

(No Model.)

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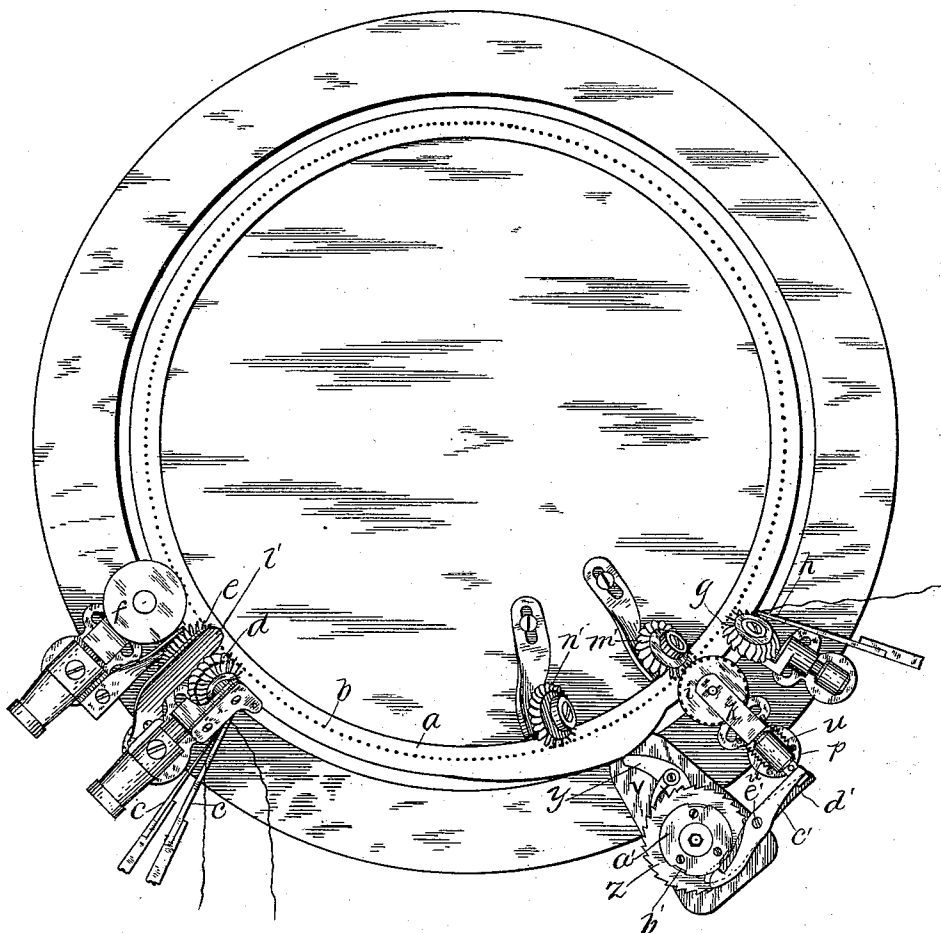
J. BRADLEY & G. Y. HODGE.

CIRCULAR SPRING BEARD NEEDLE KNITTING MACHINE.

No. 469,006.

Patented Feb. 16, 1892.

Fig. 1.



WITNESSES.

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Chas. S. Ellis.

INVENTORS

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Geo. V. Hodge,
by
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(No Model.)

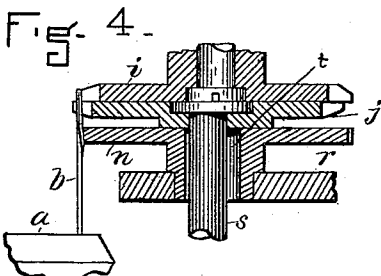
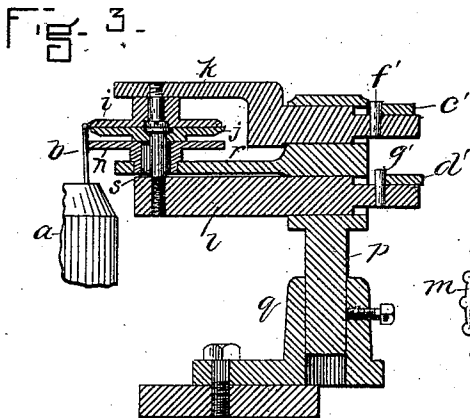
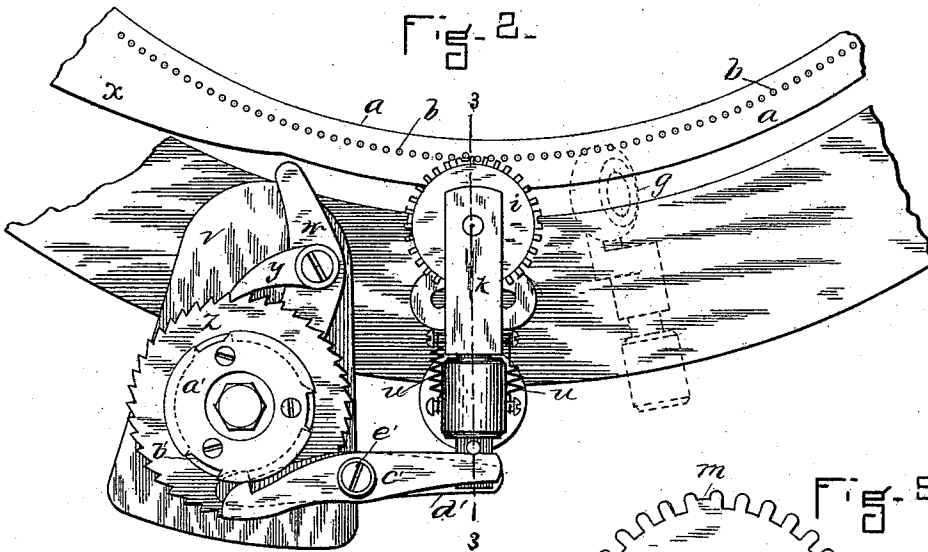
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J. BRADLEY & G. Y. HODGE.

CIRCULAR SPRING BEARD NEEDLE KNITTING MACHINE.

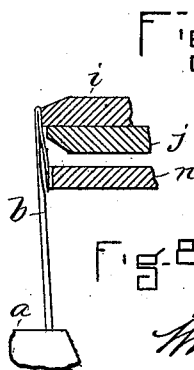
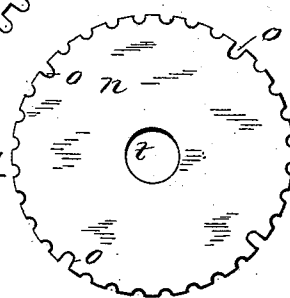
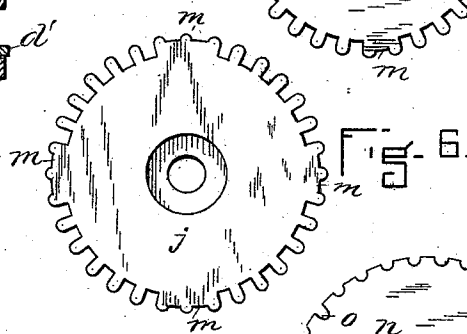
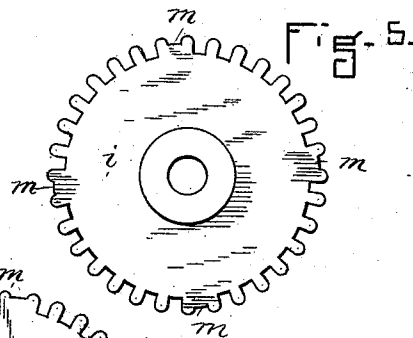
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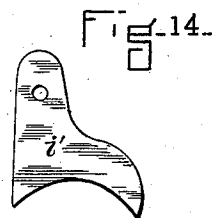
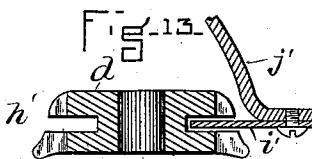
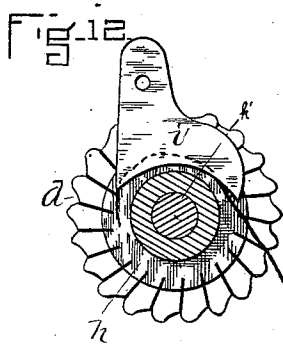
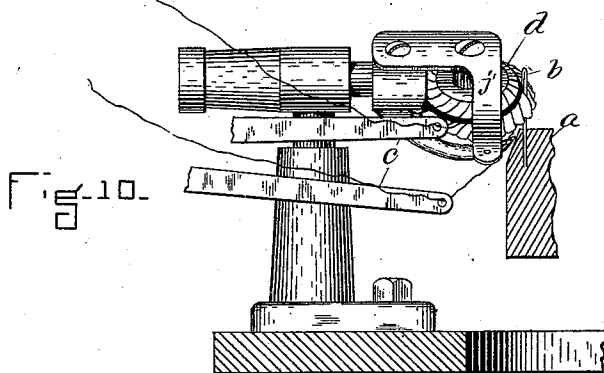
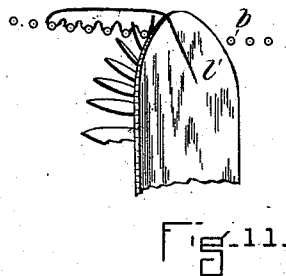
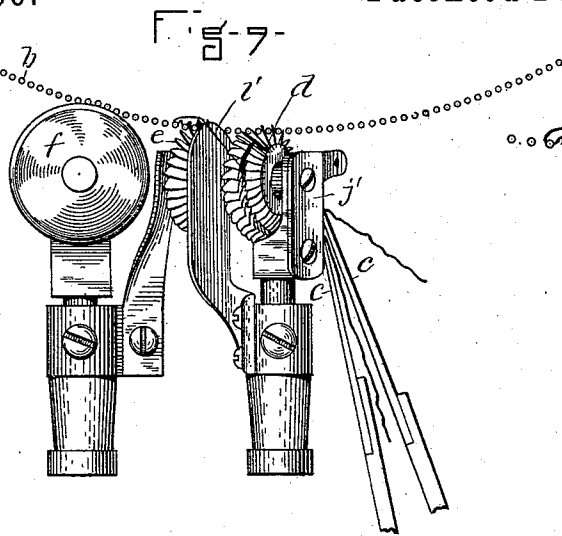
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UNITED STATES PATENT OFFICE.

JOHN BRADLEY AND GEORGE Y. HODGE, OF NORTH CHELMSFORD, MASSACHUSETTS.

CIRCULAR SPRING-BEARD-NEEDLE KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 469,006, dated February 16, 1892.

Application filed December 29, 1890. Serial No. 376,062. (No model.)

To all whom it may concern:

Be it known that we, JOHN BRADLEY and GEORGE Y. HODGE, of North Chelmsford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Circular Spring-Beard-Needle Knitting-Machines, of which the following is a specification.

The invention has relation to circular spring-beard-needle knitting-machines designed to produce a figured fabric characterized both by the varying colors of the yarn and the form or kinds of stitch.

It is the object of the invention to provide improved means for effecting a tuck-stitch figuring of a fabric, the said means being so contrived as that it may be capable of producing a great variety of patterns or designs.

It is also the object of the invention to combine a striping mechanism with the said tuck-stitch-figuring means in such manner as that the two groups of means shall operate in harmony, the action of one modifying the action of the other to the extent of producing results not attainable by their separate use.

It is also the object of the invention to provide improved means, composing parts of the striping mechanism, whereby the ends of the yarns thrown out of and brought into action may be more efficiently placed and controlled than heretofore.

To these ends the invention consists of the combination, with the needles, of one or more figured needle-pressers constructed and arranged to press certain of the needles out of line and a beard-presser, which may be either figured or plain, to press the beards of such needles as are not pressed out of line by the needle-pressers, the said devices operating in conjunction with such other suitable devices as are necessary to effect the knitting of a fabric.

The invention also consists of the combination of the foregoing with a striping mechanism constructed and arranged, as hereinafter described, so as to operate in harmony with the first-mentioned devices in the formation of patterns or designs in the fabric.

The invention also consists of an improved

stitch-wheel having a deep groove formed in its winged or bladed periphery to receive and hold in place the end of the yarn thrown out of action, so that it may not be engaged by the needles or interfere with any of the operative parts of the machine.

The invention also consists of combining with a dividing-wheel and a stitch-wheel constructed as before mentioned a guard-plate so constructed and positioned between the stitch-wheel and dividing-wheel as to keep the end of the yarn brought into action from being engaged by the dividing-wheel and thus disturbing the stitches or loops on the needles, whereby tight joinings or stitches along the line where the yarns are thrown out of and brought into action are avoided.

The invention will be described with reference to the annexed drawings and the letters of reference marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is a top plan view of so much of a knitting-machine as it is necessary to show in order to explain the nature of the invention. Fig. 2 is a detail in top plan view of the principal parts of the means for effecting tuck-work, drawn to an enlarged scale. Fig. 3 is a detail sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is a detail in section showing the needle-pressers as failing to press the needles out of line and the beard-presser as acting to close the beard. Figs. 5 and 6 are plan views of the needle-pressers. Fig. 7 is a plan view of a beard-presser. Fig. 8 is a sectional detail view showing the manner in which the needle-pressers act upon the needles to press the same out of line, so that the beard-presser may not effect the closing of the beard. Fig. 9 is a top plan view of the improved stitch-wheel, guard-plate, and adjuncts. Fig. 10 is a front side view of the parts shown in Fig. 9. Fig. 11 is a detail in plan showing the operation of the guard-plate. Fig. 12 is a sectional detail view of the improved stitch-wheel and end-guiding plate in the groove of the same. Fig. 13 is a transverse sectional detail of parts shown in Fig.

12. Fig. 14 is a detached view of the end-guiding plate adapted to operate in the peripheral groove of the stitch-wheel.

In the drawings, *a* designates the rotary needle-cylinder, provided with the circular series of spring-beard needles *b*.

c c are yarn-guides.

d is a stitch-wheel.

e is a dividing-wheel, and *f* is a presser-wheel.

In operation a push-back and landing and knocking-over wheels (which for the sake of clearness are not shown, since they are of common construction and function and constitute no part of the invention) are employed to complete a knitting mechanism.

As has already been intimated, a tucking mechanism is employed in combination with a regular knitting mechanism, and the former will first be described in detail.

g designates a stitch-wheel, which is arranged in advance of the stitch-wheel *d* and is supplied with yarn from a yarn-guide *h*. A push-back (not shown) is understood to cooperate with the stitch-wheel *g* and other adjuncts of the tucking mechanism.

i j designate wheels mounted upon movable supports *k l*, which wheels have toothed peripheries so constructed as to be engaged by the needles and to be moved thereby, a tooth of each wheel falling between each two needles *b* in the circular series. The wheels *i j* are arranged to be engaged by the tops or upper ends of the needles, and at intervals the spaces between the teeth of the wheels are filled, as at *m*, so that such filled spaces, coming against the upper ends of the needles, will spring or press the latter back, as is shown in Fig. 8; but when such filled spaces do not come in contact with the needles, as is represented in Fig. 4, the needles will be unaffected by the said wheels.

n designates a presser-wheel of common function, arranged beneath the needle-pressers *i j* to press the beards of such needles as are not pressed out of line by the said needle-pressers. The beard-presser *n* may be a plain presser—that is, a presser adapted to press the beards of all needles coming into contact therewith—or it may be a figured presser—that is, a presser notched at intervals, as at *o*, so as to mispress needles at intervals to produce lines or wales knitted in tuck-stitch.

The supports *k l* are longitudinally movable in bearings formed in a standard *p*, adjustably secured in a bracket *q*, connected with the bed of the machine, and the beard-presser *n* is secured upon a fixed support *r*, connected with the standard *p* at a point intermediate of the supports *k l*. The presser *j* turns upon a stud *s*, extended upward from the inner end of the support *l*, and which is passed through a comparatively large hole *t*, formed in the hub of the beard-presser *n*, so that the said support *l* and stud *s* may be moved to move the wheel *j* toward and away from the needles without affecting the wheel *n*.

u designates springs connected at one end with the supports *k* and *l* and at the other end with the standard *p*, or it may be any stationary part of the machine, and operating to normally hold the wheels *i j* back from engagement by the needles.

v designates a plate or bracket connected with a stationary part of the machine, upon which bracket there is fulcrumed a lever *w*, the inner end of which is constructed and arranged to be engaged in the rotation of the needle-cylinder *a* by a cam *x* on the said needle-cylinder and to be moved so as to cause the pawl *y*, pivoted thereon, to move the ratchet-wheel *z*, with which the said pawl is in engagement, to the extent of the distance between two ratchet-teeth. The lever *w* may be moved back in the opposite direction to that in which it was moved by the cam *x* by a suitably-arranged spring. (Not shown.) Connected with the ratchet-wheel *z* or with the journal-stud of the latter are two pattern-disks *a' b'*, having rises and depressions of any suitable character upon their peripheries.

c' d' are levers fulcrumed upon a stud *e'*, arranged so that one end of the former may rest upon the periphery of the disk *a'* and the corresponding end of the latter upon the periphery of the disk *b'*, the opposite ends of the said levers bearing, respectively, against pin *f'* of needle-presser support *k* and pin *g'* of needle-presser support *l*.

The stitch-wheel *d* has a groove *h'* formed in its periphery, into which there extends one end of a plate *i'*, connected at its opposite end to guard-plate *j'*, secured to the stitch-wheel support. The end of the plate *i'* extending into the groove of the stitch-wheel is preferably, though not necessarily, crescent-shaped, so as that its face opposite the hub *k'* of the stitch-wheel *d* may conform or approach a conformation to the latter.

l' designates a guard-plate connected with the stitch-wheel support or other suitable part of the machine, its free end (the edge of which is dull and smooth, so as not to abrade or cut the yarn) extending inward between the stitch-wheel *d* and dividing-wheel *e* and over the line of needles.

The yarn-guides *c c* are reciprocatory and may be actuated by any suitable means employed in a striping mechanism in order to throw one guide into action when another is thrown out. Yarn-guide-actuating means is of such well-known construction and adaptation as to make its particular description and illustration herein unnecessary.

The operation of the improvements is as follows: Yarn fed to the stitch or loop wheel *g* will be placed by the latter under the beards of the needles, as usual. The landing-wheel *m'* will operate in the usual way to land the stitches upon the beards of such needles as may be pressed by the beard-presser *n* and under the beards with the loops formed by the thread from the guide *h* as may not be

pressed by the beard-presser *n*, the knocking-over wheel *n'* serving to throw the loops over the tops of the needles, as usual. The beards of such needles as may fall into the notches *o* of the beard-presser or the tops of which may be engaged by the filled spaces *m* of the needle-pressers *i j* and be pressed back out of contact with the beard-presser (see Fig. 8) will be mispressed—that is, not pressed so as to close them upon their stems—forming at such mispressed points what is known as “tuck-stitches.” But one of the needle-pressers *i* or *j* will be in engagement with the needles at a time, and the position of the said needle-pressers will be controlled by the levers *c' d'* and pattern-disks *a' b'*, acting upon the said levers. When a raised part of the periphery acts upon the adjacent end of its co-operating lever, it will move said lever upon its fulcrum-stud *e'*, moving the corresponding needle-presser support and presser inward into engagement with the needles, the other needle-presser being allowed at the same time to be moved outward by its spring *u*, the pattern-disks *a' b'* being so constructed and arranged as that when a rise acts upon the end of one of the levers *c'* or *d'* the end of the other lever will fall into a depression of the other disk. The knitting mechanism, co-operating with the stitch-wheel *d*, will operate to form loops on all of the needles and to produce tuck-stitches on the lines of such needles as were mispressed by the presser *n*, and, the yarn-guides *c c*, carrying yarns of different colors and being operated conjointly or in harmony with the needle-pressers *i j*, figures or designs both in color and character of stitch may be produced in great variety.

The pattern or design may be varied by changing the form or pattern of the needle-pressers *i j* or by varying the form or pattern of pattern-disks *a' b'*, or both, as well as by varying the notches *o* as to position in the periphery of the beard-presser *n*, though the latter presser may with a great variety of effect be formed with a plain periphery.

By forming the stitch-wheel *d* with a groove *h'* in its periphery a construction is provided for conveniently holding the end of the inactive yarn out of engagement with the operative parts of the machine and maintaining it in such position that when its guide is brought into action it will bring the yarn into operation with certainty at the proper point.

The guard-plate *i* serves to prevent the yarn, when the yarn-guide is raised, from rising to the top of the stitch-wheel *d* and to insure the carrying of the end into the groove *h'*.

When a yarn-guide is raised out of action, the yarn carried by it will be caught between the blades of the stitch-wheel, carried into the groove *h'* of the latter device, and be broken off at or near the dividing-wheel, where it passes out of action with the needles, as shown most clearly in Fig. 9.

When a yarn-guide is lowered into action,

the yarn carried by it will be caught by the blades of the stitch-wheel *d* and carried into engagement with the needles, the end being drawn out of the groove of the stitch-wheel and guided by the guard-plate *l'* around the dividing-wheel, so as not to be caught by the latter and cause tension on the yarn so as to produce tight stitches with such yarn at the “joinings,” a matter which has been the source of objectionable work in stripe-knitting mechanisms as heretofore constructed.

We do not limit ourselves to the precise form of pattern mechanism shown for controlling the needle-pressers *i j* nor to the precise form and arrangement of any of the parts shown, as it is obvious that these may be varied without departing from the nature or spirit of the invention.

Having thus explained the nature of the invention and the manner in which the same may be performed, though without attempting to describe all of the ways in which it may be constructed and used, we declare that what we claim is—

1. The combination, with the needles, of a figured needle-presser adapted to engage the needles and press certain of the same out of line and a needle-beard presser adapted to press the beards of the needles not pressed out of line by the figured needle-presser, as set forth.

2. The combination, with the needles, of a figured needle-presser adapted to engage the needles and press certain of the same out of line and a figured needle-beard presser adapted to press and mispress the beards of the needles, as set forth.

3. The combination, with the needles, of a plurality of figured needle-pressers adapted to engage the needles and press certain of the same out of line and a needle-beard presser adapted to press the beards of the needles not pressed out of line by the figured needle-presser, as set forth.

4. The combination, with the needles, of a plurality of figured needle-pressers, movable supports therefor, a pattern mechanism to move and control said supports, and a needle-beard presser, as set forth.

5. The combination, with the needles, of a plurality of figured needle-pressers and a figured needle-beard presser, as set forth.

6. The combination, with the needles, of a plurality of figured needle-pressers, movable supports therefor, a pattern mechanism to move and control said supports, and a figured needle-beard presser, as set forth.

7. The combination, with the needles, of a figured needle-presser, a needle-beard presser, and a striping device constructed and arranged to operate in harmony with the figured needle-presser, as set forth.

8. A stitch-wheel having a deep groove formed in its periphery, in combination with a guide-plate extending into said groove, as set forth.

9. The combination, with the yarn-guides,
of the stitch-wheel and dividing-wheel and
the guard-plate', having a dull smooth edge,
arranged between the said wheels and ex-
5 tending over the line of the needles, as set
forth.

In testimony whereof we have signed our
names to this specification, in the presence of

two subscribing witnesses, this 28th day of
November, A. D. 1890.

JOHN BRADLEY.
GEORGE Y. HODGE.

Witnesses:

ARTHUR W. CROSSLEY,
EWING W. HAMLEN.