

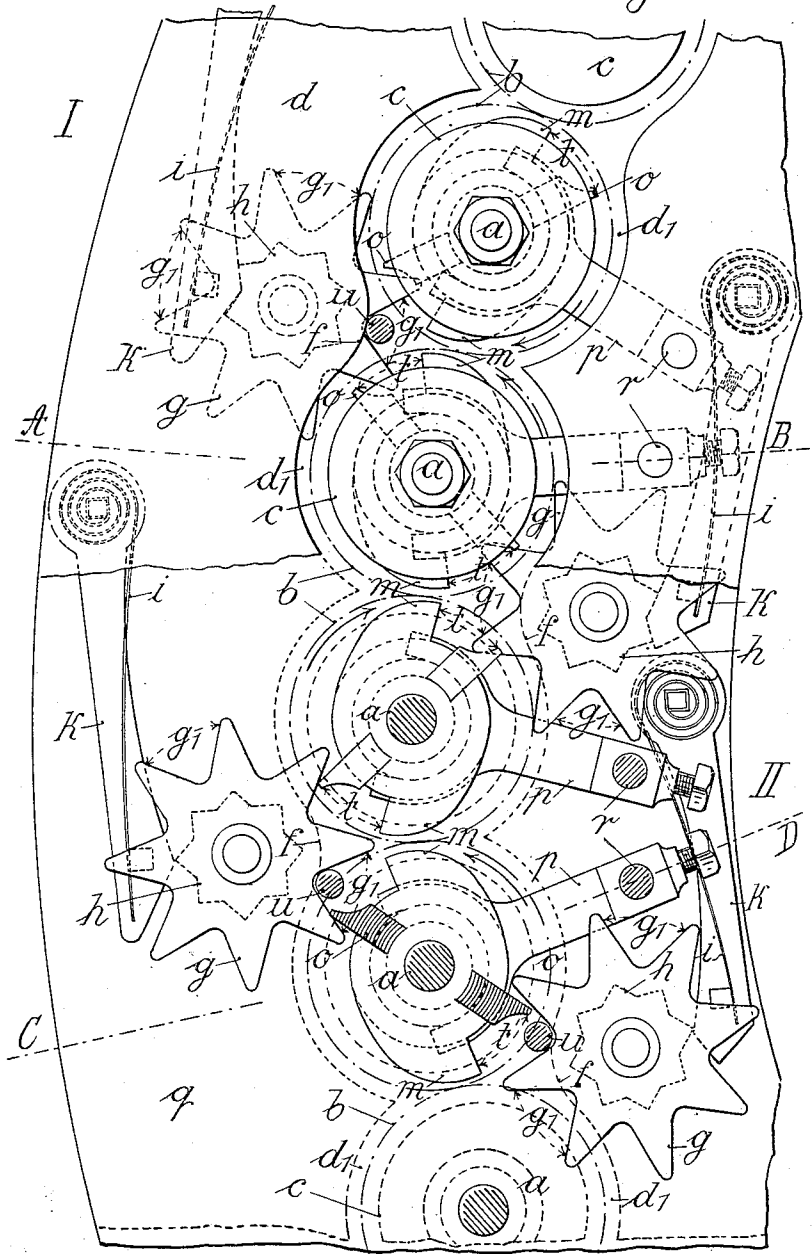
F. HOLZRICHTER.  
LACE MAKING MACHINE.  
APPLICATION FILED APR. 11, 1912.

1,042,003.

Patented Oct. 22, 1912.

2 SHEETS-SHEET 1.

Fig. 1.



Witnesses:

*Helen Nuffer*

*Albert Nuffer*

Inventor:

*Ferdinand Holzrichter*

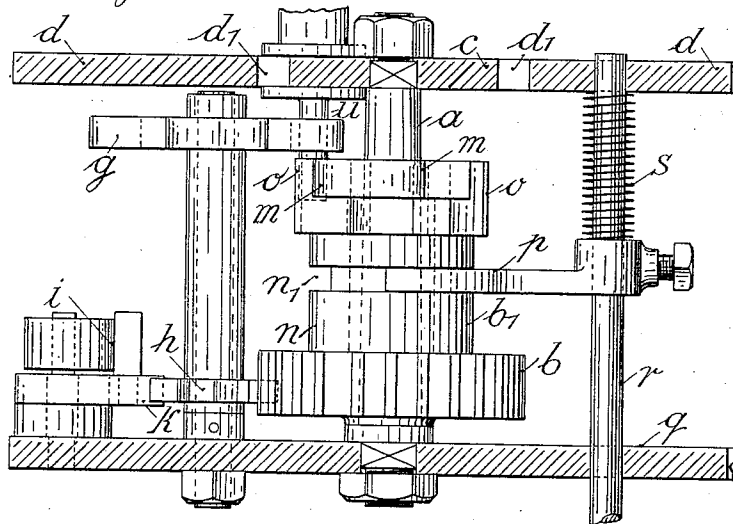
F. HOLZRICHTER.  
LACE MAKING MACHINE.  
APPLICATION FILED APR. 11, 1912.

1,042,003.

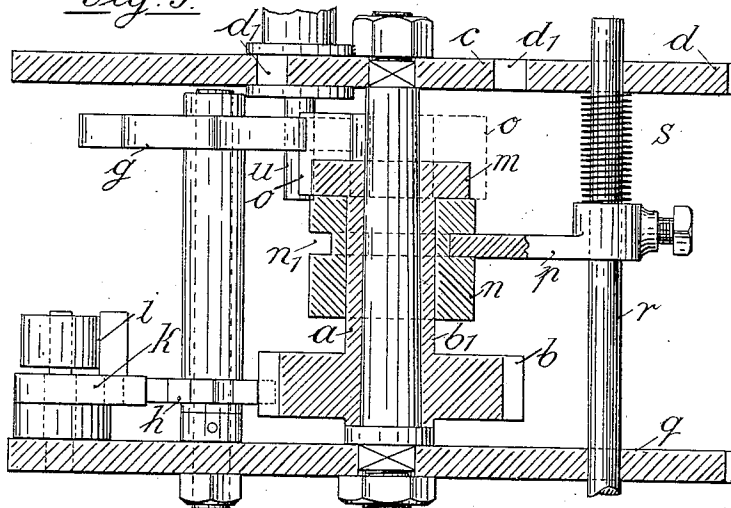
Patented Oct. 22, 1912.

2 SHEETS—SHEET 2.

*Fig. 2.*



*Fig. 3.*



Witnesses:

Helen Nuffer  
Albert Nuffer

Inventor:

Ferdinand Holzrichter

# UNITED STATES PATENT OFFICE.

FERDINAND HOLZRICHTER, OF BARMEN, GERMANY, ASSIGNOR TO BARTELS, DIERICH & CO., GESELLSCHAFT MIT BESCHRANKTER HAFTUNG, OF BARMEN, GERMANY, A CORPORATION OF GERMANY.

## LACE-MAKING MACHINE.

1,042,003.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed April 11, 1912. Serial No. 690,153.

*To all whom it may concern:*

Be it known that I, FERDINAND HOLZRICHTER, a citizen of the Empire of Germany, and residing at Barmen, Germany, have invented certain new and useful Improvements in Lace-Making Machines, of which the following is a specification.

My invention relates to lace-making machines comprising a number of heads or plates arranged in a closed circle among which the bobbin-carriers are driven in tracks by means of drivers rotating below the heads or plates, the course of the bobbins being regulated according to the pattern of lace to be made by temporarily stopping the bobbin-carriers. In these lace-making machines, in which the number of bobbins is equal to the number of heads or plates, it is well-known to stop and guide the bobbin-carriers at each crossing in the track in front of the truncated point with the aid of an inlet able to be adjusted by the pattern-gear. Now according to my invention I group a plurality of inlets about one common center to form a star-shaped wheel, and I mount this wheel revolvably at each crossing behind the truncated point located in the direction of rotation of the driving gear-wheels, so that in the rest position it always has one of its inlets or recesses facing the open side of the crossing. In the rest position of the wheel the bobbin-carrier drivers drive the bobbin-carrier into the inlet or recess and leave it behind here; the wheel is, however, rotated part of a revolution by blades axially displaceable on the hubs of the driving gear-wheels when these blades are lifted a corresponding height by the jacquard pattern-gear, the partial rotation taking place toward the one or the other wheel according as the blades of the one or the other driving gear-wheel are lifted. The partial rotation starts the stopped bobbin-carrier working on to one or other of the adjoining heads or plates depending on the direction of rotation. By means of this arrangement the stoppage and guidance of the bobbin-carriers is distributed at each crossing among a number of inlets or recesses, the wear and tear of the individual parts is correspondingly diminished and, consequently, the life of the machine is considerably increased. The backward motion of the inlet for the reception of the next

bobbin-carrier is obviated because during the partial rotation the next inlet in the wheel occupies the place of the preceding one in each case. Consequently, one movement is saved. Further, as the blades which bring about the rotation of the star wheel are located close in front of the drivers, a relatively long time almost equal to the duration of half a revolution of the driving wheel is at disposal during which the hooks of the jacquard pattern-gear can be lifted for lifting the blades.

Another advantage attaching to my improved device consists in the blades, suitably prevented from rotating on the driver hub, extending into the path of the drivers and forming with these vertical spaces for the bobbin-carrier driver pins, so that when the bobbin-carriers are moving along the track they are continuously guided and incorrect motion is completely prevented.

One illustrative embodiment of my invention is represented by way of example in the accompanying drawings, wherein:—

Figure 1 is a top plan view, the part thereof designated I showing two heads or plates of the lace-making machine with one bobbin-carrier in the rest position, and the part II showing the tracks in dotted lines, two bobbin-carriers being about to be set in motion. Figs. 2 and 3 are vertical sections taken on the lines A—B and C—D respectively in Fig. 1.

Referring to the drawings, the heads or plates *c* fast on the spindles *a* of the driving gear-wheels *b* form with the frame-plate *d* the known tracks *d*, at whose crossings the points *f* located in the direction of rotation of the drivers are truncated, as has been known heretofore. Now behind this truncated point I journal a wheel *g* provided in the illustrative embodiment, with eight recesses or inlets *g*, and consequently of a star-shape; the rest position (Fig. 1) of this star-wheel is secured by a notched wheel *h* rigidly connected with it and provided with as many notches as the star-wheel contains recesses, and by a lever *k* pressed by a spring *i* entering into one of the notches.

The hub *b*, of the driving gear-wheel *b* carries the blades *o* below the drivers *m*; these blades *o* are at opposite sides of the spindle *a* and are axially displaceable but non-rotatable relatively to the drivers.

They are moved up and down by means of the jacquard pattern-gear in the customary manner through the medium of a fork *p* which is fast on a pin *r* and engages in a groove *n*<sub>1</sub> of a bushing *n* carrying the blades; the pin *r*, pressed downward by the spring *s*, is guided in the top frame-plate *d* and in the bottom frame-plate *g* and is lifted by the pull of the hooks. The blades *o* extend upward to close in front of the drivers *m* and form therewith spaces *t* for the pins *u* (Fig. 2). In the elevated position (Fig. 3) the blades are at the elevation of the star-wheel *g* and engage therewith in such manner that it is driven so far during one partial revolution that the next recess arrives below the truncated point *f*.

In the rest position of the star-wheel *g* (Fig. 1) the bobbin-carrier moved by the drivers in the direction of the arrows is stopped at the slanting flanking sides of the recess blocking the track toward the two heads or plates and is brought along these into the stationary position. On the contrary, when one of the pairs of blades *f* is lifted, *e. g.* that shown cross-hatched in Fig. 1, II, the wheel *g* is rotated part of a revolution and the bobbin-carrier *u* is driven from the recess in which it was stopped to in front of the driver, as will be readily understood from Fig. 1. For transferring the bobbin-carrier in operation to the other head or plate, the pair of blades not cross-hatched is lifted and drives the star-wheel *g* in the opposite direction.

I claim:—

1. In a lace-making machine of the character described, the combination with a top frame-plate having truncated points, a bottom frame-plate, spindles mounted on the

bottom frame-plate, heads or plates mounted on the spindles and forming tracks with the top frame-plate, the tracks forming crossings opposite the truncated points, a gear-wheel having a hub on each spindle, and a driver for bobbin-carriers driven by each hub, of a star-wheel journaled behind each truncated point, means for arresting the star-wheel with a recess opposite a crossing, blades displaceably mounted on each hub for rotating adjacent star-wheels, and means for moving the blades into and out of the plane of the star-wheels.

2. In a lace-making machine of the character described, the combination with a top frame-plate having truncated points, a bottom frame-plate, spindles mounted on the bottom frame-plate, heads or plates mounted on the spindles and forming tracks with the top frame-plate, the tracks forming crossings opposite the truncated points, a gear-wheel having a hub on each spindle, and a driver for bobbin-carriers driven by each hub, of a star-wheel journaled behind each truncated point, means for arresting the star-wheel with a recess opposite a crossing, blades displaceably mounted on each hub for rotating adjacent star-wheels, and means for moving the blades into and out of the plane of the star-wheels, the blades extending into the path of the drivers and forming spaces for receiving bobbin-carriers movable in the tracks.

In testimony whereof, I affix my signature in the presence of two witnesses.

FERDINAND HOLZRICHTER. [L. s.]

Witnesses:

HELEN NUFER,  
ALBERT NUFER.