

Jan. 6, 1925.

1,522,224

C. BIRKENHAUER

SINGLE THREAD LACE BRAIDING MACHINE

Filed Aug. 30, 1921

3 Sheets-Sheet 1

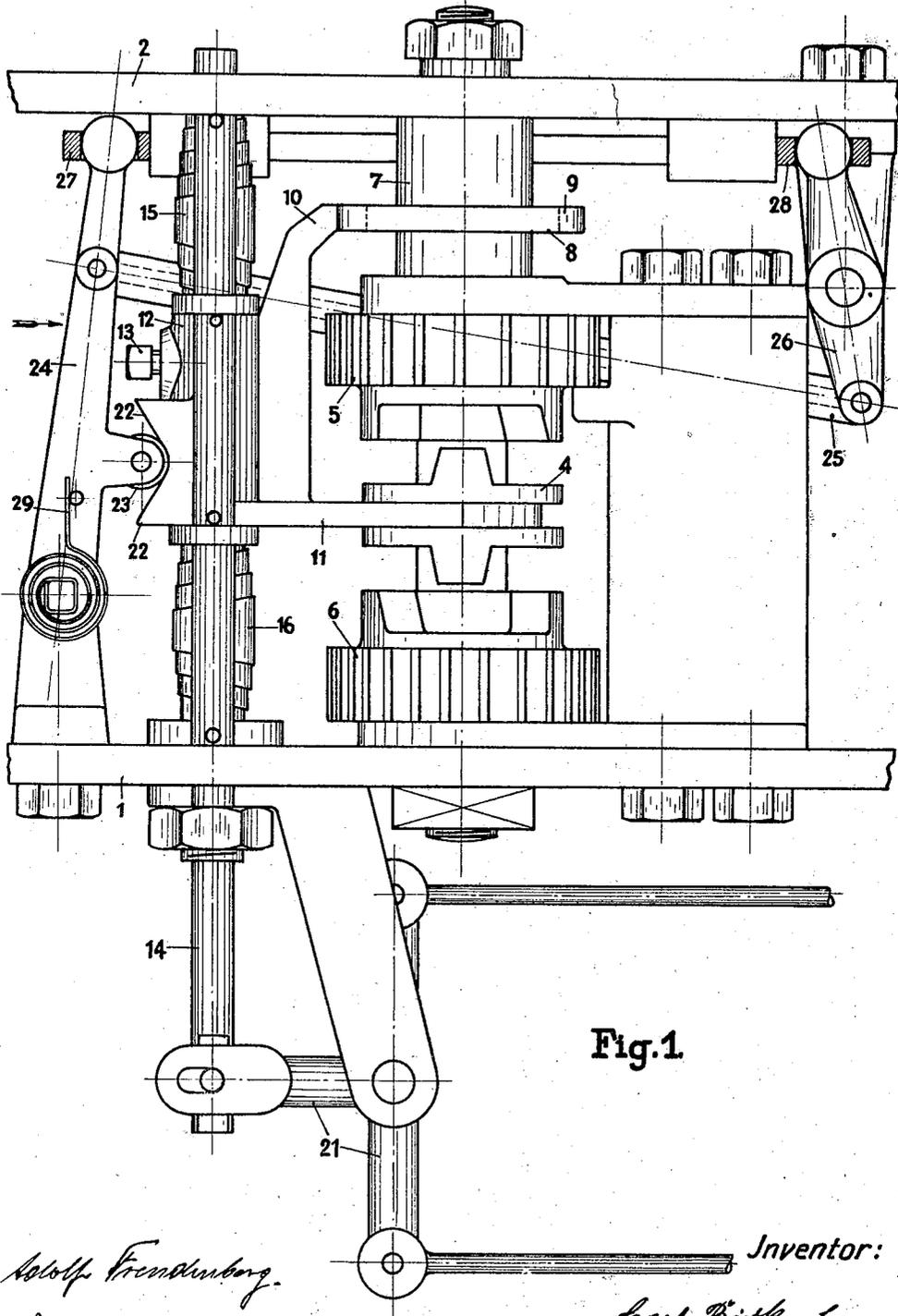


Fig. 1

*Soloff, Friedrichsberg.
Mach. R. 1111111.*

Inventor:
*Carl Birkenhauer
By his attorney
Haug & Harland*

Jan. 6. 1925.

1,522,224

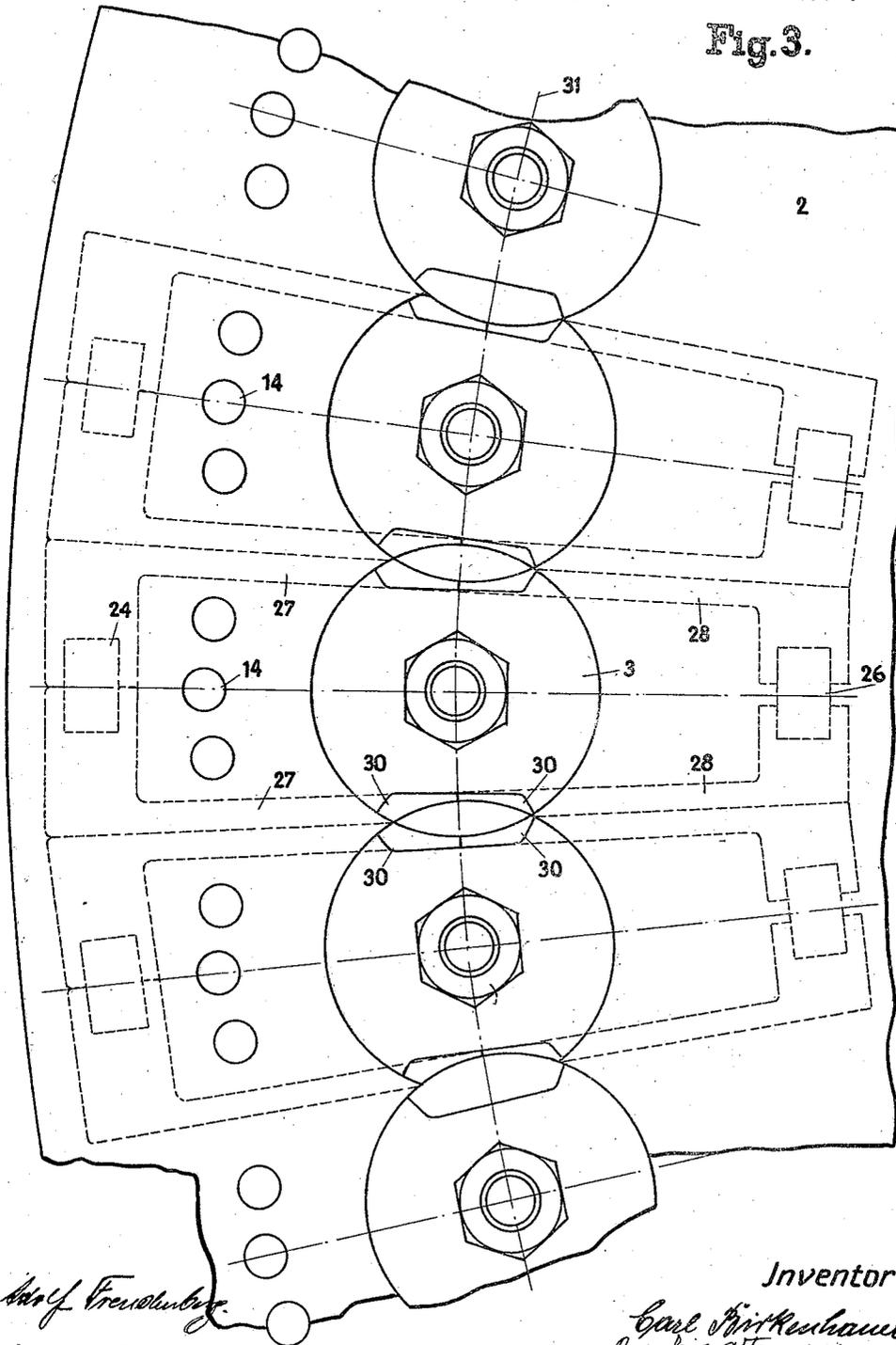
C. BIRKENHAUER

SINGLE THREAD LACE BRAIDING MACHINE

Filed Aug. 30, 1921

3 Sheets-Sheet 3

Fig. 3.



Walter Rummel
Walter Rummel

Inventor:
Carl Birkenhauer
By his attorney
Harff & Holland

UNITED STATES PATENT OFFICE.

CARL BIRKENHAUER, OF BARMEN, GERMANY.

SINGLE-THREAD LACE-BRAIDING MACHINE.

Application filed August 30, 1921. Serial No. 497,073.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, CARL BIRKENHAUER, residing at Barmen, Germany, 18 Wuppermannstrasse, have invented certain new and useful Improvements in Single-Thread Lace-Braiding Machines (for which I have filed applications for patent in Germany, on September 9, 1919, application K. 70,164 VII/25 b; England, September 20, 1920, Patent 174,671; Switzerland, March 31, 1921, Patent 98,529; France, March 29, 1921, Patent 533,369; Italy, March 30, 1921, Patent 301/1213; Holland, March 24, 1921, application 18,628; Belgium, March 31, 1921, Patent 295,263; Czechoslovakia, March 29, 1921, application P. 2307/21), of which the following is a specification.

The invention relates to so-called single thread lace braiding machines, i. e., a lace braiding machine in which a single thread or bobbin carrier is provided for each carrier driver. The object of the invention is to provide novel arrangements which enable both right hand and left hand rotary movement to be accomplished in these machines without the carrier drivers interfering with each other even though the plates are arranged in circle or on the arc of a circle. In accordance with the invention this problem is solved by shaping the carrier drivers in such a manner that, even though they may be arranged on a circle, they will pass each no matter what side of the drivers is turned towards the periphery or the center of the machine. The carrier drivers preferably have a symmetrical shape.

The operation of guiding the carriers is accomplished by means of sliding guide members which are arranged to be moved into and out of the path along which the carriers travel.

Another feature of the invention consists in guide-members which belong to a plate being simultaneously moved out of the track of the carriers by the coupling member that throws in the gear for right-hand or left-hand motion, this operation being preferably controlled by a jacquard apparatus.

Another feature of the invention consists in an arrangement by which a single coupling member is used for throwing the carrier driver into gear with the driving wheels for right-hand and left-hand motion and by

which the coupling is maintained until the driver has reached its normal position. 55

Another feature of the invention consists in the springs which restore the coupling member to its normal position being prevented from taking effect when the said member has moved beyond a certain position. 60

The sliding guide members may be substituted by other arrangements without affecting the remaining features of the invention. 65

A constructional form of the invention is illustrated in the drawing in which—

Fig. 1 is a side view of a carrier driver with arrangements for imparting to it right-hand and left-hand motion and arrangements by which continuous guides are formed at the parts where the circles of adjacent plates overlap each other, 70

Fig. 2 shows a side view—as seen when regarded in the direction of the arrow of Fig. 1—of the pull of one driver and the driving gear of an adjacent driver, the pull being arranged to be operated by a jacquard apparatus, the foot of a carrier being indicated in this figure. 80

Fig. 3 is a plan view of a part of the top plate.

In the drawing 1 is a bottom plate and 2 a top plate in which the carrier track is formed. Arranged in the plane of the top plate 2 is a carrier driver constructed in the form of a plate. 85

Associated with the driver is a coupling member 4 adapted to move up and down, but not to rotate on a sleeve which is firmly fixed to the driver. The coupling member 4 may be thrown into gear either with the toothed wheel 5 or with the toothed wheel 6 by its being raised or lowered respectively. Fixed on the sleeve 7 that carries the driver 3 is a disk 8 with notches 9 with which a detent 10 is adapted to engage that is preferably rigidly fixed to the coupling fork 11. When the detent 10 projects into a notch 9 the disk 8 is arrested to prevent any undesired rotation of the driver. The parts 10 and 11 are rigidly fixed to a sleeve 12 adapted to be screwed fast by a screw 13 to a rod 14 actuated by jacquard apparatus (not shown). The sleeve 12 is affected by springs 15 and 16 which act upon cross bars 105

17, 18 whose up-and-down motion is limited by pins 19, 20. When the bell crank lever 21 is rocked by the jacquard apparatus the rod 14 is either raised or lowered. The coupling member 4 is then thrown into gear either with the driving wheel 5, the dentent 10 being simultaneously raised above the disk 8, or with the driving wheel 6, when the detent 10 will be lowered to a level beneath the disk 8. Once the driver has been started rotating due to the operation of the jacquard pull the detent 10 will remain above or beneath the disk 8 even after the said operation ceases and thus engagement between the coupling member 4 and the particular driving wheel will be maintained until the dentent 10 appears above or beneath a notch 9 in the disk 8, when the disengaging operation will be effected automatically with the aid of one of the springs 15, 16. The sleeve 12 is also provided with inclined surfaces 22 that cooperate with a roll 23 mounted on a lever 24. The lever 24 is connected by a rod 25 with a two-armed lever 26. The upper ends of the levers 24 and 26 are connected with sliding members 27, 28 which are simultaneously moved either outward or inward by the said levers. When the sleeve 12 is moved up or down the sliding members 27, 28 whose carrier driver is caused to be rotated are pulled outward. When the sleeve 12 returns to normal the levers 24, 26 and the attached sliding members are also restored to normal by the spring 29.

It will appear from Fig. 3 that the four sliding members 27, 28 associated with a plate can thus be simultaneously moved out of and into the track of the bottom ends or feet of the carriers. The function of the members 27 and 28 is to keep the braiding carriers in engagement with the drivers, by which they are operated and to prevent the carriers from travelling into the path of a driver adjacent to an operating driver. As shown in Fig. 3 the plates 3 have two carrier driving edges 30 and are arranged in such a manner that although they are disposed on a circle 31, they are enabled to move past each other at the inner and outer sides of the bobbin track.

Instead of the plates arranged in the cover plate being arranged to also act as carrier drivers, fixed plates may be arranged in the track plate and the rotating drivers may be located beneath them.

The arrangement of the entire machine is, on the whole, similar to that shown in a copending application in which guide members that execute up-and-down motions are used instead of guide-members that slide to and fro laterally.

I claim:—

1. In a lace braiding machine, a plurality of carrier drivers adjacent to each other,

means for rotating the drivers each clockwise or counterclockwise, and guide members movable transverse to the direction of the axis of the carrier drivers adapted to be shifted into and out of the path of the carriers, so as to keep the carriers in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating driver.

2. In a lace braiding machine, a plurality of carrier drivers adjacent to each other, means for rotating the drivers each clockwise or counterclockwise, and a plurality of guide members movable transverse to the direction of the axis of the carrier drivers, associated with a said carrier driver adapted to be shifted into and out of the path of the carriers in opposite directions, so as to keep the carriers in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating driver.

3. In a lace braiding machine, a plurality of carrier drivers adjacent to each other, means for rotating the drivers each clockwise or counterclockwise, a plurality of guide members movable transverse to the direction of the axis of the carrier drivers associated with a said carrier driver adapted to be shifted into and out of the path of the carriers so as to keep the carriers in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating driver, and means for moving the said guide members simultaneously.

4. In a lace braiding machine, a plurality of carrier drivers adjacent to each other, means for rotating the drivers each clockwise or counterclockwise, a plurality of guide members movable transverse to the direction of the axis of the carrier drivers, associated with a said carrier driver and adapted to be shifted into and out of the path of the carrier, so as to keep the carriers in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating driver, actuating members for moving the said guide members in opposite directions, and connecting members for the said actuating members.

5. In a lace braiding machine, a plurality of carrier drivers adjacent to each other, means for rotating the drivers each clockwise or counterclockwise, a plurality of guide members movable transverse to the direction of the axis of the carrier drivers associated with a said carrier driver adapted to be shifted into and out of the path of the carriers, so as to keep the carriers in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating

5 driver, a rocking arm for moving some of the said guide members in one direction, and a rocker for moving other of the guide members in the opposite direction, and a connecting member between the said rocking arm and said rocker.

10 6. In a lace braiding machine, a plurality of carrier drivers adjacent to each other, means for rotating the drivers each clockwise or counterclockwise, guide members adapted to be shifted into and out of the path of the carriers, so as to keep the carriers in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating driver, clutches for coupling a carrier driver to the said rotating means, actuating members for moving the said guide members in opposite directions, connecting members for the said actuating members, means for controlling the said clutches, and operating means associated with the said controlling means adapted to operate the said actuating members whenever a clutch is operated to couple a carrier driver.

15 7. In a lace braiding machine, a plurality of carrier drivers adjacent to each other, means for rotating the drivers each clockwise or counterclockwise, guide members adapted to be shifted into and out of the path of the carriers, so as to keep the carrier in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating driver, a single clutch associated with a said driver arranged to be moved in two directions to couple the driver with the said rotating means, actuating

40 members for moving the said guide members in opposite directions, connecting members for the said actuating members, and a compound motion controlling member for said clutch, and means for operating the said actuating members whenever said clutch is operated to couple a carrier driver with the said rotating means.

50 8. In a lace braiding machine, a plurality of carrier drivers adjacent to each other, means for rotating the drivers each clockwise or counterclockwise, guide members adapted to be shifted into and out of the path of the carriers so as to keep the carriers in engagement with the operating drivers and to prevent the carriers from travelling into the path of a driver adjacent an operating driver, a single clutch associated with a said carrier driver arranged to be moved in two directions to couple the driver with the said rotating means, actuating members for moving the said guide members in opposite directions, connecting members for the said actuating members, and a compound motion controlling member for said clutch, and means for operating the said actuating members whenever said clutch is operated to couple a carrier driver with the said rotating means, the compound motion controlling member being rigidly connected with the said operating means for operating the actuating members.

In testimony whereof I have affixed my signature in presence of two witnesses.

CARL BIRKENHAUER.

Witnesses:

HEBE LICHELSCHMIDT.
ADOLF FRENDBERG,