

(No Model.)

2 Sheets—Sheet 1.

A. B. DISS.
BRAIDING MACHINE.

No. 572,357.

Patented Dec. 1, 1896.

Fig. 3.

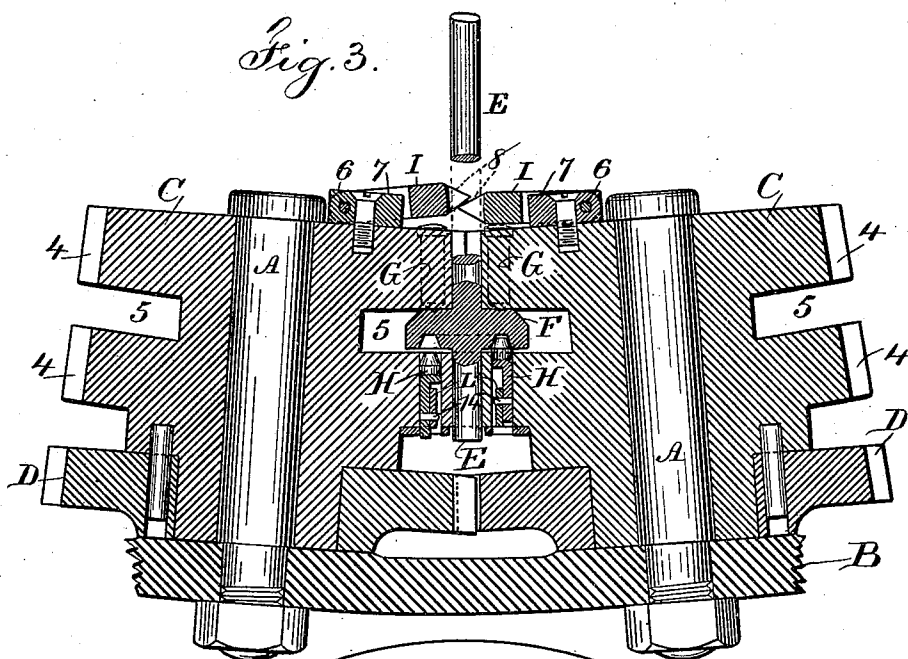
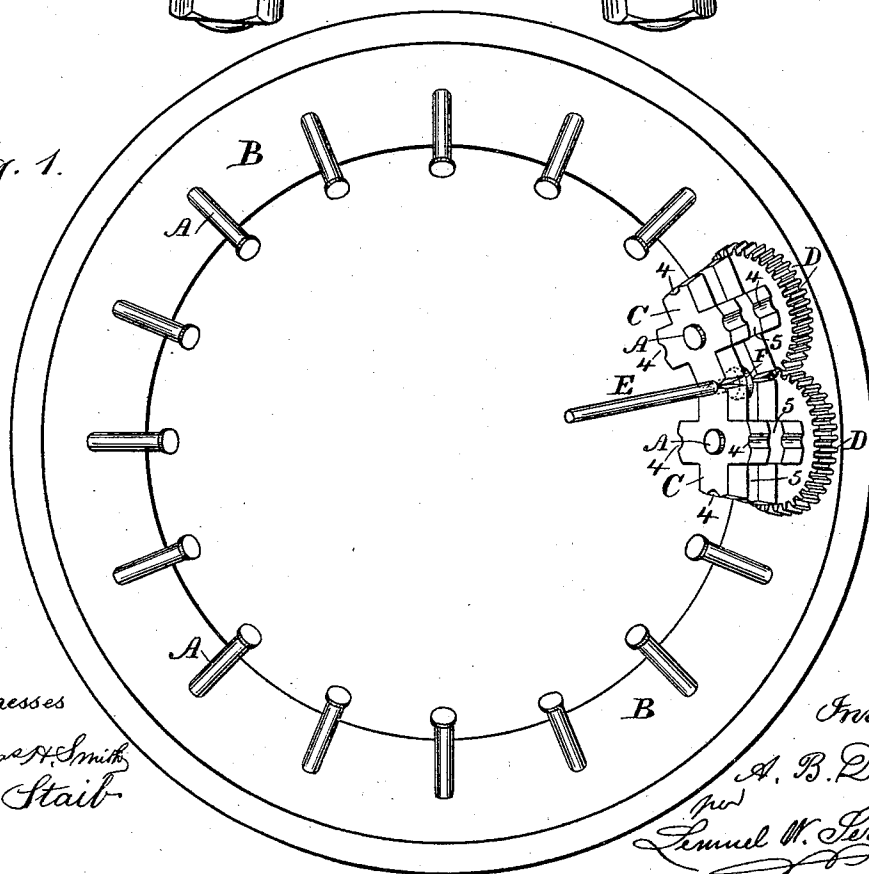


Fig. 1.



Witnesses

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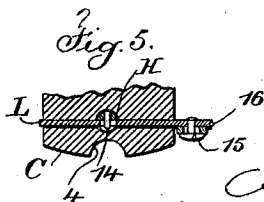
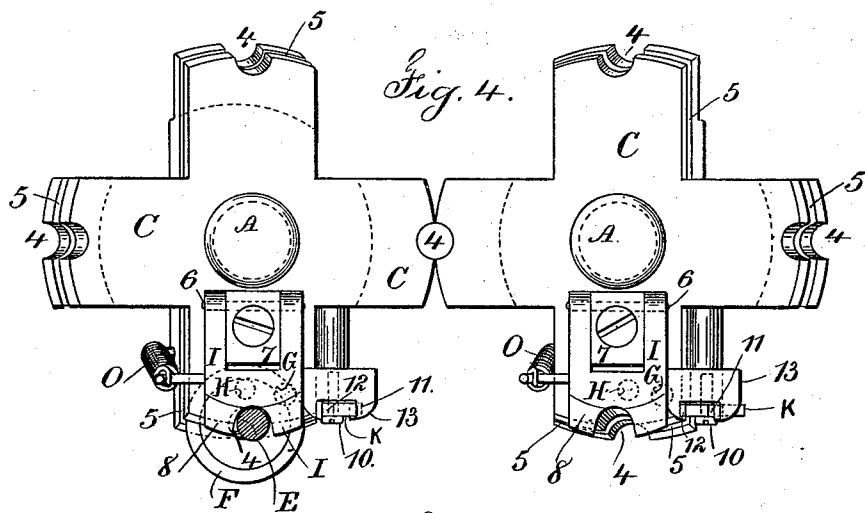
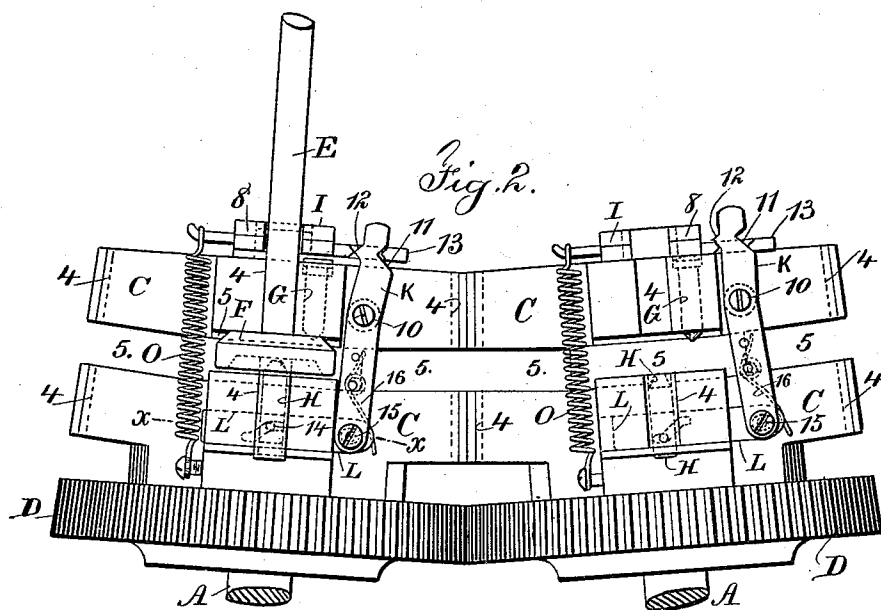
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2 Sheets—Sheet 2.

A. B. DISS.
BRAIDING MACHINE.

No. 572,357.

Patented Dec. 1, 1896.



Witnesses

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UNITED STATES PATENT OFFICE.

ALBERT B. DISS, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE THOMAS BRAID COMPANY, OF NEW YORK.

BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 572,357, dated December 1, 1896.

Application filed August 16, 1895. Renewed May 9, 1896. Serial No. 590,952. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. DISS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Braiding-Machines, of which the following is a specification.

Braiding-machines have heretofore been made with a circular range of carrier-heads upon inwardly-projecting studs or gudgeons, and these heads have been geared together so as to revolve simultaneously and in alternating directions, and spool-carriers have been made in such a manner as to be transferred from one rotary head to another, and hence to pass over one head and under the next, and so on, there being two sets of carriers, one set going in one direction and the other set going in the other direction, and the threads or cords have been braided together into a tube or tubular covering. A device of this general character may be seen in Letters Patent No. 457,171, granted to Joseph Thomas August 4, 1891.

In machines in which the spool-carrier is transferred from one rotary head to another difficulty has been experienced because the transfer is sometimes made more rapidly than the reliable movement of the spring-actuated parts, and as a consequence one head lets go the spool-carrier before the same is positively received and held by the next spool-carrier, and these spool-carriers sometimes fly out from the head and damage the other portions of the machine and are themselves injured.

The object of the present invention is to actuate the locking devices of the spool-carrier by positive movements, so that the presentation of a spool-carrier by one rotary head to the next simultaneously unlocks the spool-carrier from the head that had held it, and by the pressure exerted by the spool-carrier it is self-locked into the next revolving head by a positively-moved mechanism, so that the unbolting from one revolving head and bolting into the next revolving head are simultaneous positive operations that are not dependent upon springs, and hence the speed at which the spool-carriers can be transferred from one head to another is practically unlimited.

In the drawings, Figure 1 is a plan view indicating the positions of the revolving heads and showing two of said heads in place. Fig. 2 is an elevation, in larger size, of two of the spool-carriers and the mechanism therewith connected. Fig. 3 is a section of the revolving heads and through the actuating parts of the spool-carrier. Fig. 4 is a view of two heads endwise of the arbor. Fig. 5 is a section at $x x$, Fig. 2.

The gudgeons or arbors A are supported by any suitable frame or ring B and stand in a radial position pointed toward the place where the threads are laid together in the braiding operation, and upon each arbor is a head C, to which is connected a gear-wheel D, and the teeth of these gear-wheels interlock, so that all the heads in the circular range are simultaneously revolved, one in one direction and the next in the other direction, and usually each head is notched diametrically opposite, as at 4, so as to be adapted to two sets of spool-carriers, one set being carried in one direction and the other set in the other direction; but each head may be adapted to four spool-carriers, two sets being moved progressively in one direction and two sets in the other direction.

The spool-carrier E is provided with a circular cam F, and the edges of the head are notched or channeled of a width adapted to receive the circular cam F into the channel, and there is a motor-pin G, which is moved endwise by the act of forcing the circular cam F into the channel 5, and this motor-pin gives motion to the locking-bolt H through suitable intervening mechanism, and this locking-bolt engages the circular cam F, so as to hold the same in position. In effecting the locking operation it is advantageous to bevel the edge of the circular cam F, and also to bevel the end of the motor-pin G, so that in the act of forcing the circular cam F into the channel 5 the motor-pin G receives a positive and unfailing movement, and by recessing the opposite surface of the circular cam F the end of the locking-bolt H is projected thereinto by the act of giving motion to the motor-pin G by forcing the circular cam F into its channel 5.

The details of the devices for giving a posi-

tive motion to the locking-bolt by a motor that receives its motion from the act of forcing the circular cam into its channel may vary, and I have hereinafter illustrated some modifications of the devices herein represented for accomplishing this object; but as far as known I am the first to make use of a positive motion derived from the forcing of a device connected with the spool-carrier, such as the circular cam F, into its receiving-channel for positively actuating the locking device, it being understood that as two heads are revolving in opposite directions the contiguous moving surfaces are traveling in the same direction, and that a spool-carrier in one of the revolving heads is pressed in the act of revolving into the empty channel of the next head, the spool-carrier passing into the notch 4 and the circular cam into the channel 5, and in this operation the locking device (indicated by the bolt H) receives a positive motion from the pressure exerted in forcing the circular cam into its channel, and thereby the locking of the spool-carrier into the next head is reliably effected.

Of course it is to be understood that the devices employed simultaneously relieve the spool-carrier from its previous locked position in the first head; but as the difficulties have heretofore existed in reliably locking the spool-carrier into the next head as it advances it is of secondary importance as to how the spool-carrier shall be unlocked from its previous position, because there has not been difficulty heretofore experienced in the unlocking operation.

I have represented the exchange-lever I as pivoted at 6 upon a stationary lug 7, and the outer edges 8 of this exchange-lever are V-shaped or beveled, and the length of the motor-pin G is sufficient to lift the exchange-lever I slightly away from the end of the head C when the cam F is in contact with such motor-pin, the spring O acting to draw the exchange-lever toward the end of the head.

It will now be understood that the V-shaped edges 8 in the head that is holding the spool-carrier are farther from the surface of the head than the V-shaped edges of the exchange-lever in the head that is empty. For this reason as the two exchange-levers come together in the revolution of the two heads the circular cam F, acting against the motor-pin in the head that has been empty, presses outwardly its exchange-lever I, and simultaneously that lever moves the exchange in the head that has been carrying the spool-carrier, and the additional motion thus given to the exchange-lever acts to unbolt the circular cam from the head that has been carrying it. These motions are given through the agency of the bolt-lever K, which lever is pivoted at 10, and the inner end is made with a notch 11 and a V-shaped cam 12, these parts being within the jaw 13 that is upon the exchange-lever I. Hence as the

exchange-lever I is moved to the position shown in Fig. 2 by the action of the motor-pin G as the circular cam F is forced into place the bolt-lever K receives its extreme movement by the V-shaped edge of the jaw 13 being upon the point of the V-cam 12, and when the exchange-lever is moved farther away from the head the bolt-lever K is moved in one direction, and when the exchange-lever I is moved nearer to the head the bolt-lever K is moved in the same direction.

There is a bolt-slide L that is connected with the opposite end of the bolt-lever K and acts upon the locking-bolt H. I prefer to use a pin 14 upon the locking-bolt, passing into an inclined slot in the bolt-slide, and there is a looseness in the connection between the bolt-slide L and the bolt-lever K, the hole for the screw 15 being elongated, and a spring 16 acts to project the bolt-slide, but yields if the bolt cannot be moved.

It is now to be understood that when the parts are in the position shown in Fig. 2 the bolt H locks the spool-carrier firmly and the bolt-lever K cannot move to unlock the same, because the jaw on the exchange-lever holds the bolt-lever K in a fixed position, and as the two heads revolve together and the transfer is made of one spool-carrier from one head to the other head the spool-carrier itself gives motion to the motor-pin G in the previously-empty head, and in so doing moves its exchange-lever I, and the exchange-lever of the empty head throws such exchange-lever of the first head out still farther, and by the jaw 13 acting upon the V-cam 12 the bolt-lever K is moved and the pin 14 and the locking-bolt are withdrawn from the spindle by the inclined slot in the bolt-slide, and simultaneously the motor-pin in the head that is to receive the spool-carrier, acting through its exchange-lever, moves the same into the position shown in Fig. 3, and acting upon the V-cam 12 swings the bolt-lever K, and by the bolt-slide L and its cam acting upon the pin 14 of the locking-bolt moves the locking-bolt H into its recess in the circular cam F by a positive motion that holds the spool-carrier firmly locked in the head to which it is transferred.

It is now to be understood that the path described by each spool-carrier is a range of half-circles standing in alternating opposite directions, and that one spool-carrier is taken over one head and down below the next head, and while one spool-carrier is being carried along below one head in one direction another spool-carrier is being moved by the same head in the opposite direction as it is carried over such head, the transfers being made simultaneously and in opposite directions.

As before indicated, it is usual to provide each head with four notches 4, and the complete set of appliances for locking and unlocking the spool-carriers for each notch and the total number of heads in the braiding-ma-

chine equal the maximum number of threads to which the machine is adapted, and a half or a quarter the number of spool-carriers and spools can be made use of when the machine is employed in braiding with these numbers of spools and threads, the spool-carriers being properly placed at intervals around the circular range of heads in the machine.

In some braiding-machines the circle of carriers is interrupted, so that the spool-carriers go to the end of the segment and return. This is used in flat braiding.

The present improvements are available when the machine is constructed or changed to effect such braiding. In changing the machine it is only necessary to provide the end stocks with an odd number of notches and transfer devices, as heretofore usual.

I claim as my invention—

1. The combination with the revolving heads in a braiding-machine having notches in the periphery, of spool-carriers adapted to be received into such notches, each carrier having a circular cam, a motor-pin actuated by such cam as it is pressed by one head against the other head, a locking-bolt for holding the spool-carrier in position, and mechanism intervening between the motor-pin and the locking-bolt for communicating to such locking-bolt a positive movement in holding the spool-carrier when transferred from one head to the other, substantially as set forth.

2. The combination in a braiding-machine having a range of circular revolving heads notched for the reception between them of spool-carriers, spool-carriers with circular cams, motor-pins in each head actuated by the circular cam, locking-bolts for holding the circular cam, exchange-levers and bolt-levers actuated by the same and bolt-slides connected with the bolt-levers for giving motion to the locking-bolts, substantially as set forth.

3. The combination in a braiding-machine, of a circular range of heads geared together and revolving in alternating directions, the edges of the heads being notched, spool-carriers adapted to be received into the notches,

each carrier having a cam, positively-actuated mechanism receiving its motion from the circular cam of the spool-carrier and acting to simultaneously bolt the carrier to one head as such carrier is unbolted from the previous head, substantially as set forth.

4. The combination in a braiding-machine, of a range of revolving heads, each head being provided with a set of transferring devices, each set of transferring devices consisting in a motor-pin receiving its motion from the spool-carrier, an exchange-lever acted upon by the motor-pin and also acting upon the exchange-lever of the adjacent set of devices, a bolt for locking the spool-carrier, a bolt-lever receiving its motion from the exchange-lever and a bolt-slide for giving motion to the locking-bolt, substantially as set forth.

5. The combination with the revolving head in a braiding-machine, of a motor-pin, a spool-carrier and circular cam for acting on the motor-pin, an exchange-lever having V-shaped ends to engage the similar lever on the adjacent head, a bolt-lever having a V-shaped projection acted upon by the exchange-lever, a locking-bolt for engaging the spool-carrier, and a bolt-slide for actuating the locking-bolt, substantially as set forth.

6. The combination with the revolving head in a braiding-machine, of a motor-pin, a spool-carrier and circular cam for acting on the motor-pin, an exchange-lever having V-shaped ends to engage the similar lever on the adjacent head, a bolt-lever having a V-shaped projection acted upon by the exchange-lever, a locking-bolt for engaging the spool-carrier, and a bolt-slide for actuating the locking-bolt and a spring acting at the connection between the bolt-lever and bolt-slide, substantially as set forth.

Signed by me this 12th day of August, 1895.

ALBERT B. DISS.

Witnesses:

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S. T. HAVILAND.