(No Model.)

C. H. WILLCOX.

CAM MECHANISM.

No. 389,782. Patented Sept. 18, 1888.

FIG. I.

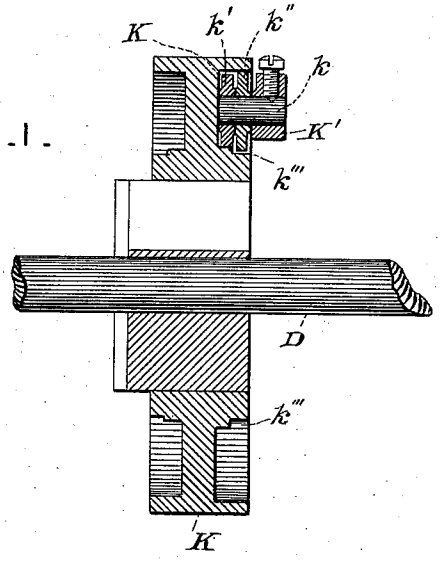
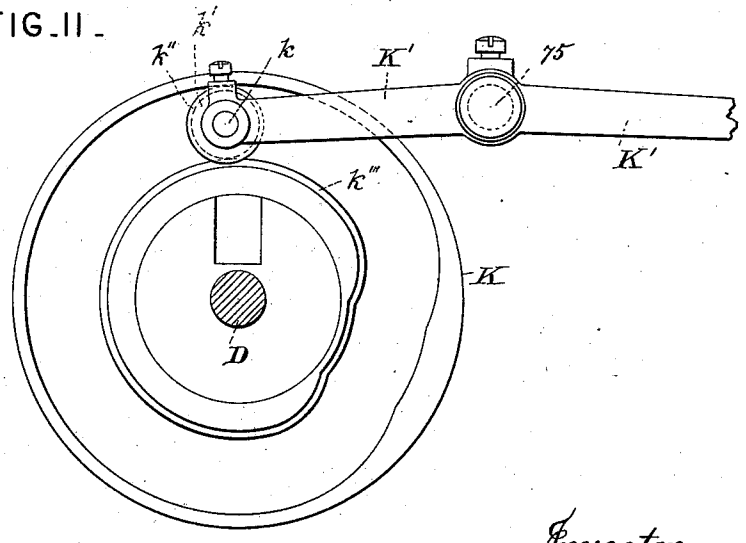


FIG. II.



Attest:
Geo. T. Smallwood,
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Inventor
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by A. Pollok
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UNITED STATES PATENT OFFICE.

CHARLES H. WILLCOX, OF NEW YORK, N. Y., ASSIGNOR TO THE WILLCOX & GIBBS SEWING MACHINE COMPANY, OF SAME PLACE.

CAM MECHANISM.

SPECIFICATION forming part of Letters Patent No. 389,782, dated September 18, 1888.

Application filed June 18, 1888. Serial No. 277,442. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. WILLCOX, of New York city, in the county and State of New York, have invented a new and useful Improvement in Cam Mechanism for Sewing and other Machinery, which improvement is fully set forth in the following specification.

This invention relates generally to mechanism employing grooved cams (whether face-cams, peripheral cams, rotary cams, reciprocating cams, or of whatever form or style) with friction-rollers (whether cylinders, frusta of cones, or of other form) in the cam-grooves for reciprocating (whether in straight or curved lines) the parts of sewing and other machinery of any description wherein such cams are or may be usefully employed.

Ordinarily a single roller is placed in the cam-groove and is acted upon by (or acts upon) first one wall of the groove and then the wall opposite, so that it is turned or is exposed to forces tending to turn it alternately in opposite directions. In rapid-running machinery having cams with short inclines these forces or some of them may not overcome the inertia of the roller, in which case the latter will slide or even turn against the bearing-surface, rather than roll thereon, and in any case the inertia on each reversal of the motion creates more or less extra resistance and wear; and in order that the roller may not bear on both walls of the grooves it is necessary that it should be of a diameter somewhat less than the width of the cam-groove, so that there would be always a certain amount of lateral play between the said roller and the walls of the said groove. With a view of overcoming these objections it has heretofore been proposed to employ two rollers mounted side by side on the same stud or journal-pin and so arranged as to bear against opposite walls of the cam-groove, each wall being cut away to allow a clearance to the roller which bears against the opposite wall. One of these rollers being at the bottom of the groove, one of the walls is therefore cut away at the bottom of said groove, leaving a projecting face which forms the bearing for the other roller. This under cut in the wall of the groove is objectionable, for one reason, because it is troublesome to make. Moreover, in this arrangement, as heretofore proposed, in order that there may be no play between the rollers and the walls of the cam-groove, the diameter of the rollers should be exactly the width of the cam-groove, and it is difficult to get the inner roller—that is, the roller at the bottom of the groove—into and out of positon owing to the close fit it makes with the projecting face before mentioned. Of course this last difficulty would be avoided by making the walls of the groove adjustable; but this would be itself objectionable because of expense and for other reasons.

Another proposed arrangement has been to place the two rollers eccentrically to each other, so that the relative position of their axes gives a clearance to each roller without requiring the walls of the groove to be cut away; but this is objectionable as requiring a special form of supporting-stud or journal-pin, and also as introducing the unmechanical feature of two centers for the rollers, which, with an ordinary cam-groove of uniform width, would cause them to fit only at certain points in the groove.

The present invention overcomes these difficulties of the double-roller arrangement and produces a cam mechanism of that kind free from the objections of those previously proposed.

It consists in employing rollers of different diameters—one smaller and the other larger than the width of the cam-groove, and the smaller roller placed at the bottom of the groove. By making the sum of their radii equal to the width of the cam-groove the two rollers, when placed on a common journal-pin or rotating about a common axis, will each fit closely against its own bearing-wall, while at the same time there will be no difficulty in introducing or removing the inner roller, and the necessity for undercutting or having a projecting face on one wall of the cam-groove is avoided. One wall of the cam-groove will be cut away to give a clearance to the larger roller. In the old arrangement first mentioned the cam was similarly cut away at the outside of the cam, in addition to the under-cut at the

bottom of the groove. The cutting away at the outside of the cam can more easily be performed than at the bottom of the groove.

It is designed to employ the present improvement in connection with the looper-cam, threader-cam, and the take-up cam of the straw-sewing machine described in the application for patent of myself and George H. Noble, filed June 8, 1886, No. 204,546; but it is not restricted to these, being of general applicability to cam mechanism, as before stated, in machinery of whatever description. It is not limited to any special form of grooved cam, and can of course be applied in one or more places in the same mechanism or machine.

In the accompanying drawings, which form part of this specification, Figure I is a sectional view of the cam mechanism (including the cam and the lever operated thereby) for the threader of the before-mentioned straw-sewing machine provided with the present improvement, and Fig. II a face view of the same.

The cam K is mounted on the rotary shaft D, and the lever K′ (fulcrumed at 75) is vibrated (or reciprocated in curved lines) by means of the stud *k*, fixed in the end of the lever K, and forming the common journal-pin for the rollers *k′ k″*, which fit in the cam-groove and turn about a common axis. The roller *k′* at the bottom of the cam-groove is of a diameter sufficiently smaller than the width of the cam-groove to be easily inserted and to revolve freely therein. It may be as much smaller as may be desired, but it is preferred to make the roller as large as practicable, and only a slight difference is requisite to give the necessary clearance. The roller *k″* is of a diameter larger than the width of the cam-groove, one of whose walls is cut away, as at *k‴*, sufficiently to give a clearance, or as much more as may be desired. It does not matter which of the walls is cut away, as the roller *k″* may bear upon the wall opposite the cut-away portion, whichever this may be.

The term "cut-away" is employed generally to indicate an absence of material, and is not restricted to the removal thereof after the cam is made, although in practice the main cam-groove would first be cut and the wall then cut away opposite the larger roller. The width of the cam-groove is the distance between bearing-surfaces measured as if they were opposite each other. In operation, the rollers turning on a common axis run each on its own wall of the cam-groove, and in case of a revolving cam always rotate in the same direction, (although in opposite directions to each other,) while at the same time they can easily be inserted in the groove or removed therefrom for any purpose without requiring any play between the rollers and the walls of the cam-groove when inserted. Wear can be taken up by the replacing either or both rollers by a roller or rollers of larger diameter; but of course the inner roller must always be of a diameter less than the width of the cam-groove.

I claim as my invention or discovery—

The two rollers of different diameters turning on a common axis, in combination with the grooved cam and the part on which said rollers are mounted, the smaller roller being of a diameter less than the width of the cam-groove, and the larger roller of a diameter greater than said width, and the two rollers being set in the said cam-groove, with the smaller roller at the bottom of the same, and one wall of said groove being cut away opposite the said larger roller, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHAS. H. WILLCOX.

Witnesses:
PHILIP MAURO,
C. J. HEDRICK.