

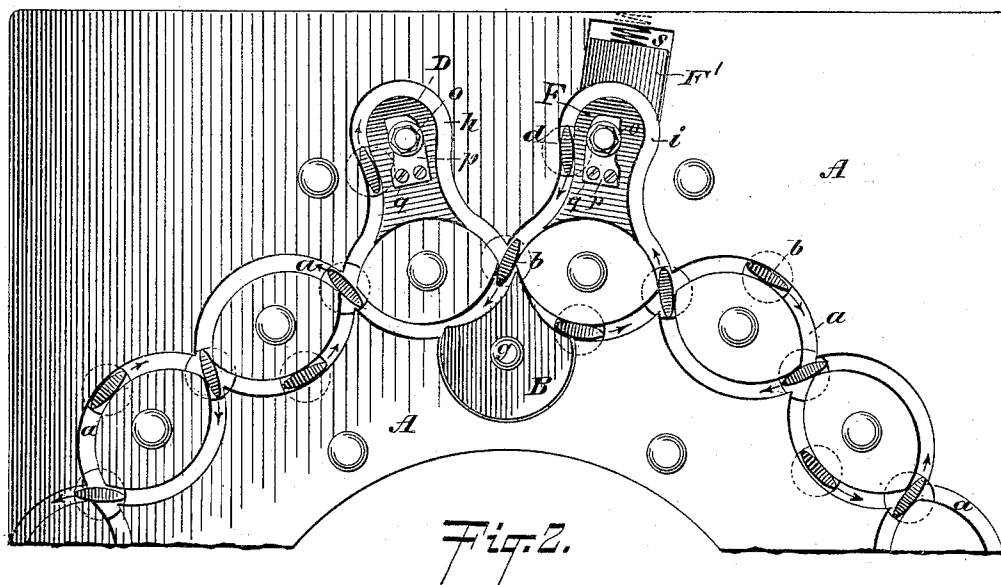
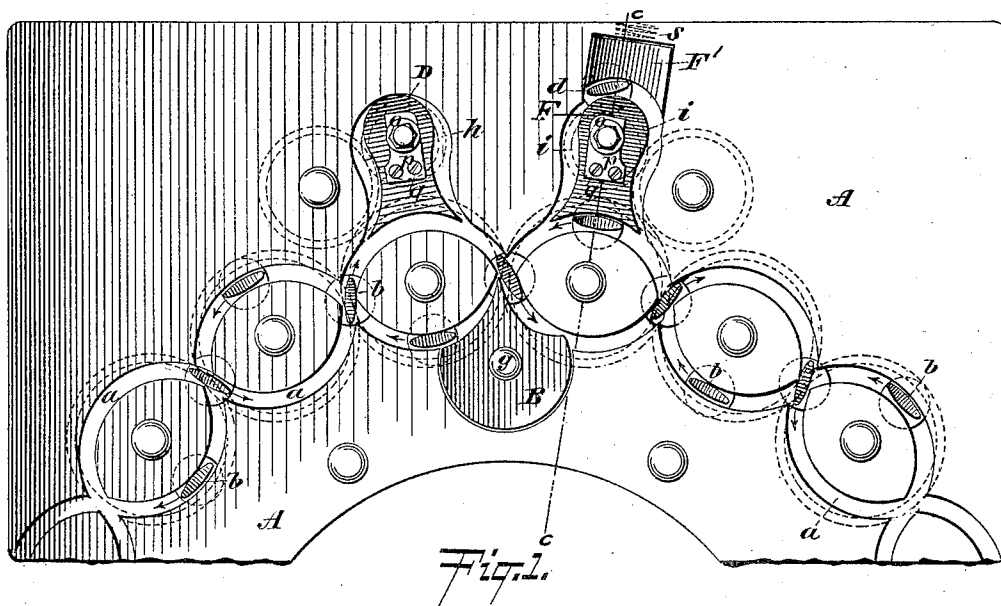
(No Model.)

3 Sheets—Sheet 1.

H. W. STRUSS.
BRAIDING MACHINE.

No. 467,585.

Patented Jan. 26, 1892.



WITNESSES:

Gustave Dietrich
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INVENTOR

Henry W. Struss

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(No Model.)

3 Sheets—Sheet 2.

H. W. STRUSS.
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Fig. 3.

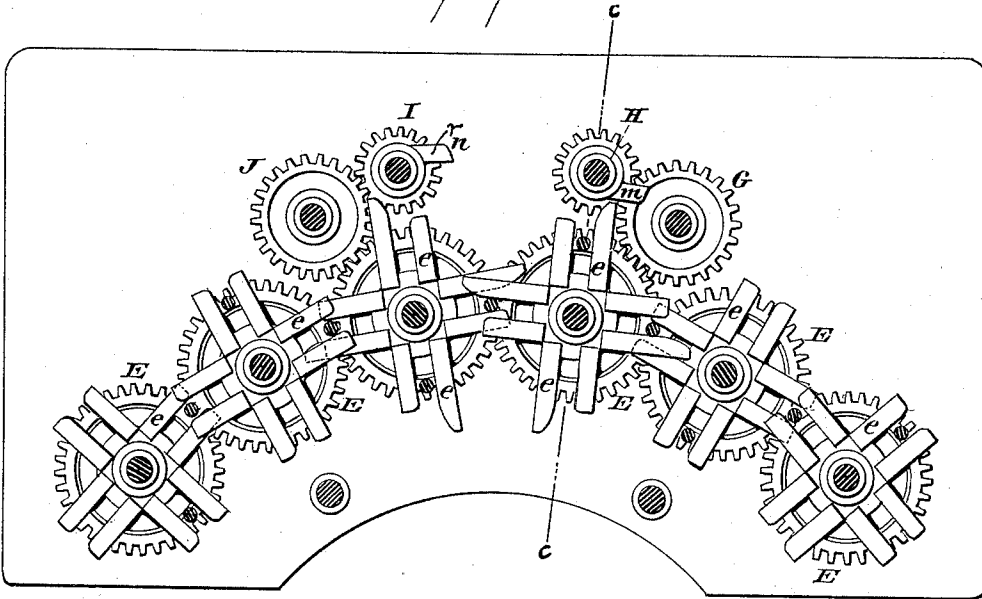


Fig. 6.



Fig. 4.

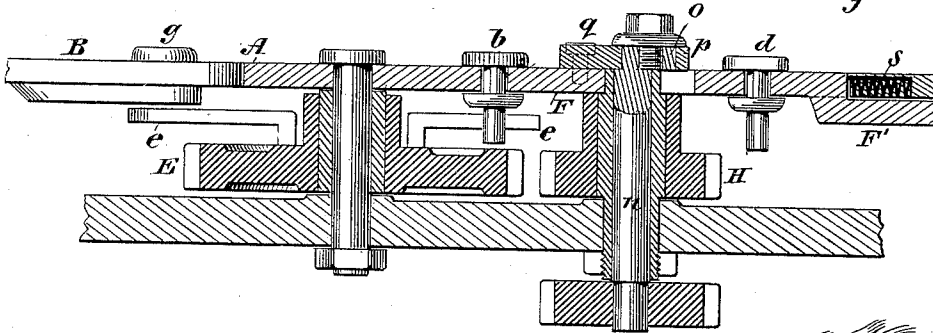
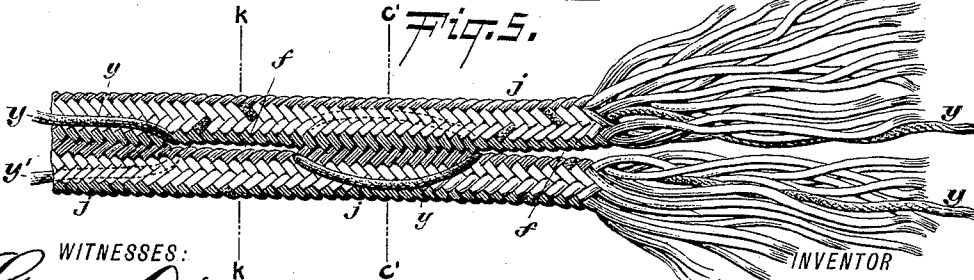


Fig. 7.



Fig. 5.



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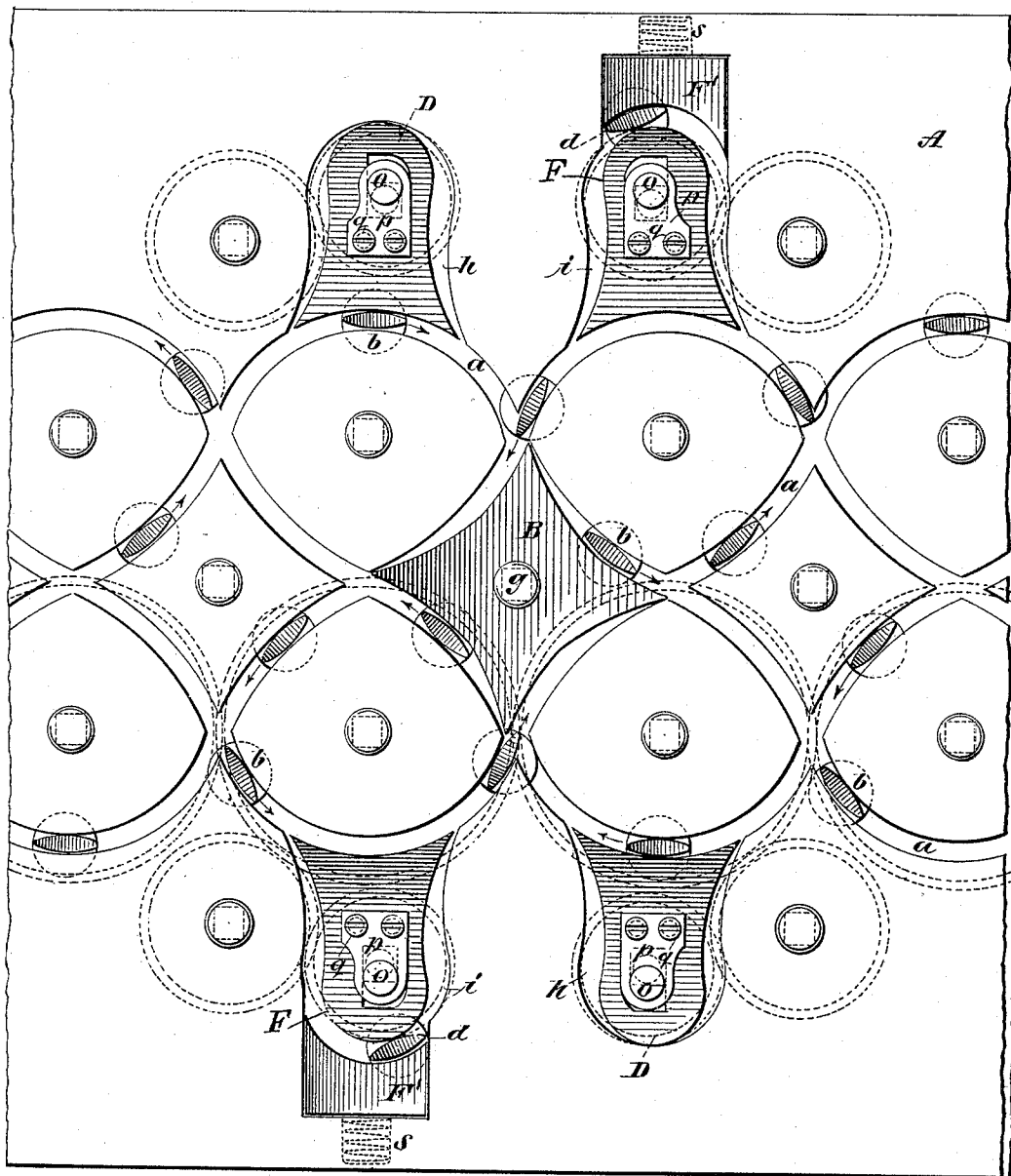
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Fig. 8.



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UNITED STATES PATENT OFFICE.

HENRY W. STRUSS, OF NEW YORK, N. Y.

BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 467,585, dated January 26, 1892.

Application filed January 3, 1891. Serial No. 376,630. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. STRUSS, a resident of the city of New York, in the county and State of New York, have invented an Improved Braiding-Machine, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof, wherein—

Figure 1 is a plan view of a section of a braiding-machine, showing the shuttles, tracks, cut-outs, and switch, said parts being arranged to make a solid braiding. Fig. 2 is also a plan view, said parts being arranged to form a button-hole or other separation in the braid. Fig. 3 is a plan view, partly in section, showing the gearing and shuttle-actuating mechanism of the machine. Fig. 4 is an enlarged vertical cross-section on the line *c c*, Fig. 3. Fig. 5 is a face view of a piece of braiding produced on my machine. Fig. 6 is a cross-section on line *k k*, Fig. 5, showing the appearance of the braid at the division or button-hole. Fig. 7 is a cross-section on line *c' c'*, Fig. 5, showing the appearance of the said braid at an undivided point. Fig. 8 is a plan view of a modification.

My invention relates to a new arrangement of carrier-tracks, in combination with cut-outs and a switch, and with a set of shuttles or carriers to run in said track so as to interlock or braid several strands, as hereinafter fully explained.

The object of my invention is to produce a machine that will make a braid in which at any desired interval a separation or button-hole of any desired length may be left; and it consists in providing an ordinary braiding-machine having the ordinary interlocking tracks and carriers which produce a braid with a set of branch tracks and cut-outs, which, when thrown into action, will cause the carriers that approach the dividing-line from one side to be deflected to the same side, and those that approach from the other side to be deflected to that other side, thereby producing a division in the braid. By this means I am able to form the full braid until I desire to divide it, and then to form a divided braid for a button-hole or the like, and after that again the full braid, &c., *ad libitum*.

In all the figures similar letters refer to similar parts.

A is the top plate in which are cut the interlocking carrier-tracks *a a*, usual in flat or tubular braiding-machines.

h is a branch track extending from the track *a* on one side, and *i* a similar branch track extending from the track *a* on the other side of its middle or other desired dividing-line.

b b are the usual carriers.

B is a vibrator-switch pivoted at *g* opposite the dividing-line between the branch tracks *h* and *i*.

D and F are cut-outs or sliding plates adapted to be raised, as in Fig. 1, so as to leave the track *a* uninterrupted or lowered, as in Fig. 2, to interrupt the track *a* and connect it with the tracks *h* and *i*.

E E are cog-wheels, gearing one to another and carrying the racks or claws *e e* for moving the ordinary carriers *b b*. As the manner of transmitting motion to these carriers is well known, it is unnecessary for me to further specify the construction of the gear-wheels and their claws. It will suffice to say that the machine is set in motion substantially as the machine of Patent No. 112,946.

It will be seen by following the direction of the arrows in Fig. 1 that the carriers for making the full braid follow one another through the track *a* in an undulating, or, more properly, a zigzag motion. Each carrier *b* is connected in the usual manner with a thread, and as the carriers are moved on the track *a* they braid their threads together in the well-known manner, forming a solid braid, as at *j* in Figs. 5 and 7. In their action they will alternately tilt the switch B from right to left, and vice versa, leaving the track at the central cross-ing open for the passage of the next carrier from one side of the dividing-line to the other.

In order that the button-hole or division *f*, as shown in Fig. 5, may be made in the braid, I introduce an extra carrier *d*, which, during the solid braiding process, remains idle and in the position shown in Fig. 1, and is active only while the division is being made. In this idle position the extra carrier *d* is maintained by the cut-out F, as in Fig. 1, and in this position the said extra carrier *d* is also out of reach of an arm or claw *m*, on a pinion H, which pinion, by a toothed wheel G, gears with the train of wheels E. The outward po-

sition of the cut-out F, which is represented in Fig. 1, serves, also, to leave the interlocking track *a* undisturbed and to break into the continuity of the branch track *i*, all as is clearly represented in Fig. 1. In like manner the cut-out D on the left-hand side of the dividing-line is at this time still held away from the track *a*, leaving it undisturbed, but breaking the continuity of the branch track *h*. When now the button-hole or division in the braid is to be formed, the operator moves the cut-outs D and F from their outward position (shown in Fig. 1) into their inward position, (shown in Fig. 2,) thereby causing them to bring the branch tracks *h* *i* into alignment with the main track *a*, as clearly appears from an inspection of Fig. 2. This inward movement of the said cut-outs may be produced in various ways, one being illustrated in Fig. 4, where the sliding cut-out F is still represented in the outward position of Fig. 1. A spindle *n*, which has its bearings in the framing of the machine, connects at or near one end by an eccentric portion *o* with a plate *p*, which in turn connects by a pin *q* with the plate F, so that by turning the spindle *n* on its axis by belt and pulley or otherwise its eccentric connection with the cut-out plate F will cause the same to be moved from the position shown in Fig. 1 into the position shown in Fig. 2, and vice versa, whenever desired. In like manner the cut-out D may be moved. The outer follower F' of the cut-out F may be moved inward by a spring S or by suitable positive mechanism, so that it will follow the cut-out F when the same is drawn inward. When now the braid is to be formed to produce either a button-hole or other separation, the operator has to take care to move the cut-outs D and F down or into their inward position at a time when no carrier *b* prevents this motion, and, in fact, preferably at a time when a carrier shall just pass from under the cut-out F into nearly the position shown in Fig. 2 (by the centermost carrier *b* there represented.) As soon as the cut-out F has been brought into this inner position it will bring the extra carrier *d* within reach of the rotating claw *m*, and by the said claw the carrier *d* will be moved ahead in the groove or channel *i* until it is brought within reach of one of the claws *e* of the main system of conveyers, which will cause it to closely follow the carrier *b*, which I have named, with reference to Fig. 2, the "centermost carrier." As this centermost carrier is moved across the dividing-line from right to left, it will set the switch B so that the extra carrier *d* will be deflected when it reaches the center line to the right, in doing which this extra carrier will set the switch with its point to the right, so that the next carrier *b*, which comes from the left through the track *h*, will find its track open along the point of the switch B, whereby it shall be deflected to the left, setting the switch again, so that the next carrier from the right will go to the right, and so on, it follow-

ing that after the introduction of the carrier *d* into the system of actuating-carriers each carrier approaching the dividing-line from the right will be turned back to the right, and each carrier approaching the dividing-line from the left will be turned back to the left, thus producing at this time, and as long as the cut-outs D and F are in this innermost position, a divided instead of the solid braid previously produced. This division is represented in Figs. 5 and 7 at the sides of the button-hole *f*, and in Fig. 5 also at the terminal ends of the divided braid there shown; yet whenever it is desired to resume the production of the solid braid it is only necessary to raise the cut-outs D and F back into their outward position, which is shown in Fig. 1, thereby confining one of the carriers, which- ever that be, in the grasp of the cut-out F, and causing the remaining carriers to resume the production of the solid continuous braid.

It goes without saying that for moving the carriers properly through the branch track *h* a pinion I, having an actuating-claw *r* and geared by the wheel J with the system of wheels E, must be employed, which claw *r* of course finds nothing to do at the time the cut-out D is in the outward or raised position shown in Fig. 1.

As each of the carriers *b* *d* of this machine when in action helps to interbraid with the fabric produced a thread or strand or set of strands which it controls, it follows that when one of the carriers is held idle by the cut-out F the thread which it carries will not be interbraided with the continuous or solid braid, which fact is illustrated in Fig. 5, where the loose thread *y* represents the thread that was held by the idle-carrier while the same was idle, whereas the moment a slit *f* is produced that thread *y* is immediately interbraided with the remainder. When the fabric is finished, the loose pieces of the thread *y* may be conveniently cut off as far as they are not interwoven with the main braid.

The machine, so far as illustrated in Figs. 1 to 4, inclusive, is what is known as a "single-braid" machine. For producing the same effect which I have already described with reference to a machine for making a double thickness of braid, the system illustrated in Fig. 8 is employed, in which case the track *a* is duplicated and connected with two branch tracks *h* *h* and with two branch tracks *i* *i*, within which are pairs of cut-outs D and F, respectively, the parts otherwise operating in the same manner already specified, the switch B being modified as to its form to be adapted to the modified shape of the main track *a*. In such a double machine there will be an additional idle-thread *y'* formed in the solid braid, as shown in Fig. 5.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a braiding-machine, the combination of the main table A, having the interlocking

track *a*, with the usual thread-carriers *b*, and with the automatic switch B, placed at a point where the braid produced may be wished to be divided, and with the two cut-outs D and
5 F and branch tracks *h i* on opposite sides of said switch, and with means, substantially as described, for moving said cut-outs into and out of the path of the main track *a* and out of and into the paths, respectively, of the
10 branch tracks *h i*, and with means for holding one or more of the carriers idle and out of the main track when a solid braid is to be formed and for throwing said idle carrier or
15 carriers into action when a divided braid is to be formed, as set forth.

2. In a braiding-machine having the main track *a* and branch tracks *h* and *i*, the combination, with said tracks, of the carriers *b d* and switch B, and means, substantially as described, for holding one or more of said car- 20 riers idle and out of the path of the track *a* when a continuous braid is to be formed and for throwing said idle carrier or carriers into action when a divided braid is to be formed, substantially as set forth.

HENRY W. STRUSS.

Witnesses:

HARRY M. TURK,
MAURICE BLOCK.