearings in the machine. These rollers are so juxtaposed that recesses or cavities *a'* *b'* in the surfaces thereof are intended to be brought together to press the candy sections they contain together and result in the formation of the hard-candy designs. Of course the recesses or cavities will be configurated to impart to the candy product any desired shape.

On the shafts *a b* are intermeshing gear-wheels A' B', the hubs of which are keyed to said shafts, so that motion will be revolubly transmitted through such gear-wheels. Either or both of these wheels can embody the adjusting provision constituting an important part of my invention. I will describe the provision in connection with the gear-wheel A', it being understood that substantially a duplication thereof will be employed in connection with the wheel B', if desired.

The gear-wheel comprises generally a hub C and tooth-carrying shell D, both of annular character, the hub being in thickness and dimentions capable of affording comparatively great strength. The periphery of the hub is smoothly and accurately finished off for snugly occupying the space within the toothed rim *d'* of the shell. The front face of the hub abuts against the inner side of an inwardly-extending flange d^2, forming an integral part of the shell and contracting toward the central shaft-opening d^3, alined with the axial opening *c* for a similar purpose.

At a plurality of points, preferably equidistant from each other, the hub is longitudinally tapped for the reception of bolts E, insertible from the hub front. In the construction disclosed there are three of these bolts, and each is adapted for passage through one of a corresponding number of slots d^4, slightly curved to conform to the circular series in which they are disposed. The outer ends of these bolts each involve an annular base *e* and square head *e'*, the base for spanning the adjacent slot and bearing against the front of the flange, while the head facilitates the manipulation of the bolt through the application of a suitable key. The shank e^2 of each bolt which is to occupy the appropriate slot is plane-surfaced.

From the description thus far it will be readily comprehended that with the hub C secured on the roller-shaft and the gear-shell positively connected to the hub by adjusting the several bolts E so that their bases *e* will firmly clamp the flange d^2 against the hub the construction will perform the functions of an ordinary gear-wheel, care having been observed that the position of the gear-teeth C' is such that the roller A will be in proper coactive relation with respect to the roller B and the machine operated in a manner well understood. The spreading tendency of the material operated on by the rollers will throw the wearing contact of the teeth upon the flanks *c'* of the same and ultimately result in such undue wear of the teeth that either or both of the rollers will be out of true and induce the objections and difficulties heretofore noted. When this contingency arises, the proper operative relation of the rollers can be quickly and conveniently restored by slightly loosening the bolts, which will by reason of the slots d^4 permit a limited turning movement of the shell D relative to the hub. Such adjustment can be attained by the features which will now be described.

In the face of the hub C, at one point thereof, is a radially-disposed slideway F, extending from the hub periphery to and intersecting the opening *c*. The hub portions *f* at the forward parallel edges of this recess are undercut to permit the confinement within the way F of a radially-sliding block *f'*, containing a circular bearing. Revolubly mounted in the flange d^2 of the gear-shell is a pin G, provided at the inner side of said flange with a disk *g*, which occupies a depression in the contiguous part of the flange rear and maintains the pin against forward withdrawal. It will be observed by reference to Fig. 4 that the disk *g* revolubly works close to that part of the flange d^2 in which the way F is located. Integrally projecting from the rear face of the disk *g* is an eccentrically-located stud *g'*, which is cylindrical and of such diameter as to adapt it for snug revoluble engagement within the circular bearing of the block *f'*. The outer projecting portion g^2 of the pin is square to facilitate the turning of the latter by the application of a suitable key.

With the cap or clamp screws E loosened, as previously explained, the pin G can be revolved to a limited extent. Assuming that such pin is turned in the direction indicated by the inner arrow, Fig. 5, the eccentric-pin will describe an arc movement tending to bring it close to the wheel-center, but in a different radial plane. This will have the effect of revolubly shifting the gear shell and hub relative to each other in the directions indicated by both arrows in Fig. 5, the extent of such relative shifting movement being dependent upon the extent to which the pin is revolved. The changing position of the eccentric stud *g'* will be compensated for by the sliding capacity of the block *f'*, thus providing a positively-guided engagement of the sliding connection established between the gear shell and hub. Palpably the turning of the pin G in the reverse direction will effect

the relative shifting of the shell and hub, but in directions respectively opposite from those indicated.

After the required adjustment has been accomplished the cap-screws E are again tightened and the gear-wheel is restored to the condition of accuracy of which it was capable previous to the undue wear of its teeth.

The shifting device represented by the pin G and parts immediately coacting therewith constitutes an exceedingly simple and convenient arrangement for expeditiously attaining the purpose desired. Moreover, it is of highly-durable character, particularly in view of the absence of screw-threads.

It will be well to locate on the back of the toothed rim d' index or other means d^5, adapted to coöperate with suitable graduations or a scale c^2 on the contiguous part of the hub, so that the extents of different relative shifting movements of the gear-shell will be visibly communicated with precision. Thus if the rollers are but slightly out of true an adjustment of one degree represented by the first of the shorter graduations will suffice. An adjustment less in extent can be reasonably calculated by the attendant.

I do not desire to be understood as limiting myself to the precise arrangement and construction of parts shown and described, but reserve the right to all modifications within the scope of my invention.

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

1. In adjustable gearing, the combination with parts constituting a hub and a gear-section respectively of an eccentric device revolubly bearing in one part and having a sliding engagement with the other.

2. In adjustable gearing, the combination with parts constituting a hub and a gear-section respectively, of a pin revolubly bearing in one part having a projecting operating portion and an eccentrically-located stud, the latter having a sliding engagement with the other part.

3. In adjustable gearing, the combination with parts constituting a hub and a gear-section respectively, one of said parts containing a radial way and block slidingly therein, said block containing a bearing-opening, of a pin revolubly bearing in the other part and having an eccentrically-located stud engaged within the bearing-opening of said block.

4. In adjustable gearing, the combination with parts constituting a hub and a gear-section respectively, one of said parts containing an undercut radial way, and block slidingly confined therein, said block containing a bearing-opening, of a pin revolubly bearing in the other part and having an eccentrically-located stud engaged within the bearing-opening of said block.

5. In adjustable gearing, the combination with parts constituting a hub and gear-section respectively, one of said parts containing a radial way and the other part an opposite circular depression, of a block sliding in said way and having a bearing-opening, a pin revolubly bearing in the part containing the depression and having a disk seated in the latter, and an eccentrically-located stud carried by said disk and engaged within the bearing-opening of the block.

Signed at New York city, in the county of New York and State of New York, this 1st day of April, A. D. 1904.

GEORGE M. MILLS.

Witnesses:
WILLIAM PAXTON,
CHAS. L. WOLF.