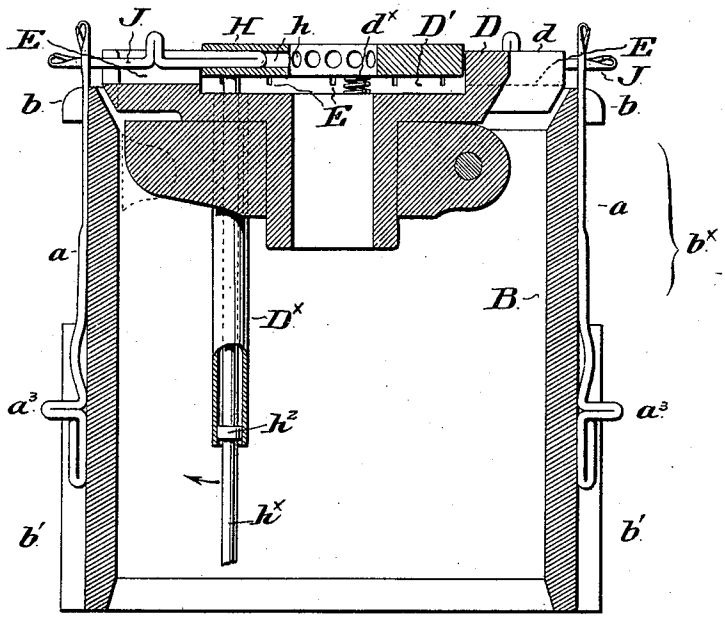
(No Model.) 2 Sheets—Sheet 1.

H. EDDISHAW, G. E. KNOWLES & J. E. EDDISHAW.

NEEDLE DIAL FOR KNITTING MACHINES.

No. 588,559. Patented Aug. 24, 1897.

FIG. 1.



WITNESSES:

A. E. Paige

Thos. K. Lancaster.

INVENTORS:

H. EDDISHAW

G. E. KNOWLES

J. E. EDDISHAW

By their attorneys

Strawbridge & Taylor

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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FIG. 2.

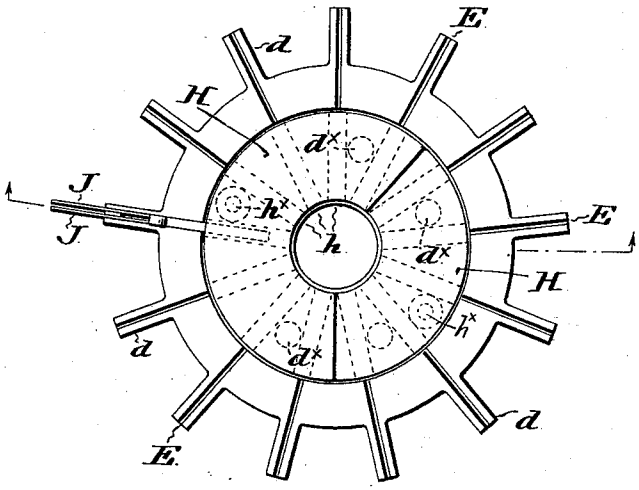
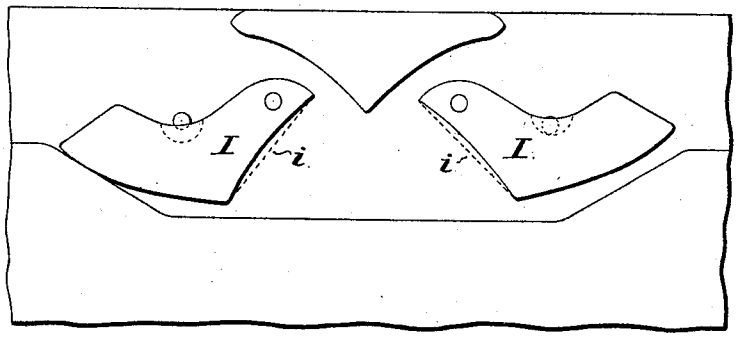


FIG. 3.



WITNESSES:

A. E. Paige

Thos. K. Lancaster

INVENTORS:

H. EDDISHAW

G. E. KNOWLES

J. E. EDDISHAW

By their attorneys, Strawbridge & Taylor

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY EDDISHAW, GEORGE EDWARD KNOWLES, AND JOHN ELLIS EDDISHAW, OF PHILADELPHIA, PENNSYLVANIA.

NEEDLE-DIAL FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 588,559, dated August 24, 1897.

Application filed August 21, 1895. Serial No. 559,991. (No model.)

To all whom it may concern:

Be it known that we, HENRY EDDISHAW, GEORGE EDWARD KNOWLES, and JOHN ELLIS EDDISHAW, of Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Needle-Dials for Knitting-Machines, of which the following is a specification.

It is the object of our invention, to provide a knitting machine equipped with a dial plate of such arrangement that it may be used contemporaneously with sinkers, said dial plate being of such special construction, moreover, that a group or all of the dial needles may at such time as may be desired, be thrown out of operation while the remainder remains in operation.

In the accompanying drawings we show, and herein we describe, a good form of a convenient embodiment of our invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings,

Figure 1 represents a vertical, central, sectional, elevational, view of the parts of a knitting machine with which our invention is immediately concerned. The parts of the knitting machine not illustrated and described are omitted because well known to those familiar with the art and unnecessary to be herein set forth.

Figure 2 is a top plan view of a dial embodying our invention.

Figure 3 is an inside face view of a portion of the cam cylinder of the machine.

Similar letters of reference indicate corresponding parts.

Referring now to our improved form and arrangement of dial plates:

Our invention aims to provide a dial plate which may be used contemporaneously with the sinkers upon an ordinary knitting machine, and this object is, generally stated, accomplished by providing a dial plate, peripheral portions of which, in the spaces between the dial needles, are removed for such radial depth as is necessary to afford space for the operation of the sinkers. In connection with this dial plate we employ in the machine as many sinkers as the number of spaces thus formed will accommodate.

In the dial plate D, shown in central section in Figure 1, and in top plan in Figure 2, thirteen dial needle grooves E are provided, although any desired number may, of course, be employed, and we show the substance of said dial plate as removed between adjacent dial needle grooves, thus forming radial arms *d*.

The sinkers of the ordinary character, and which being of well known construction and operation we do not illustrate or describe,—are to be mounted about and work across the top of the needle cylinder,—the sinkers being, however, of course, omitted from the series at points opposite the dial arms *d*.

In order to provide for the throwing out of operation when desired of the dial needles,—we resort to the following arrangement:

Within a central open-topped depression or recess D′ in the top face of the fixed part D of the dial is mounted a holder H, the same consisting in the form shown in Figure 1, of a disk-like casting constituting a movable part of the dial, in the edge of which are formed a series of radial holes or seats *h*, which register and are in axial alinement with, the grooves E referred to, and in which holes or seats dial needles are supported and operate.

The holder H referred to is provided with a stem h^x which extends through an axially bored sleeve D^x depending from the part D,—and said holder is normally supported, by springs d^x or otherwise, slightly above the floor of the depression D′ referred to and with the bases of the holes or seats *h* above the level of the bases of the dial needle grooves E, as shown in Figure 1.

As will be understood, when the parts are in the position shown in said Figure 1, and the dial needle cam mechanism, (of usual construction, and not therefore shown,) is in operation upon the top of the dial, all of said dial needles will alike be operated.

When, however, in the manufacture of the knitted product, it is desired to narrow the knitted product, the dial needles carried by the holder H may be thrown out of operation

by depressing said holder, which may be conveniently done by grasping its central stem h^x and drawing down the same, at the same time compressing the springs d^x, until the collar h^z mounted on said stem engages beneath the edge of the depending sleeve D^x, with the result that the needles carried by the holder will be caused to descend to the floor of the grooves E in which position the butts of said dial needles will be carried out of the range of operation of the dial needle cam, and will so remain after being relieved of their stitches until, by the manual release of the collar h^z from the end of the sleeve and the consequent elevation of the holder by the springs d^x, the holder is restored to its normal position, shown in Figure 1.

The removed stitches are allowed to hang loose in the fabric. In this connection it may be stated that the stocking is knitted as a continuous tube, the narrower portion thereof, that is the foot and ankle portions, being first knitted, and the wider or leg portion being knitted as a continuation thereof. During the knitting of the narrower portion only those dial needles which work in connection with the formation of the front of the stocking, are in use, the other portion of the dial needles being buried in the grooves of the dial so that the back half of the narrow portion is plain. The balance of the dial needles are then placed in action, which, of course, widens the fabric, and the operation then continues until the desired length of leg has been produced. Thereupon the portion of the dial needles are removed from action as above described, and the operation is repeated, beginning at the foot of a new stocking, and working from its bottom to its top. The break in the fabric resulting from the taking out of action of the dial needles, occurs at the point of division between the stockings formed.

The result of the just described operation will, of course, be to reduce the number of stitches formed in the row by the machine, and consequently accomplish the narrowing of said fabric.

The holder H is shown in Figure 1 as an annular integral body provided with a number of seats h corresponding to the whole number of dial needle grooves E.

It is, of course, to be understood that the holder H may extend a part way only around the dial plate, and be provided with a less number of needle seats than the number of dial needle grooves, or that two such holders independently supported and operated may be employed. Such a construction is indicated in Figure 2, the holder being shown as formed in two parts, one of which alone may if desired be employed.

The subdivision of the holder may, of course, be varied indefinitely.

A construction employing a holder extending only part way around the dial would be useful where it is desired to simply at times provide the fabric with ribs on one side and not upon the other, as for example in the heeling operation in knitting hosiery, where ribs are not desired on that face of the tube which forms the heel.

In each dial needle groove E we prefer to mount, instead of one needle as heretofore, a plurality of dial needles J J of very fine diameter, and preferably, although not necessarily, unite said needles at their bases to form a single needle structure.

This arrangement we illustrate in connection with one of the needle grooves E of the dial shown in Figure 2.

The pivot cams of the cylinder shown in Figure 3 are of ordinary construction except that the opposing inner or under faces of said cams I are shown as made slightly concave, instead of straight as in the ordinary pivot cams as indicated by the dotted lines i in said Figure 3.

When in the ordinary construction of knitting machines the said pivot cams are formed as described with straight faces or edges they impose a strong shearing strain upon the butts of the needles and occasion thereby a great deal of the breakage to which said butts are subject.

We have found that by constructing the cams with the concave faces described, the machine works more accurately and easily and with so much less strain upon the needle butts that we find when the machine is run at high speed practically no breakage of the butts occurs.

The arrangement described of pivot cams with concave inner faces is especially valuable in connection with the arrangement of needle structures illustrated in the drawings and hereinbefore described.

Having thus described our invention, we claim—

1. In a knitting machine, a dial plate provided with needle supports, the substance of the plate being cut away as to its rim between said supports,—substantially as set forth.

2. In a knitting machine, a dial plate provided with radial grooves for dial needles, the substance of the plate being cut away as to its rim between said grooves,—substantially as set forth.

3. In a knitting machine, a needle cylinder, a dial plate provided with radial arms which extend out to the vicinity of the top of the needle cylinder, and which arms contain grooves for the reception of dial needles,—substantially as set forth.

4. In a knitting machine, a dial formed in two parts, a plate and a holder, one of said parts being movable with respect to the other,—substantially as set forth.

5. In a knitting machine, a dial plate provided with a series of radial grooves, a holder mounted upon said plate and provided with a seat for a dial needle arranged in axial alinement with a groove of the radial series mentioned, said holder being movable with respect to said dial plate,—substantially as set forth.

6. In a knitting machine, a dial plate provided with a series of radial grooves and embodying a recess, a holder mounted in said recess and provided with a series of seats or holders for dial needles arranged in axial alinement with grooves of the radial series mentioned, said holder being movable with respect to said dial plate, means for normally supporting said holder in position with the bases of its seats or holders above the level of the floors of the said grooves and means for depressing said holder,—substantially as set forth.

7. In a knitting machine, a dial plate provided with a series of radial grooves and embodying a recess, a holder mounted in said recess and provided with a series of seats for dial needles arranged in axial alinement with the grooves of the radial series mentioned, said holder being vertically movable with respect to said dial plate, springs for normally supporting said holder in position with the bases of its seats or holders above the level of the floors of the grooves, and a stem extending from said holder down through a sleeve formed in the plate, and provided with a projection adapted to be carried into engagement with the lower end of the said sleeve,—substantially as set forth.

8. In a knitting machine, a dial plate provided with a series of radial grooves and embodying a recess, a holder mounted in said recess and provided with a series of seats for dial needles arranged in axial alinement with grooves of the radial series mentioned, said holder being vertically movable with respect to said dial plate, springs for normally supporting said holder in position with the bases of its seats or holders above the level of the floors of needle grooves, and a stem extending from said holder down through a sleeve formed in the dial plate, and provided with a projection adapted to be carried into engagement with the lower end of the said sleeve, said dial plate having peripheral spaces removed between its dial needle grooves to allow space for sinkers,—substantially as set forth.

9. In a knitting machine, a dial plate, and a holder mounted upon said dial plate, equipped with radial seats for dial needles and formed in sections, said sections being independently movable with respect to each other and to the dial plate, means for normally supporting said sections in operative position, and means for retaining them independently out of operative position,—substantially as set forth.

In testimony that we claim the foregoing as our invention we have hereunto signed our names this 17th day of August, A. D. 1895.

HENRY EDDISHAW.
GEORGE EDWARD KNOWLES.
JOHN ELLIS EDDISHAW.

In presence of—
JOHN R. NOLAN,
THOS. K. LANCASTER.