(No Model.) 3 Sheets—Sheet 1.

J. BRADLEY.

YARN FEEDING DEVICE FOR KNITTING MACHINES.

No. 414,487. Patented Nov. 5, 1889.

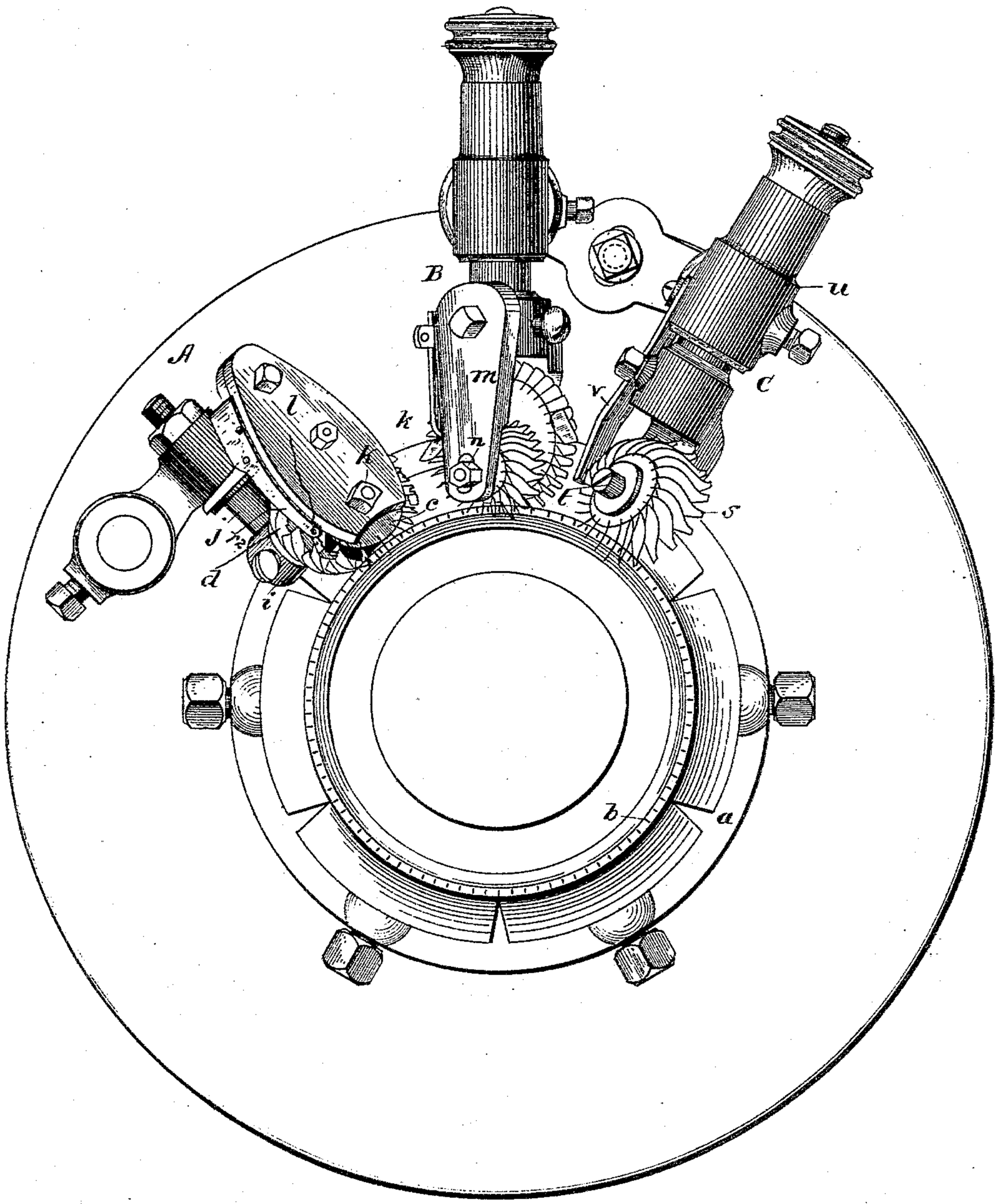

Fig. 1.

WITNESSES:
H. Brown
J. E. Smith

INVENTOR
Jno Bradley,
by Wright, Brown & Crosley
his attys.

(No Model.) 3 Sheets—Sheet 2.

J. BRADLEY.

YARN FEEDING DEVICE FOR KNITTING MACHINES.

No. 414,487. Patented Nov. 5, 1889.

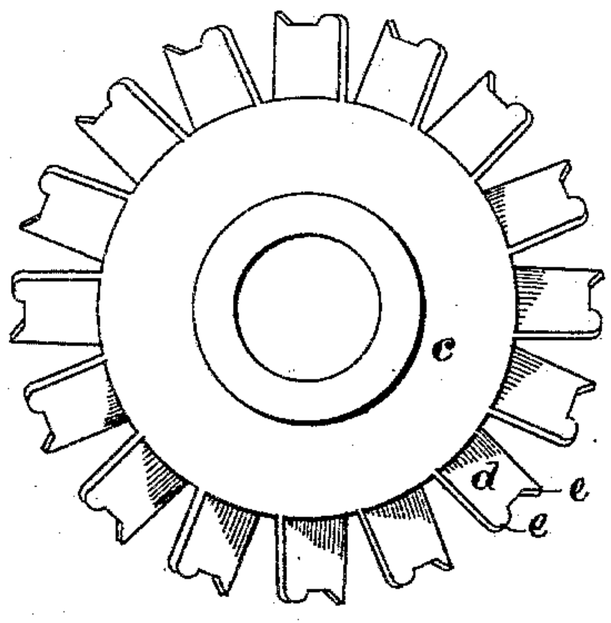

Fig. 2.

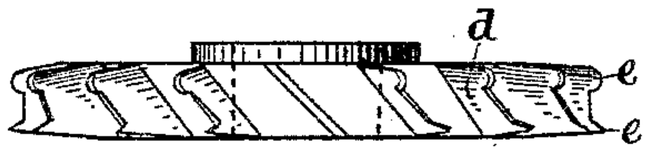

Fig. 3.

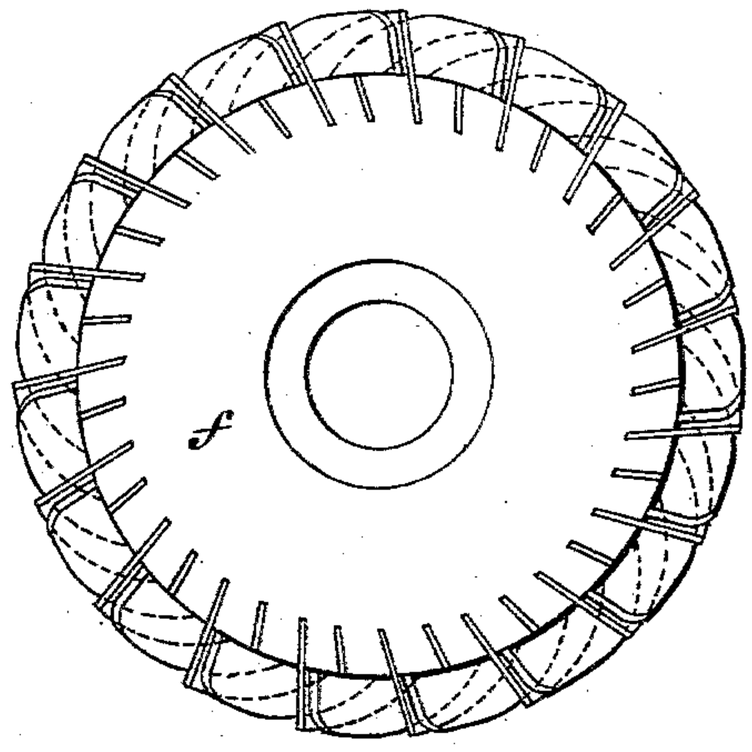

Fig. 4.

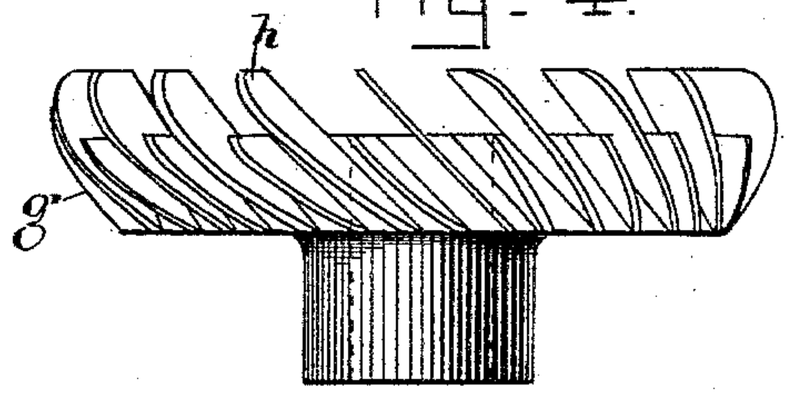

Fig. 5.

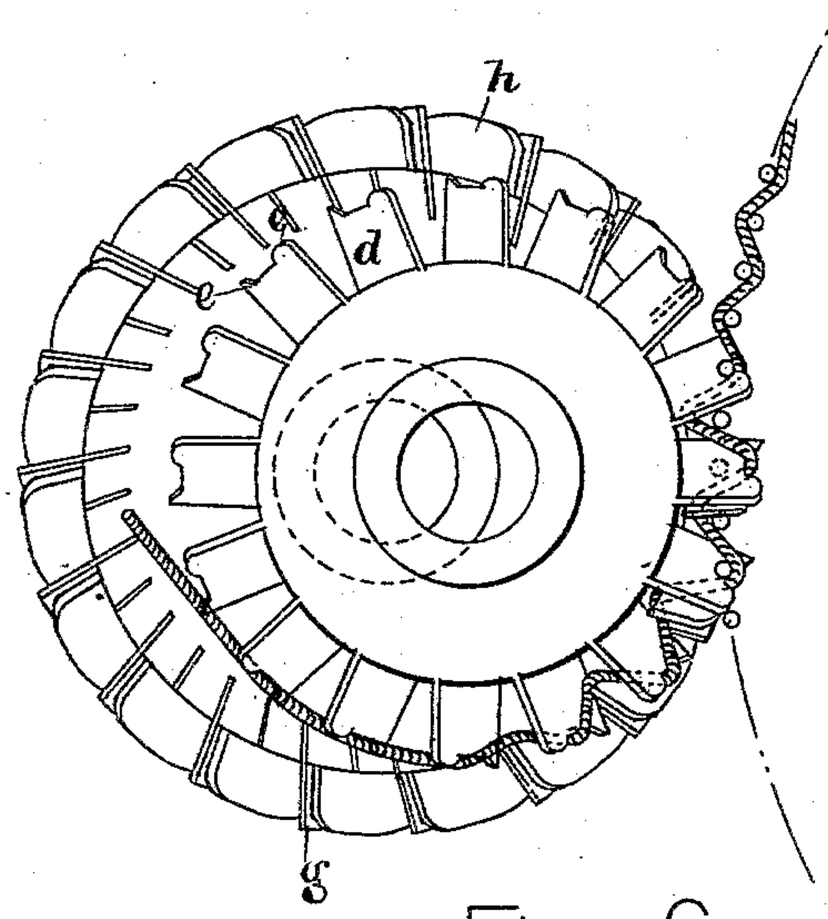

Fig. 6.

WITNESSES:
H. Brown
J. E. Smith.

INVENTOR:
Jno Bradley.
by Mich. Brown & Crossley.
attys.

(No Model.) 3 Sheets—Sheet 3.

J. BRADLEY.

YARN FEEDING DEVICE FOR KNITTING MACHINES.

No. 414,487. Patented Nov. 5, 1889.

Fig. 7.

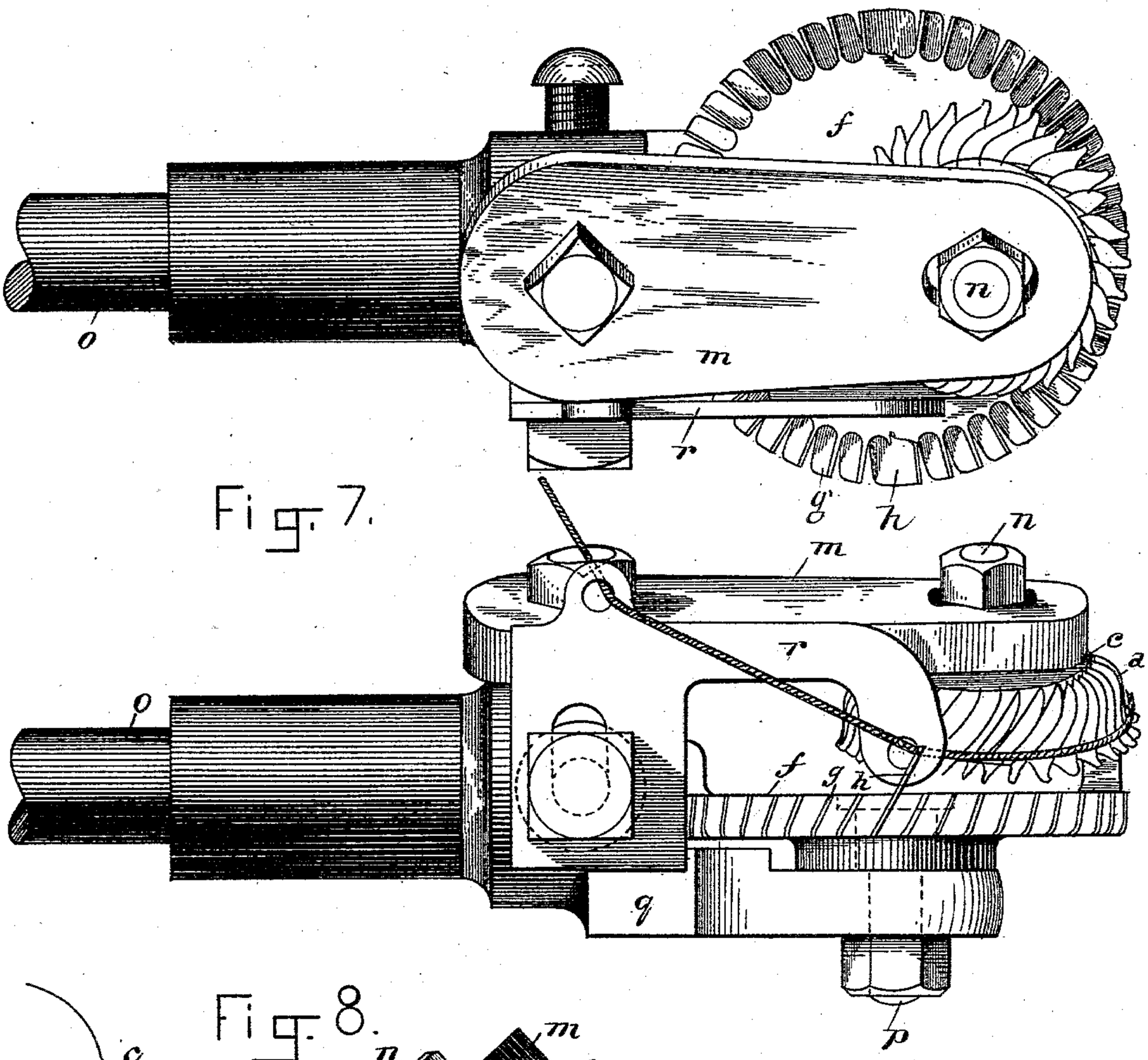

Fig. 8.

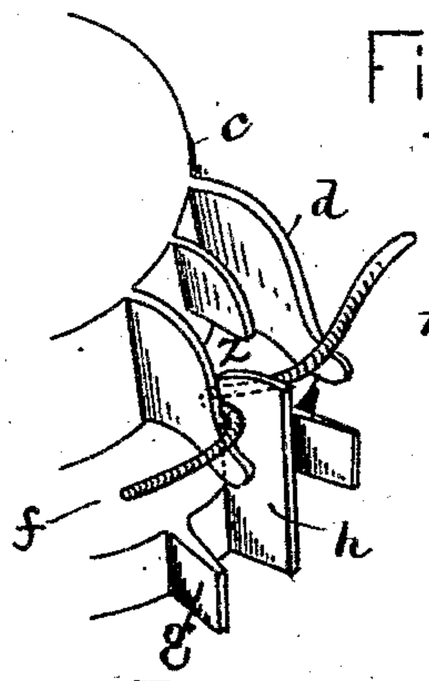

Fig. 10.

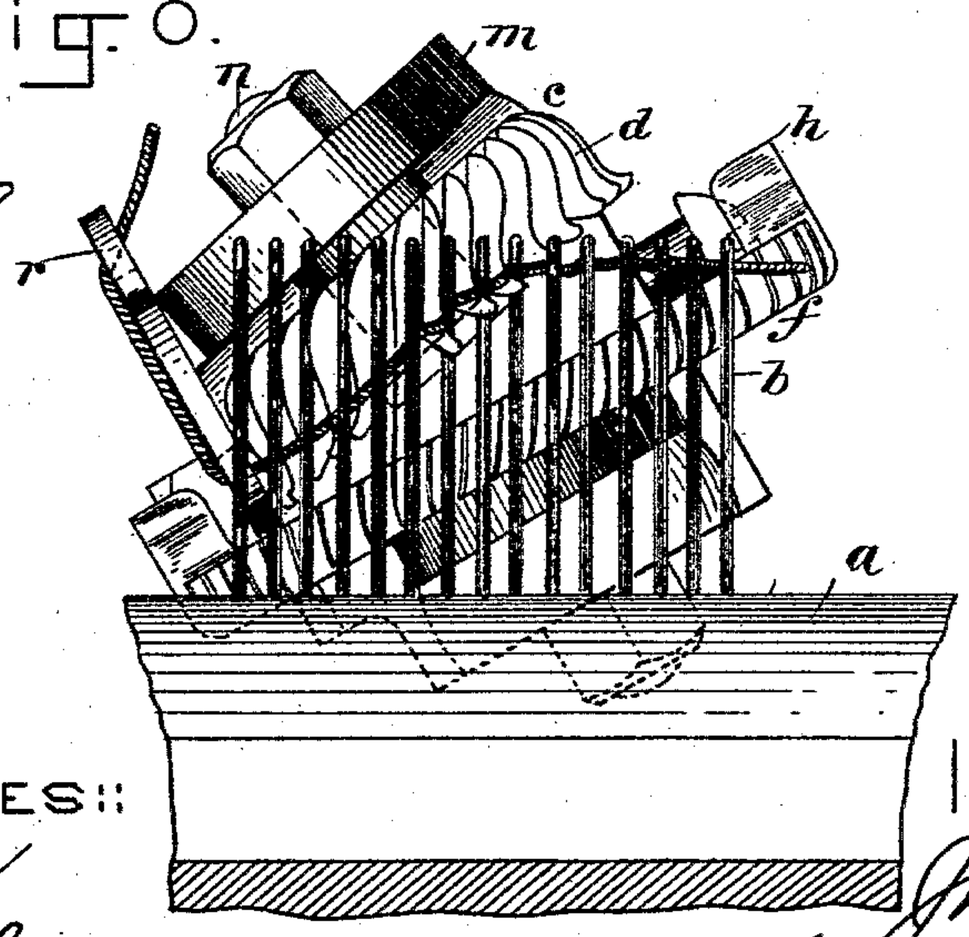

Fig. 9.

WITNESSES::

H. J. Brown

J. E. Smith.

INVENTOR::

Jno. Bradley.

by Knight, Brown & Crosby

" attys.

UNITED STATES PATENT OFFICE.

JOHN BRADLEY, OF NORTH CHELMSFORD, MASSACHUSETTS.

YARN-FEEDING DEVICE FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 414,487, dated November 5, 1889.

Application filed October 31, 1887. Serial No. 253,867. (No model.)

To all whom it may concern:

Be it known that I, JOHN BRADLEY, of North Chelmsford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Yarn-Feeding Devices for Knitting-Machines, of which the following is a specification.

My invention has relation to knitting-machines employing spring-beard needles and designed to have one or more of the yarns composing the fabric laid in front of certain needles and behind certain others, or under the beards of certain needles and upon the beards of certain others, for the purpose of producing vertically-striped work or plain goods embodying a "filling" yarn or yarns—that is, a fabric knit of one yarn or set of yarns and having one or more yarns interlocked at intervals with, though not knit into, the loops of the body yarn or yarns, such interlocked yarn or yarns floating on the back of the fabric between the points at which they are connected therewith in the manner mentioned, so that such floating yarns may be combed, brushed, or otherwise treated to form a nap or shag on the goods, which goods are commonly known as "stockinet" or "plush" fabrics.

Fabrics of the character mentioned have generally been formed on spring-beard-needle knitting-machines by the use of what are familiarly known as "filling-wheels"—such, for example, as those shown and described in Letters Patent of the United States No. 131,595, granted to me September 24, 1872—which wheels are constructed and arranged to press bodily backward the needles that fall upon the projections of the periphery of the wheel, laying the yarn in front of such pressed needles, and passing it behind such needles as fall into the notches of the wheel, after which the filling or backing yarn thus laid in the needles is moved to proper position to be locked in the knit goods, as before mentioned. The objection to the operation of this class of filling-wheels is that the frequent bending of the needles soon weakens their structure, eventually resulting in breaking them, causing material expense for repairs, not to mention the making of imperfect fabric and loss of time and other annoyances.

In order to lay the yarn upon the beards of certain needles and under the beards of certain other needles it has been proposed to construct the needles of the series with beards of varying lengths, and so adjust the thread-introducing wheel as that, for example, it will pass the yarn under the needles having short beards and lay it upon the beards of the long-bearded needles. This construction and arrangement work very well so far as introducing the yarn is concerned; but trouble is met with in pressing the beards in order to throw off the previously-formed loops on the needles, it being difficult to so operate a single presser as to effect good work on needles having beards of different length.

It is the object of my present invention to provide means for introducing a filling or backing yarn into the needles without bending the latter, and to lay yarn upon the beards of certain needles and under the beards of certain other needles, the needles and beards being of the same length without in any manner pressing the beards or bodies out of their normal positions; and this I do by a contrivance consisting of a wheel having wings or blades constructed and arranged to pass between the needles, and by means of notches or nibs on the ends of the blades enable said blades to engage a yarn and sink it between the needles and carry it down or up on the stems of the needles, according to the angle at which the wheel is set with respect to the needles, or over the tops of the needles and down on the back side of the stems, and construct and arrange a second wheel, also having blades or wings adapted to pass between the needles, certain of which blades extend upward or outward, so as to fall at points on the periphery of the first-mentioned wheel where a blade or blades has or have been cut away or mutilated, so that these long or extended blades of the second wheel will press or hold forward the yarn carried by the blades of the first-mentioned wheel and prevent the yarn at such points from passing behind the needles or being passed under the beards of the needles according to the arrangement of the two wheels with respect to the needles.

I will now proceed to describe my invention, so that others skilled in the art may be able to make and use the same, having reference to the accompanying drawings, and to

the letters of reference marked thereon, forming a part of this specification, the same letters indicating the same parts wherever they occur.

Of the drawings, Figure 1 represents a plan view of a circular spring-beard-needle knitting-machine having my improvements applied thereto. Fig. 2 is a plan view of a thread-introducing wheel constructed in accordance with my invention, said wheel being adapted in the present instance to carry a yarn over the tops of the needles and down on the backs of the stems of the same when properly arranged with respect to the needles. Fig. 3 is an edge view of the wheel shown in Fig. 2. Fig. 4 is a plan view of the supplemental wheel adapted to co-operate with the yarn-introducing wheel and having elongated blades or wings adapted to extend between the blades of the said yarn-introducing wheel and at such points hold the yarn forward, so that it will not be passed over the needles, but be carried down on the front of the stems of the latter. Fig. 5 is an edge view of the wheel shown in Fig. 4. Fig. 6 is a diagram in plan showing the manner in which the two wheels may be made to co-operate so as to lay a yarn behind one needle and in front of the next, and so on, without bending the needles out of their normal positions. Fig. 7 is a plan view of my improved contrivance, showing a construction and arrangement of the two wheels, whereby the yarn introduced may at intervals be laid upon the beards of certain needles and under the beards of the other needles. Fig. 8 is a side view of the contrivance shown in Fig. 7. Fig. 9 is a detail view of the parts shown in Fig. 7, and together with several of the needles and a portion of the needle-cylinder as though the point of observation were in the rear of the needles. Fig. 10 is an enlarged detail showing the manner in which the blades of the two wheels co-operate to lay the yarn upon the beards of certain needles and under the beards of others.

I have purposely omitted to show the clearing, dividing, landing, pressing, and knocking over wheels, as also some other parts of a fully-equipped knitting-machine, for the reason that the illustration of such parts would have a tendency to confusion and as having nothing to do with my present improvements, the functions of which are to introduce the yarn in desired manner to the needles, its operation and control by the omitted devices, after being introduced in order to form a web, being a matter of such common and complete knowledge among knitting artisans as not to require particular description.

In the drawings, *a* represents a rotary needle-cylinder equipped with spring-beard needles *b*, said parts being of common construction and functions.

A in Fig. 1 designates my improved contrivance, constructed and arranged so as to carry a yarn over the tops of the needles and lay it first behind one needle and in front of the next, and so on throughout the series. This contrivance consists of two wheels, which may be constructed and arranged as shown in Figs. 2 to 6, inclusive, to which particular reference may be had in the immediately following description.

c designates a yarn-introducing wheel having blades or wings *d* set obliquely in its periphery, so that when said wheel is arranged obliquely with respect to the needles, as shown in Fig. 1, said blades will pass between the needles and the wheel will be thereby rotated. Nibs *e e* are formed on the outer ends of the blades *d*, so as to adapt said blades to engage a yarn and carry it over the tops of the needles and down back of the same, or sink it between the needles and carry it up or down on the stems of the same, according to the manner in which it is arranged with respect to the needles, as will be readily understood.

In the present example the wheel *c* is shown as arranged to carry the yarn over the tops of the needles and down on the backs of the stems, and the blades *d* are shown as only sufficient in number to pass between every other and the next adjacent needle of the series.

f designates a wheel of larger diameter than wheel *c*, and having blades or wings *g* set obliquely in its periphery, said blades being shown as sufficient in number to enter between each two needles of the series. Every other blade of the series projects beyond the face of the wheel, as shown at *h*, so that when the yarn-introducing wheel *c* is arranged adjacent to or above wheel *f*, (which I may term a "supplemental wheel,") so as to have its periphery coincide at one point with the latter wheel, as shown in Fig. 6, the extensions *h* of blades or wings *g* will fall between the blades *d* of the yarn-introducing wheel *c*, and so as to bend a yarn fed to wheel *c* in zigzag form around the extensions *h* of wings *g* and wings *d*, the extended wings *g h* catching on the yarn on the wings *d* of wheel *c* between said latter wings and pressing it forward, so that as the yarn is carried down on the needles it will be guided in front of the same at the points where the extended blades *g h* fall and passed behind the same at all points where the blades *d* operate unopposed. The yarn is fed to the yarn-introducing wheel *c* by means of a yarn-guide r^2, of ordinary construction, (see Fig. 1,) secured to the support for said wheel, or to any other convenient stationary part of the machine. In this way a filling-yarn can be introduced to the needles without bending the same. The devices can be arranged at a single point outside the circle of needles, and be made so compact as not to occupy more room than would a single yarn-introducing wheel or a clearing-wheel or the like. Besides this, they afford a means for introduc-

ing a filling-yarn, which is absolutely certain in its operation and may be operated with great rapidity.

I have shown the supplemental wheel *f* as journaled on a stud *i* of a bracket or stand *j*, similar to the manner of supporting an ordinary clearing-wheel in position, while the yarn-introducing wheel *c* is journaled on a stud *k* in a bracket *l*, secured to stand *j* and projecting out over wheel *f*, all as shown in Fig. 1.

At B in Fig. 1 and in Figs. 7, 8, 9, and 10 I have shown my invention as adapted to introduce a yarn under the beards of certain needles and laying it upon the beards of the others. In this instance the yarn-introducing wheel *c* is provided with blades similar to the blades of an ordinary stitch-wheel, and certain of these blades are mutilated or cut away, as at *z*, Fig. 10, and the extended blades *g h* of the supplemental wheel *f* are arranged so that in the operation of the device they will fall at the points where the blades of the yarn-introducing wheel are mutilated or cut away, so as to hold the yarn forward at these points and carry it in front of or out upon the beard of the needle adjacent to such extended blade, while the blades of the yarn-introducing wheel will carry the yarn under the beards of the other needles and sink it between the needles. It will be seen that in this instance the contrivance operates on precisely the same principle as in the first-described example, the construction and arrangement of parts being varied only so as to introduce the yarn to the needles below the beards thereof and raise it upward instead of introducing it at the tops of the needles and carrying it downward.

In Figs. 7, 8, and 9 and at B in Fig. 1 the supplemental wheel *c* is shown as journaled on a stud *m*, attached to a bracket *n*, secured to adjustable arm *o*, while wheel *f* is journaled on a stud *p*, secured to a bracket *q*, also attached to arm *o*. *r* designates the yarn-guide, likewise attached to arm *o*.

It is obvious that it is not essential that the wheels *c* and *f* should be supported by means having the precise form and arrangement of those shown, as such form and arrangement may be varied without departing from the nature or spirit of the invention, and in like manner the form and arrangement of the wheels may be varied.

At C in Fig. 1 I have shown an ordinary stitch-wheel *s*, supported on a stud *t* of an arm adjustable in star-box *u*, the yarn-guide for such wheel being designated by the letter *v*.

A head or machine may be equipped with one or more groups of devices, as designated at A in Fig. 1, with or without one or more groups of devices, as designated at B, and the same thing may be said of the group of devices B with respect to the group A.

It will be noticed that the yarn is fed to the contrivance at a point within the circle of the supplemental wheel, which makes it feasible to accomplish the introduction of the yarn to the needles in the manner explained by me.

It is not essential that the supplemental wheel should be of much larger diameter than the yarn-introducing wheel, and the former wheel need not be made larger than an ordinary clearing-wheel, so that the room occupied by the contrivance need be but little as compared with many other devices designed to do the same work.

Having thus described my invention, I would have it understood that what I claim is—

1. A contrivance for introducing yarn to the needles of a knitting-machine, consisting of a yarn-introducing wheel provided with blades adapted to pass between the needles, and a supplemental wheel arranged to operate face to face with the first-mentioned wheel, and also provided with blades adapted to pass between the needles, certain of which blades are extended and project over the periphery and between the blades of the yarn-introducing wheel, as set forth.

2. A contrivance for introducing yarn to the needles of a knitting-machine, consisting of a yarn-introducing wheel provided with blades adapted to pass between the needles, certain of which blades are mutilated or cut away, and a supplemental wheel arranged to operate face to face with the first-mentioned wheel, and also provided with blades adapted to pass between the needles, certain of which blades are extended and project over the periphery and between the blades of the first-mentioned wheel at the points where its blades are mutilated or cut away, substantially as set forth.

3. A contrivance for introducing yarn to the needles of a knitting-machine, consisting of a yarn-introducing wheel provided with blades adapted to pass between the needles, and a supplemental wheel of larger diameter than the first-mentioned wheel, arranged to operate face to face with said first-mentioned wheel, and also provided with blades adapted to pass between the needles, certain of which blades are extended and project over the periphery and between the blades of the yarn-introducing wheel, as set forth.

4. A contrivance for introducing yarn to the needles of a knitting-machine, consisting of a yarn-introducing wheel provided with blades adapted to pass between the needles, certain of which blades are mutilated or cut away, and a supplemental wheel of larger diameter than the first-mentioned wheel, arranged to operate face to face with the said first-mentioned wheel, and also provided with blades adapted to pass between the needles, certain of which blades are extended and project over the periphery and between the

blades of the first-mentioned wheel at the points where its blades are mutilated or cut away, substantially as set forth.

5. The spring-beard needles and their support, combined with the yarn-introducing wheel *c*, having blades *d*, and the supplemental wheel *f*, having blades *g*, certain of which are extended, as at *h*, said wheels being arranged to operate face to face, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 24th day of October, A. D. 1887.

JOHN BRADLEY.

Witnesses:
ARTHUR W. CROSSLEY,
A. D. HARRISON.