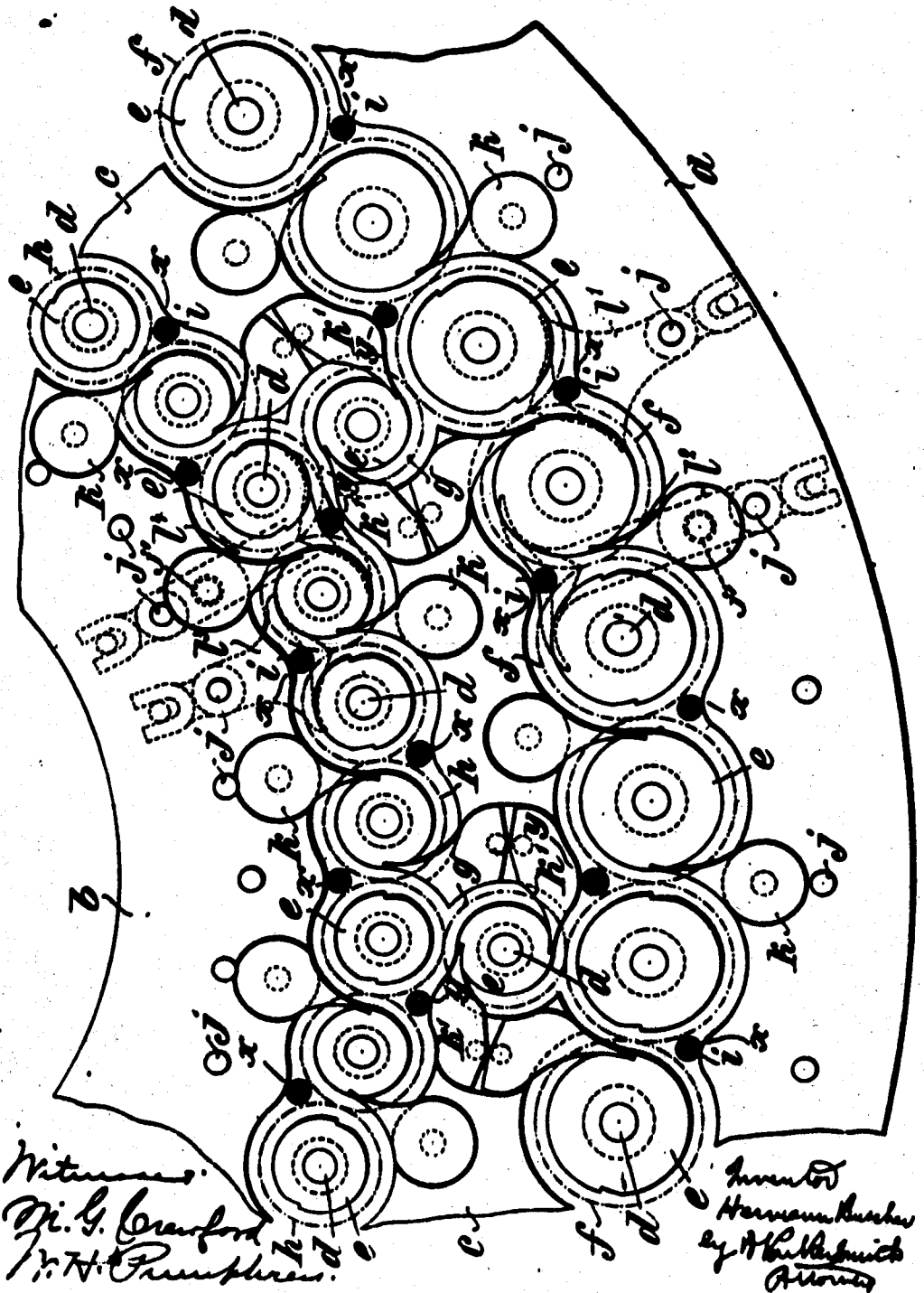


H. BUSCHER.
MACHINE FOR PRODUCING BRAIDED OR PLAITED LACE.
APPLICATION FILED JAN. 8, 1908.

946,007.

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UNITED STATES PATENT OFFICE.

HERMANN BUSCHER, OF LANGERFELD, NEAR BARMEN, GERMANY, ASSIGNOR TO THE FIRM OF ALB. & E. HENKELS, OF LANGERFELD, NEAR BARMEN, GERMANY.

MACHINE FOR PRODUCING BRAIDED OR PLAITED LACE.

946,007.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Application filed January 8, 1906. Serial No. 395,013.

To all whom it may concern:

Be it known that I, HERMANN BUSCHER, of Langerfeld, a subject of the King of Prussia, and whose post-office address is No. 45 Barmerstrasse, Langerfeld, near Barmen, Prussia, German Empire, have invented a new and useful Machine for Producing Braided or Plaited Lace, of which the following is a specification.

This invention relates to an apparatus for producing by mechanical means lace having ornamental design superficially applied thereto. Hitherto the said ornamental design has been made of distinct warp-like threads which form a separate structure independent from main lace work and are generally led into the plaiting field by causing them to pass through hollow stays or like members which usually connect the known annular slide way plates to the corresponding lower plates or other like parts of the machine frame. These slide plates being duplicated and serving, with the aid of convenient secondary leading and switching devices, to guide a double system of bobbins by forming slide-paths for the lower spindle extremities of such bobbins, the main lace work is alternately made on the external or internal of the two known concentric slide plates by means of the respective two systems of plaiting appliances, so that the said warp-threads may correspondingly appear and remain, for a certain length of time, on the right or left side of the lace. In such method of mechanically producing appliqué lace the attachment of the appliqué ornamental work to the main lace work, is simply effected by causing the plait bobbin threads to go around the warp threads which are always fed in straight lines or, in other words, by causing the warp threads to issue alternately above and beneath or before and behind the lace work. It will be evident that the mechanical production of such appliqué lace, as generally defined by the foregoing statement is yet a very imperfect one and very limited, in consequence of the necessary straight course of the warp threads, in respect to the character of the appliqué figures, and to obtain a closer imitation of real appliqué lace by mechanical means it has been proposed to use a combination of two lace machines connected by intermediate raceways for intertwining the bobbins of the two machines. This known principle is

the basis of my present invention by which I am able to produce mechanically a most faithful imitation of manually made appliqué plait work, inasmuch as I am also enabled to produce, on the plaiting principle, the appliqué ornamentations of my new improved lace which is thus made susceptible of a great and almost indefinite variety of figures or designs, the intermittent attachment of the latter to the main or ground lace work being likewise mechanically and automatically effected by plait interlacement of the respective lace and appliqué threads.

The fundamental conception of the new method of the mechanical imitation of manually plaited appliqué lace consists in causing the threads serving to make the appliqué figures to run off also from plaiting bobbins as is the case for all the other threads constituting the main ground. Thus the warp threads used in making appliqué lace of the explained known structure and which are so to speak, quite inactive are replaced by threads which are active since the plait bobbins carrying the same are moved as may be necessary for introducing into the plaiting field, in accordance with the proposed design the appliqué threads, either by being interlaced one with the other or by interlacement with the threads forming the main lace work, and for this purpose the said plaiting bobbins are guided within the slide plates and held inactive for a certain lapse of time in accordance with the design to be produced. It is thus to be considered a new feature in the present invention, that either of the two concentric plaiting systems is made to braid or plait one or the other of the two distinct parts which constitute the appliqué lace i. e. either its ground work or its appliqué ornamentation, convenient arrangements in the bobbin guiding, disengaging and reengaging device being provided by means of which, in certain intervals, the two plaiting systems are brought to work the one into the other as is determined by the distances, lengths and character or design of the lace parts, whereby the attachment of the appliqué figures to the lace ground work, i. e. corresponding interlacement of the appliqué and lace threads, is effected in plaiting style. From this statement it appears that each of the two plaiting systems must be capable of two different modes of opera-

tion, of which one may be called independent and the other reciprocal or intercommunicating, and that, accordingly, it is necessary to provide each of the two concentrically working plaiting systems with a double switching and disengaging or reengaging device and to arrange between the two concentric plaiting systems a convenient intercommunicating device which allows or effects the necessary periodical cooperation of the two said systems.

In carrying the present invention into effect the general arrangement of disengaging and reengaging devices described in the specification to the United States Patent No. 613,380 of November 1st 1898 is modified, as shown in the accompanying drawing which shows by way of illustration a part plan of a compound plaiting machine adapted to produce appliqué lace according to the new method, and which also exhibits other new constructional features which are useful in a compound plaiting according to this invention.

Referring to the drawing *a, b* are respectively the external and internal annular slide plates, each made in one piece, while the third slide plate *c* is composed of several elements. The three plates *a, b, c* are connected in any known manner to a corresponding lower, likewise annular, frame plate by means of stays not shown on the drawing. The edges of the guide ways provided in the assembled slide plate *a, b, c* are formed with blunted points *x* so that they offer resisting surfaces for the stems *i* when at rest, as shown on the drawing. The pivots *d* are fixed in the usual manner to the annular frame plate concentric with the circular parts of the guiding edges, and carry at their upper ends the guiding disks *e*. Between the latter and the frame plate and mounted loosely on the pivots *d* are the driving devices, which are preferably constructed on the system explained in the United States Patent No. 613,380, and are indicated on the annexed drawing by dotted lines lettered *f, g, h*. These driving disks *f, g, h* which nearly touch with their upper faces, the lower surfaces of the guiding disks *e* (which, in turn, have their upper surfaces in the plane of the upper surfaces of the slide plates, *a, b, c*) impart the necessary motion to the plaiting spindles, of which only the stems *i* are shown on the drawing, such motion being controlled by the switches *k, k'* and the disengaging and reengaging organs acted upon by the jacquard pulling device, the said driving disks being rotated in alternate directions by known means, such as are for instance described in the before mentioned United States Patent No. 613,380.

The two forms of switches *k, k'* differ only with regard to their arrangement on the external or internal or on the intern

mediate portion of the slide plate *a, b, c*. For the intermediate slide plate the switches are made with a curved edge portion or blunted point *v*, so that, together with the guide way edges situated underneath, they offer resting surfaces for the stems *i* when at rest, as shown on the drawing. The switches *k* and the disengaging and reengaging members are operated in the manner described in the above mentioned United States specification with reference to the analogous members therein, and the switches *k'* are also operated as therein described by means of a jacquard chain. The surfaces of the slide plates are recessed to receive the switches, the upper surfaces of which are thus flush with the upper surface of the slide plates.

The disengaging and reengaging organs, the number of which is equal to that of the stems *i* are made in four different sets, the members of each set varying from the members of the other sets either in form or in dimensions, of which two sets are adapted to the internal and two to the external plaiting system. The round bars *j*, upon which the disengaging and reengaging levers are mounted, are axially shifted in accordance with the design which is to be produced in the lace and its appliqué ornamentation, such shifting movement being effected in known manner by the jacquard controlling device. By the action of springs the slidable bars *j* are always retracted to their upper position, in which they are adapted for conducting the stems *i* into their resting places or for retaining them therein. The lowering of the bars *j* for allowing certain stems *i* to circulate is effected by means of cords and levers cooperating with a jacquard chain. All these arrangements are preferably made according to the United States Patent No. 613,380, and in the annexed drawing only one piece of each of the four different types *l', l'', l''', l''''* of disengaging and reengaging levers is represented, in order to avoid useless complication. The levers *l'* and *l''* are similar one to the other in form, but different in size, and the same is true of levers *l'''* and *l''''*. The multiple arrangement of the four types of organs is evident from the disposition of the round bars *j*, these being all shown in the drawing. For the levers *l'* and *l''* the small circles *j'* shown on the drawings in dotted lines indicate that the said levers are surrounding, with play, the shafts of the switches *k*. The bars *j*, as it is known, are arranged to penetrate also the lower annular frame plate, thereby receiving their second, lower, bearing for the sliding movement which is produced in dependence upon the jacquard-shifter.

As to the bobbin motion, it may be particularly stated that one part of the whole existing number of plait bobbins is produc-

ing for a certain length of time a certain measure of the main lace work in one plaiting path, being accordingly acted upon to this end by the guiding, driving and disengaging devices, while simultaneously, on the other plaiting path, the other part of the bobbins is working, likewise in individual coöperation, a corresponding portion of the appliqué figure or design, exclusively using to that effect threads that are supplied from ordinary plaiting bobbins. After such separate or individual action of the two groups of bobbins are brought into intercommunication, so that interlacement takes place between the threads issuing from the appliqué figure and from the line on which the working of the ground lace was interrupted, i. e., that the attachment of the separately finished appliqué figure to the main lace work is effected likewise in plaiting style and in accordance with a certain design also prescribed for the attachment sections of the appliqué lace.

It remains only to add that it is not necessary to provide such controlling operation that all of the bobbins after having worked an appliqué figure should be carried back to each of the plaiting paths from which they issued, but that for the purpose of attaching the appliqué figures to the main lace work only a comparatively small number of bobbins appertaining to one of the two concentric plaiting systems need exchange, by means of the intercommunicating devices, their positions with a corresponding number of bobbins appertaining to the other concentric plaiting system.

What I claim, and desire to secure by Letters Patent of the United States, is:

1. In a plaiting machine the combination of an external plaiting system, an internal plaiting system concentric thereto, intermediate disks, adapted to transport the plaiting bobbin-stems from one of the two systems to the other, switches and disengaging and reengaging members, the guideways of both systems having blunted points, adapted to allow the bobbin-stems to rest between the two systems, the said blunted points alternating with the switches, and a disengaging and reengaging member, being located opposite to each blunted point, substantially as set forth.

2. In a plaiting machine the combination of an external plaiting system, an internal plaiting system concentric thereto, intermediate disks between both systems, switches and disengaging and reengaging members, the guideways of both systems having blunted points alternating with the switches, the disengaging and reengaging members being located opposite to each blunted point and the switches of the intermediate disks having also blunted points, adapted to allow the stems to rest between the two concentric plaiting systems, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HERMANN BUSCHER.

Witnesses:

OTTO KÖNIG,
T. A. RITTERHAUS.