

1,011,632.

H. LUTHE.
BRAID MACHINE.
APPLICATION FILED APR. 1, 1910.

Patented Dec. 12, 1911.

2 SHEETS-SHEET 1.

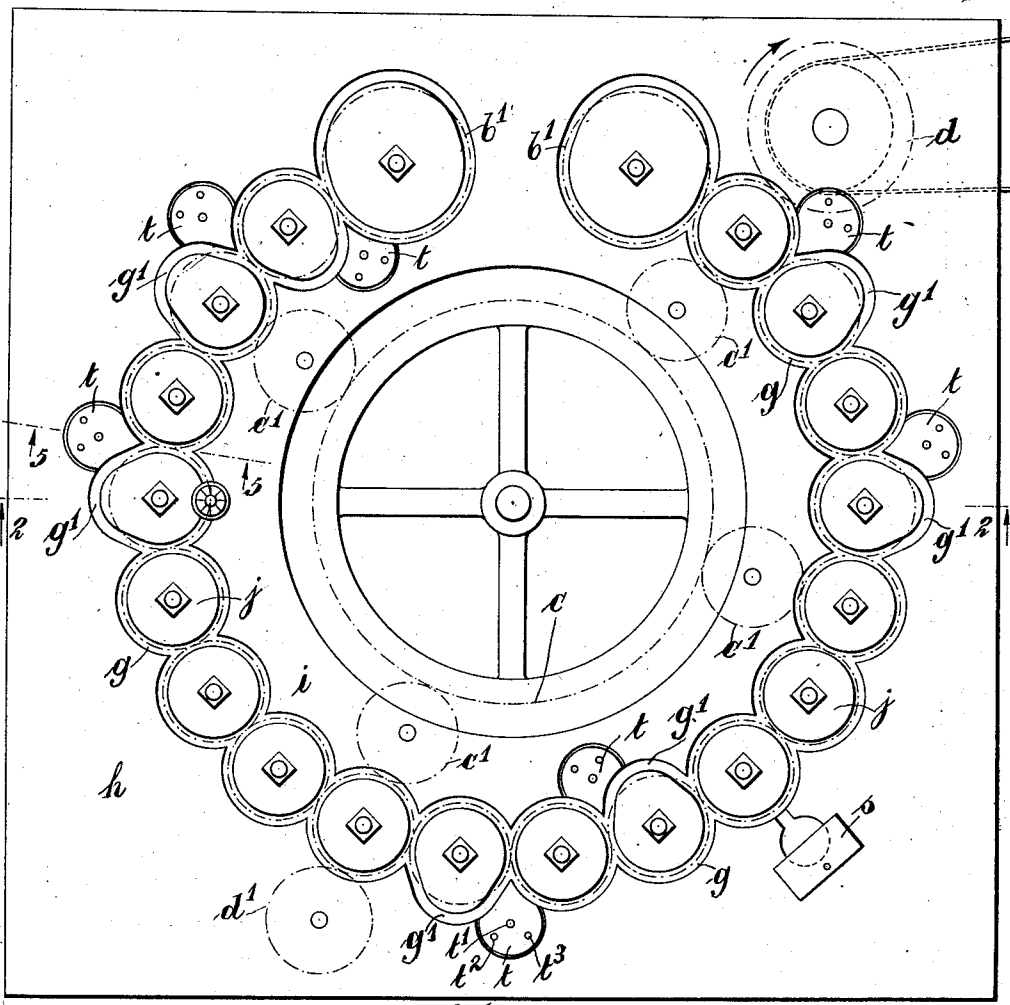


Fig: 1,

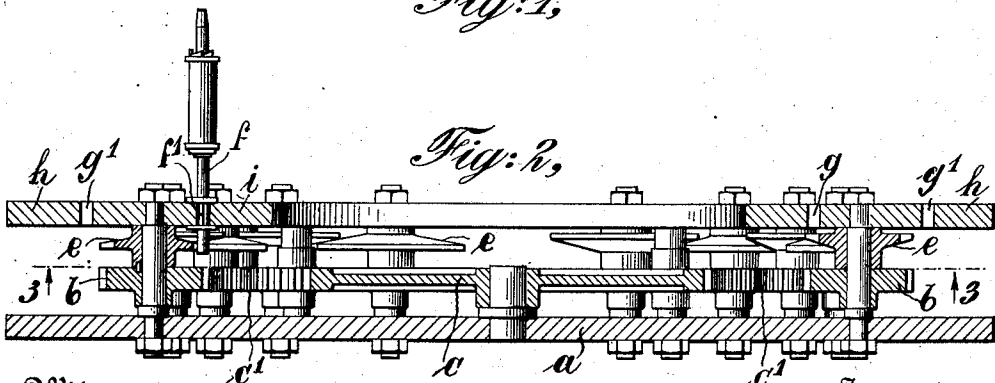


Fig: 2,

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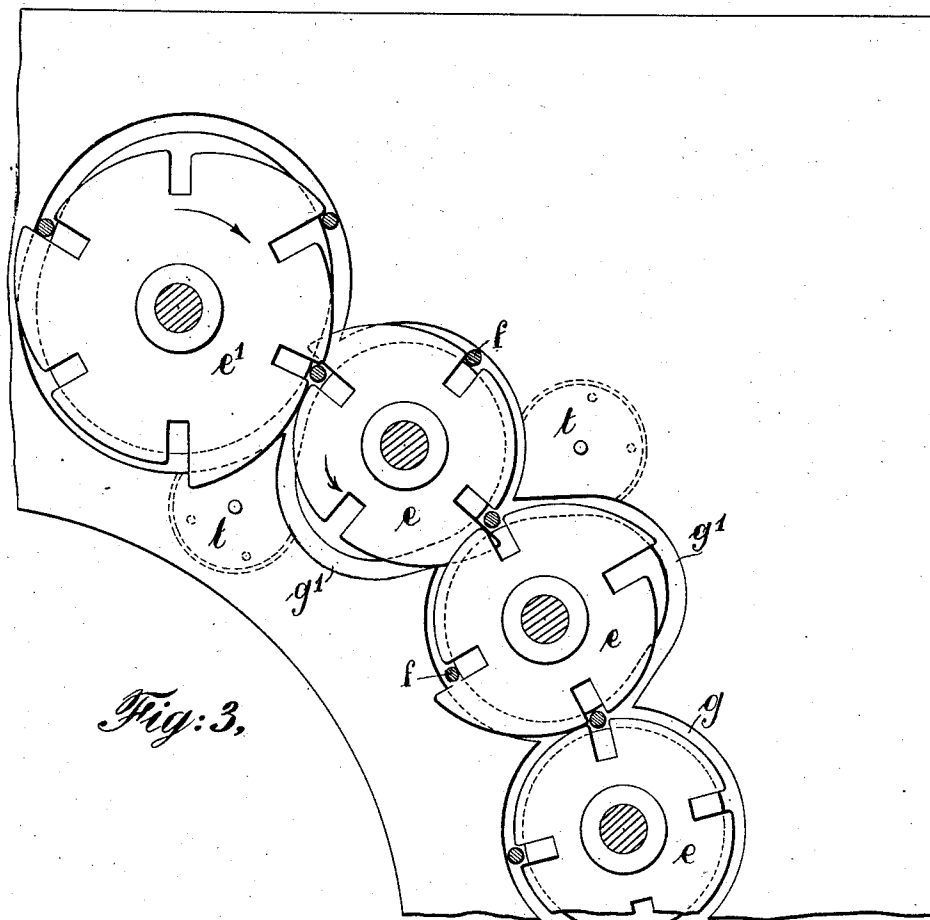


Fig. 3.

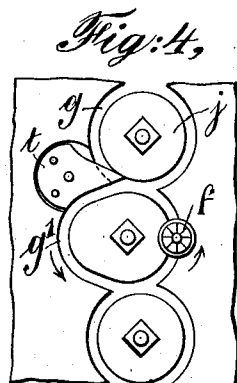


Fig. 4.

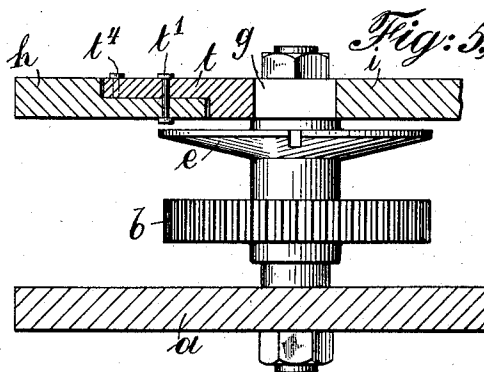


Fig. 5.

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UNITED STATES PATENT OFFICE.

HENRY LUTHE, OF BROOKLYN, NEW YORK.

BRAID-MACHINE.

1,011,632.

Specification of Letters Patent.

Patented Dec. 12, 1911.

Application filed April 1, 1910. Serial No. 552,815.

To all whom it may concern:

Be it known that I, HENRY LUTHE, a citizen of the German Empire, and a resident of Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Braid-Machines, of which the following is a specification.

This invention has reference to improvements in braid machines for forming braids of various widths and designs. In braiding the threads run in opposite direction to each other and are thus interlaced or interwoven. Machines of the kind forming the subject matter of this invention may also be used for producing cords when single or double threads are used running all in one direction and further for the so called diamond braiding when double threads are in the finished texture.

The known braid machine consists essentially of a base plate, a set of pinion gears circularly arranged on the base plate and having extended vertical shafts provided with horned gears for propelling the spool carriers which run in a slot or passage way in a top plate. This passage way divides the top plate into an inner and an outer plate leaving small plates within which are located on the shafts of the gears and encircled by said passage way. When such a machine is set and in running order a certain design of braid for instance can be made or a braid of certain width. However when a braid of different design or different width is to be manufactured a number of wheels had to be taken out of the machine and others substituted therefor which run idle. To facilitate this exchange the large top plate is made of several portions each connecting with a certain number of gears below. One such portion of the top plate is taken out and a like plate portion substituted which is connected to a different number of gears having different numbers of teeth than the gears taken out. This manipulation of course takes time during which the machine is out of order whereby its operation is interrupted involving a loss in time and wages not only for the operator but wages have to be paid to a mechanic skilled in this art and when season articles are made to be delivered at short notice the delay in turning same out is of great disadvantage.

It is the purpose of the present invention to avoid the above described deficiencies

of the known braid machines and to save all the time and wages expended in and by the exchange of gears. To attain this desirable result I have devised a machine in which all the pinion gears, the spool carrying wheels, and plates encircled by the passage way are non-removable and need not be disturbed or exchanged when an article different from the one just made is to be manufactured. This I have accomplished by the use of movable tongues inserted in the top plate and having an inner pointed portion reaching into the passage way of the spool carriers. When one or more tongues are set so that they stand mathematically in the center then the spool carriers pass same in the usual manner. But when set out of the mathematical center line either to the right or the left such tongue closes off the passage way on that particular side and the spool carrier can not continue in the passage-way in its forward direction but travels around that particular small plate and runs backward. By virtue of this arrangement that number of gears which is beyond the tongue is cut out but remains in the system while making a braid of different design or width. If a sufficient number of gears are taken out of the system by setting some of the tongues accordingly then the cut out portion of the machine may independently be operated for manufacturing simultaneously another article. In fact the one machine may be divided into halves which simultaneously may be used for manufacturing the same or different articles and for narrow braids the machine may be divided into three or four independent parts representing thus as many machines. It is self evident that means must be provided under the above described conditions which prevent any collision of the returning spool carrying devices.

In order to fully explain the invention reference is made to the accompanying drawings in which:

Figure 1 represents in top plan view a braid machine embodying in desirable form the present improvements. Fig. 2 is a vertical cross section on line 2—2 of Fig. 1. Fig. 3 is a bottom view of part of the machine on line 3—3 of Fig. 2. Fig. 4 is a detail view showing a tongue in the position to close off the passage way and Fig. 5 is a vertical section on line 5—5 of Fig. 1.

Similar characters of reference denote like parts in all the figures.

In the drawings *a* represents the base plate and *b* the pinion gears. These are circularly arranged as diagrammatically represented in dotted lines in Fig. 1. In order to assure a smooth running of the pinion gears auxiliary gears are provided inside of the circle meshing with the pinion gears. Centrally within the base plate there is mounted a big gear wheel *c* which is meshing with a number of small auxiliary gears *c*¹ of which four are shown in Fig. 1. The gear wheel *c*¹ in turn meshes with the pinion gears *b*. The pinion gears *b* are set in motion by a driving gear wheel *d* while a gear *d*¹ is provided opposite the gear wheel *d* on the outside of one pinion gear to steady their motion.

All the pinion gears so far described are of uniform size but at the end of the circle there are two larger pinion gears *b*¹ whose purpose will be made clearer farther down.

The pinion gears are mounted each on a shaft secured in the base plate. Each shaft extends upwardly and carries above the pinion gear *a* wheel *e*. The construction and arrangement of the wheels *e* renders them adapted to propel the spool carrying devices or carriers *f*, as they may shortly be called. The shafts of the pinion gears extend beyond the wheels *e* and pass through the top plate. As above stated the top plate is divided by the serpentine passage-way *g* for the spool carriers which is formed by a series of intersecting race-circles. Thus the top plate forms an outer plate *h*, an inner plate *i* which is centrally cut out as shown in Fig. 1 and a number of small plates *j* which are encircled by the passage-way. Each of the shafts of the pinion gears and wheels *e* passes through one of the small plates encircled by the passage-way and is permanently connected therewith. Above each of the two large pinion gears *b*¹ there is mounted a wheel *e*¹ of corresponding size encircled by a portion of the passage-way of a size corresponding to the diameter of the wheel.

The spool carrying devices or carriers *f* rest with the lower ends in the slots of the wheels *e* and are supported on the top plate by means of two cross plates one on the lower and one on the top surface of said top plate. A narrow elongated portion *f*¹, the so called "heart" is located in the passage-way *g*. The wheels *e* are arranged successively one above and one below the other and have each four slots as shown in detail in Fig. 3. When the pinion gears rotate one in one direction and the other in the opposite direction as usual the spool carrying devices *f* travel along the passage-way and finally around the large end wheel *e*¹ and return all around the machine in the usual manner. In order to reduce the width of the braid with-

out taking the machine apart the movable tongues *t* are provided in any desired location. The tongues are arranged in the top plate as shown in Fig. 5. Part of the top plate is cut out so as to receive the tongue which then is flush with the top surface of said plate. The tongue is mounted on a pivot *t*¹ and two small openings *t*², *t*³ are formed in the same. When the tongue is moved to the right or to the left to close off part of the passage way *g* one of said openings in the tongue will come above a like opening in the reduced portion of the top plate and the tongue is then secured by means of a pin *t*⁴. The tongues shown in Fig. 1 are all set in the mathematical center line of the passage way and therefore the spool carriers can travel all around the machine from one end to the other because the passage-way is not obstructed and braid of the largest width for the size of the machine may be made under those conditions. When braid of a smaller width is to be made or the machine is to be divided into various parts as above pointed out then the tongues are set as shown in Fig. 4. The carrier *f* moving in this figure in the direction of the arrow can not pass on in the usual manner but will strike the side of the tongue and thereby will be forced around the second half of the small inner plate and return in the opposite direction. Thus the wheels beyond the tongue are cut out of the system and a number of spool carriers may be taken out of the machine by means of the spool locks *s* which are pivotally secured and may be turned out of position so that the carriers may be taken out. In this way a braid of less width than before will be made and the machine may be divided into two, three or four parts that may be independently operated as desired.

In order to avoid collision of a carrier which returns by means of the adjustment of the tongue and another one still traveling in a forward direction the wheels *e* located near the tongues have been modified. Each wheel *e* has four slots whereby the wheel is divided in four so called wings or horns which normally are of even size. However the wheels which are to form the terminal gears for the short courses into which the whole race-way is divided and which are adjacent the tongues have two short and two long wings or horns. Accordingly the passage-way above the wheels having two long wings is laterally enlarged as shown at *g*¹.

Assuming that three carriers have passed into the slots of such wheel *e* which is near a tongue, two being in the slots in the horned gears between the long wings and one in a slot of a short wing or horn while the slot of the second short wing or horn remains empty. This wheel *e* is one of the lower

wheels of that type. The long wing or horn naturally takes along the returning carrier in that slot by passing the adjusted tongue. By this operation the long wing or horn gets free from a carrier because this carrier passes on around the next wheel in a backward direction. Said long wing or horn is now behind a short wing with carrier. This carrier in the short wing passes the tongue and stops where formerly the empty short wing was located because the passage-way is enlarged on this point as shown at g^1 . These enlargements g^1 in the race-way are such as to carry the bobbin carriers out of reach of the short horns of the horned gears and here the carrier stands still while the wheels and the other carriers are constantly moving. The one carrier coming up in the direction toward the tongue thus has time to pass the meeting point between the two circles of the passage way and the carrier standing still is now carried along by the next long wing or horns which reaches over the enlargement g^1 .

The large wheels e^1 at the end of the system are usually provided with six incisions and thereby divided into six wings or horns but when building a new machine or changing an old machine according to this principle five or four wings or horns may only be formed on these wheels according to requirements. These wheels likewise are provided with long and short wings or horns to avoid collision when a tongue is set near them.

I claim as my invention:

1. A braid machine comprising a top plate with race-way composed of intersecting circles, some of said circles having lateral extensions, and adjustable tongues stationary during the operation of the machine in the top portion of the top plate adjacent the extended portion of said circles of the race-way and reaching into same to divide the machine into a number of independent machines for producing simultaneously a plurality of braids of various widths and designs.

2. A braid machine comprising a top plate with raceway composed of intersecting circles, some of said circles having lateral extensions, spool carriers in the race-way, means for propelling same, and adjustable tongues stationary during the operation of the machine in the top portion of the top plate adjacent the extended portion of said circles of the race-way and reaching into same to divide the machine into a number of independent machines for producing simultaneously a plurality of braids of various widths and designs.

3. A braid machine comprising a top plate with race-way composed of intersecting circles, some of said circles having at a predetermined number of points lateral ex-

tensions, spool carriers in the race-way, means for propelling same, and adjustable tongues in the top portion of said top plate flush with its top surface adjacent the extended portions of such circles of the race-way and remaining stationary during the operation of the machine, said tongues having each a pointed portion that reaches into the race-way to divide the machine into a number of independent machines for producing simultaneously a plurality of braids of various widths and designs.

4. In a braid machine for producing a plurality of braids of various widths and designs simultaneously, a top plate with single race-way composed of race-circles, spool carriers in said race-way, a set of wheels below the race-circles of the race-way having slots in which the carriers rest and forming thus wings or horns taking the carriers along, certain of the wheels in this set being provided at suitable location with two long and two short wings or horns below a circle of the race-way, said circle having a lateral extension corresponding to the long wings or horns, and pointed movable tongues in the top plate adjacent the lateral extensions of said circles of the passage-way and reaching into the latter for reversing the movement of the carriers at those points in the system when desired.

5. In a braid machine adapted to produce braids of different widths and designs simultaneously, a top plate with race-way, composed of a series of intersecting race-circles having an arc-shaped arrangement, some of said circles having lateral extensions, spool carriers in the race-way, means for propelling said carriers, movable tongues in the top plate of the machine flush with its top surface adjacent the extended portions of such circles of the race-way having each a pointed portion reaching into the race-way and adapted to be adjusted so that it reverses the movement of the carriers.

6. In a braid machine adapted for producing braids of various widths and designs simultaneously, a top plate with race-way composed of a series of intersecting race-circles having an arc-shaped arrangement, some of said circles of the race-way having lateral extensions, a set of spool carriers, winged or horned gears arranged below the circles of the race-way with four incisions forming thus four wings or horns on each wheel and having certain wheels amongst them located below the race-circles with extensions provided with two long and two short wings or horns opposite each other, and movable tongues adjacent the race-circles with extensions reaching into the race-way and adapted to be adjusted so as to reverse the movement of the carriers.

7. In a braid machine of the type described a top plate with race-way composed

of a series of intersecting race-circles, some of said circles having lateral extensions, and movable tongues in said top plate flush with its top surface adjacent the extended portions of such circles of the race-way, said tongues having each a pointed portion that reaches into said race-way adjacent such extended portion of such circle and adjustable therein, and winged or horned gears below the circles of the race-way, some of said

horned gears being located below the race-circles with extensions and having each two long and two short wings or horns opposite each other.

Signed at New York, N. Y., this 29th day 15 of March, 1910.

HENRY LUTHE.

Witnesses:

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THOMAS DONNELLAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."