

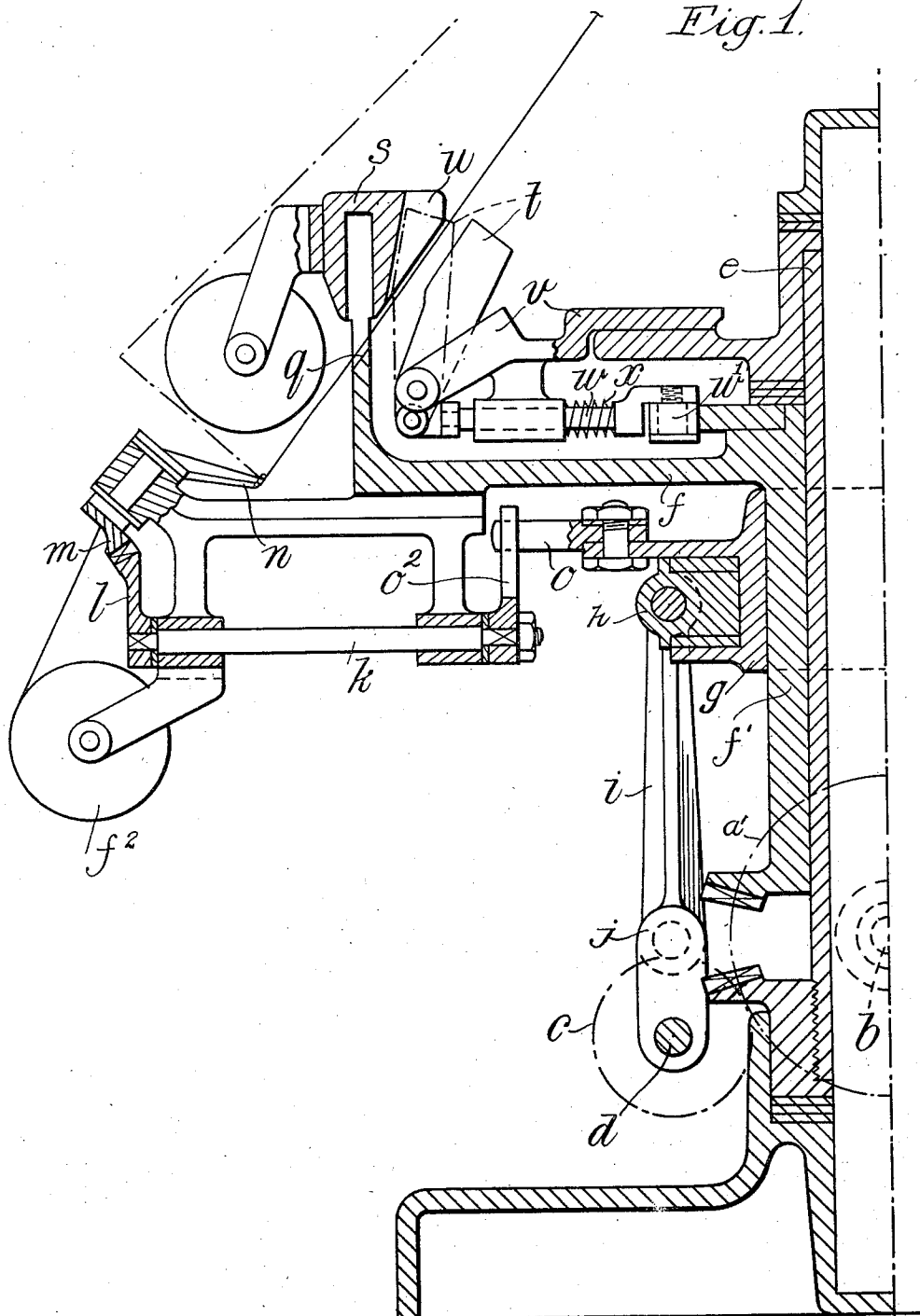
E. RANKIN.
BRAIDING MACHINE.
APPLICATION FILED NOV. 20, 1908.

1,058,100.

Patented Apr. 8, 1913.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

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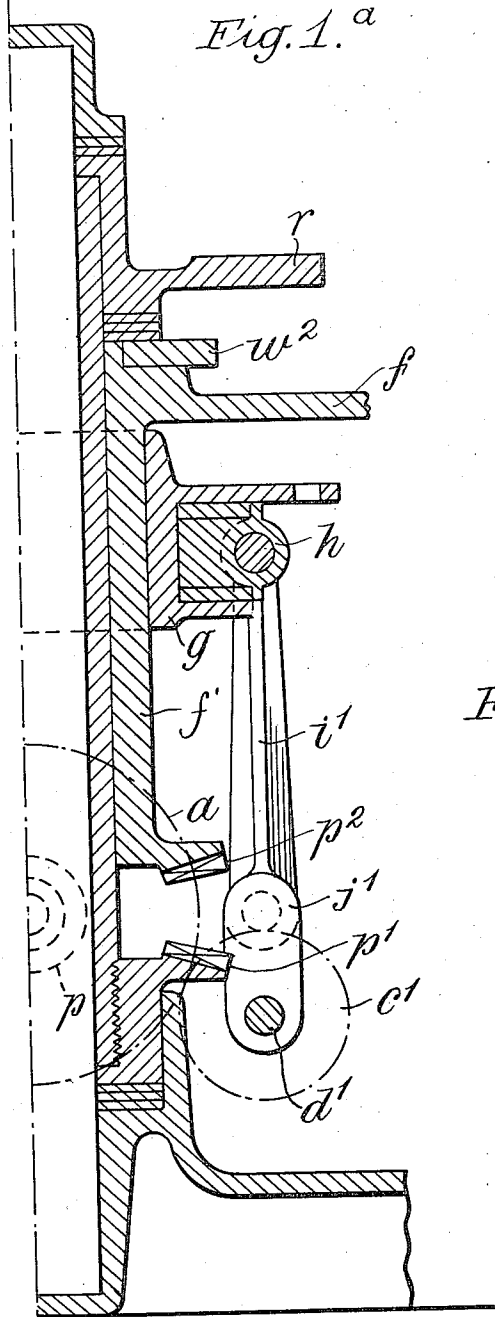


Fig. 2.

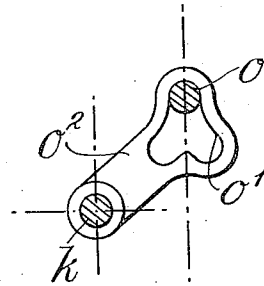
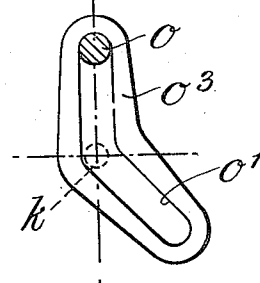


Fig. 3.



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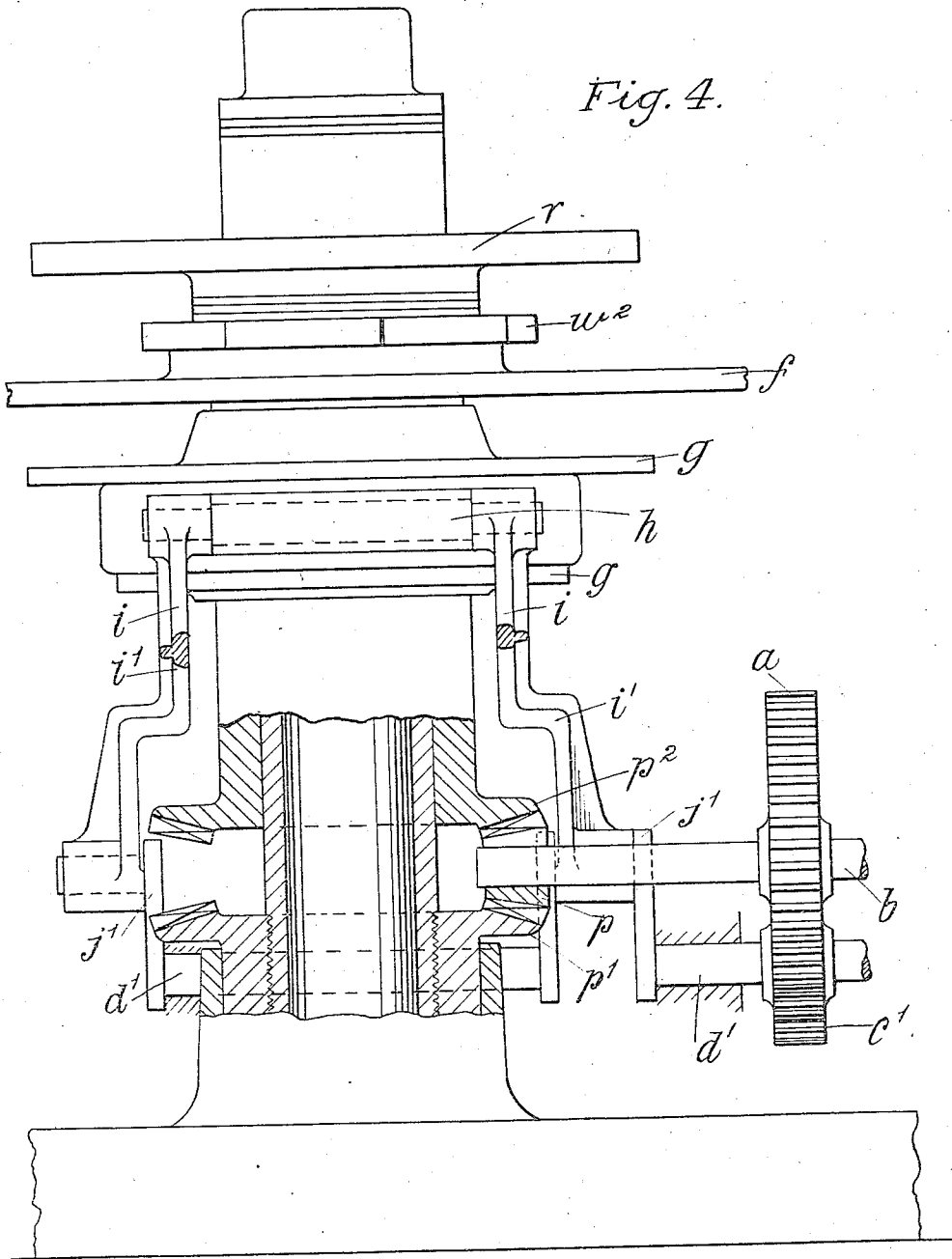
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4 SHEETS—SHEET 3.

Fig. 4.



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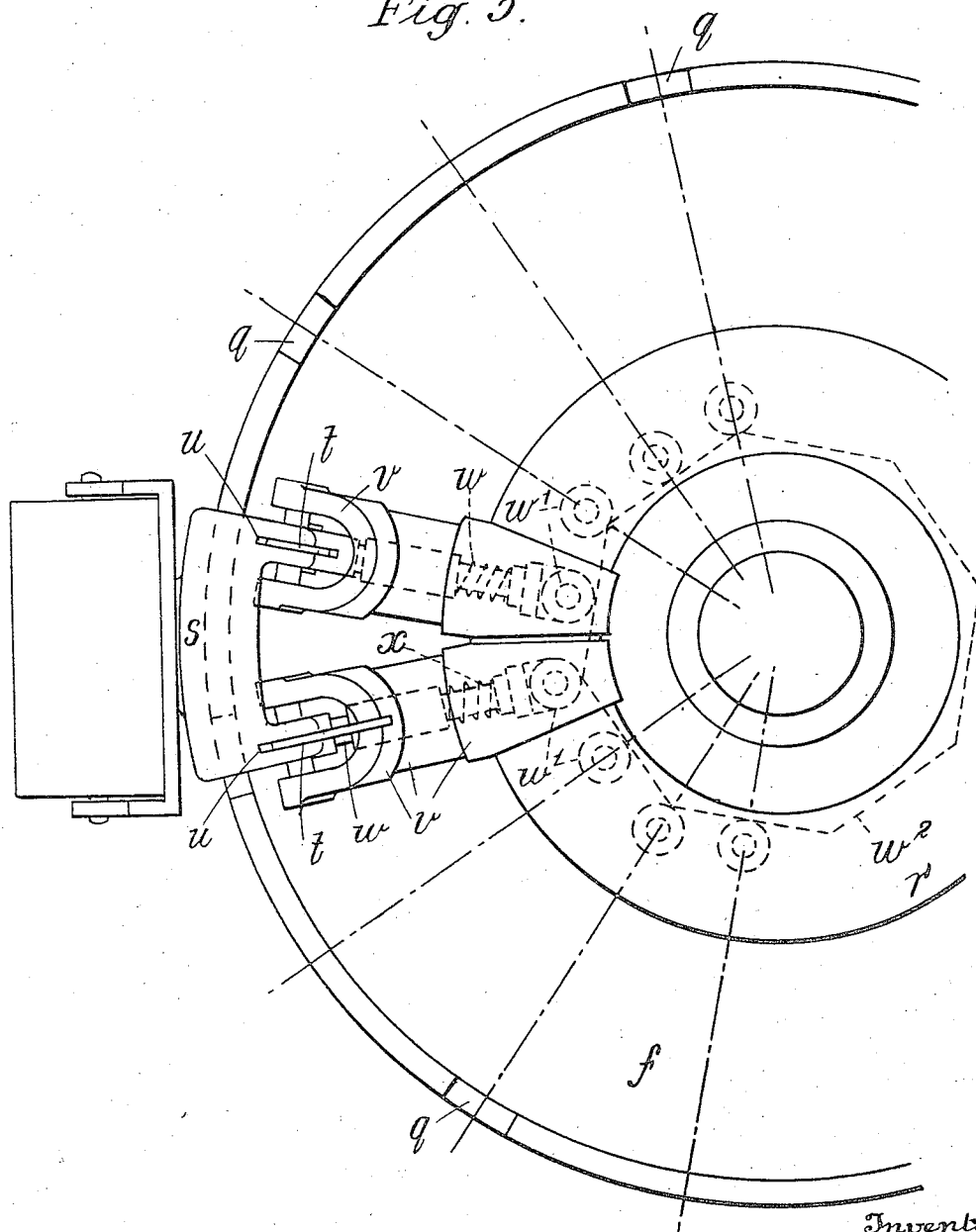
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Fig. 5.



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UNITED STATES PATENT OFFICE.

EUGENE RANKIN, OF EAST SHEEN, ENGLAND, ASSIGNOR OF ONE-HALF TO GEORGE SPICER, OF LONDON, ENGLAND.

BRAIDING-MACHINE.

1,058,100.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed November 20, 1908. Serial No. 463,706.

To all whom it may concern:

Be it known that I, EUGENE RANKIN, a subject of the King of Great Britain and Ireland, residing at 9 Church avenue, East Sheen, in the county of Surrey, England, have invented certain new and useful Improvements in Braiding-Machines, of which the following is a specification.

This invention for improvements in braiding machines relates to the method of effecting the throwing and passage of the threads and consists in effecting the throwing motion by means of a central sliding sleeve that is caused to rise and fall by means of links operated from a crank or cranks driven from the main driving shaft.

It also consists in the improved arrangement for providing the required gap and in the method of traversing or imparting motion to the inner bobbin carriers while they are passing over the threads of the outer bobbins.

In one way of carrying out this invention as applied to a machine in which an inner and outer set of bobbins are rotated in opposite directions by bevel gearing and in which the threads from the outer set of bobbins are passed over and under the threads of the inner bobbins, a rising and falling sleeve is mounted to rotate with the bottom table or spider carrying one set of bobbins and is operated to rise and fall by means of a trunnion collar mounted loosely on the sleeve and connected by links to cranks on two countershafts running on either side of the center axis of the machine. These countershafts are driven by a spur wheel mounted on the main driving shaft and mesh with spur wheels on the crank shafts. The bobbin carrier blocks are mounted to slide on the bottom spider and are driven from the top spider through the medium of pivoted lever arms adapted to be alternately withdrawn from the carrier blocks to form a gap for the passage of the threads.

The following more detailed description describes more particularly various ways of carrying out this invention.

In the accompanying drawings: Figures 1 and 1^a are vertical sectional views respectively of the opposite halves of a machine constructed according to this invention; Figs. 2 and 3 are detail views showing two forms of rocking arm and the operating pin on the trunnion collar; Fig. 4 is a side

elevation partly in section taken in a plane at right angles to Fig. 1; Fig. 5 is a plan view of a portion of the machine showing one of the upper bobbin carriers.

A spur or other suitable gear wheel *a* is mounted on a driving shaft *b*, and operates two spur wheels *c c'* mounted on double crank shafts *d d'*, respectively, said crank shafts being arranged on either side of the central axis of the machine. Around the center support *e* of the machine and on the sleeve or extension *f'* of the bottom spider *f* is mounted a sleeve *g* which rotates with the spider *f* and is provided with a trunnion collar *h* on which links or connecting rods *i i'* are mounted loosely. This sleeve *g* is operated to rise and fall by means of cranks *j j'* of the above mentioned crank shafts *d d'* with which the links *i i'* are connected and trunnion collar *h*. The reciprocating motion of the sleeve *g* is transmitted to throwing arms mounted on the spider *f*, through the medium of rocking shafts *k* suspended from the bottom spider *f* and having a toothed sector or quadrant *l* on the outer end, which gears with a similar sector *m* connected to the throwing arms *n* so that each upward and downward stroke of the piston-like sleeve *g* causes the throwing arms *n* to rock on their centers, thereby raising and lowering the yarn at the required times as the spider rotates. The piston sleeve *g* is provided with a series of pins or projections *o* which engage in suitably shaped slots *o'* in the crank or arms *o²* on the inner end of the shafts *k* for operating and connecting the throwing arms *n* thereby allowing the arms a dwell when reaching the top and bottom of a stroke.

It will be readily understood from the foregoing description that the throwing arms *n* may be dispensed with and the bottom or top spider can be operated directly in the manner of a piston thereby raising and lowering the bobbins mounted on the spider by means of the cranks before mentioned to pass the threads. In a further modification the gears also can be dispensed with and the driving shaft be provided with a single crank and link operating a lever connected by links on either side of the center shaft with the above mentioned sleeve by a trunnion collar or the like. It will be at once seen that by changing either sleeve, cranks or gears that different changes

in timing and consequently pattern of braid can be effected.

In operating the machine it is driven in the known manner through a bevel wheel p , which is fixed on the driving shaft b and which gears with the co-axially mounted bevel wheels p' p^2 on the top and bottom spiders r and f respectively to rotate the spiders in opposite directions.

10 The lower bobbins f^2 are suspended from the underside of the lower spider f and the thread passes through the center of the spindles of the thread throwing arms n and through the ends of the arms, as shown in
15 Fig. 1. A plurality of recesses q are formed in the flange of the bottom spider f into which the thread from the lower bobbins f^2 is deposited during the passage of the top bobbin carrier blocks s thereover. The top
20 bobbin carrier blocks s are mounted to slide on the flanged edge of the bottom spider f and are preferably driven or actuated from the top spider portions of the machine through the intermediary of a plurality of
25 pivoted blades or levers t engaging in vertical slots or grooves u in the carrier blocks s . The blades are fulcrumed in suitably shaped brackets v secured radially around the top spider. A sliding rod w having a
30 roller w' on its inner end and connected at its other end to the short arm of the lever t is slidably mounted in a guide below each of the brackets v and is adapted to be reciprocated in its guide by a cam w^2 carried by
35 and fixed on the bottom spider f . This cam w^2 is preferably octagonal in shape and is so positioned and arranged that the thread throwing arms of the outer or lower bobbins deposit the threads exactly in a line with
40 the projections or highest points of the arm as they meet the rollers w' on the sliding rods thus allowing the threads to pass in the gap that is formed between the bobbin carrier blocks s and the lever arms t . Each
45 bobbin carrier block s has two lever arms t normally in engagement with it so that when one is withdrawn to form a gap to allow the thread to pass it will have been returned again into its slot in the block s before the
50 other arm is withdrawn. This arrangement insures the blocks and bobbins being always positively driven by the top spider. A spring x serves to hold the roller w' on the rod w yieldably against the faces of the
55 cam w^2 .

It will be readily seen that a cam of any desired shape may be employed according to the pattern of braid required.

I claim as my invention:

60 1. In a braiding machine, the combina-

tion of top and bottom spiders, means for rotating said spiders in opposite directions, inner and outer sets of bobbins connected with said spiders, respectively, and rotated in opposite directions thereby, said bottom 65 spider having an upturned annular flange provided with a plurality of recesses, means for passing the threads comprising bobbin carrier blocks mounted to slide on the flange of said bottom spider and having slots 70 therein, a plurality of pivoted blades or levers on the upper spider adapted to engage the slots in the bobbin carrier blocks, each lever having a spring retracted sliding rod 75 connected at one end thereto, a roller on the free end of each rod, and a cam mounted on and rotating with the bottom spider in position to alternately engage the rollers of said levers to form the required gap for the 80 passage of the threads.

2. A braiding machine comprising an upper and lower spider mounted to rotate in opposite directions, inner and outer sets of bobbin carriers supported by said spiders, bobbin carrier blocks mounted to slide on 85 the bottom spider and provided with slots, the inner bobbins being supported by said blocks, brackets on the top spider, a sliding rod, a plurality of lever arms pivoted on said brackets and engaging at one end in 90 a slot in the bobbin carrier blocks and at their other end with said sliding rod, a roller on said sliding rod, a cam on the bottom spider operating said lever arms to form a gap for the passage of the threads 95 from the outer bobbins, and a rising and falling central sliding sleeve for operating the outer bobbin carrier arms to pass the threads.

3. In a braiding machine, the combination 100 of top and bottom spiders, thread throwing arms carried by said bottom spider, means for rotating said spiders in opposite directions, inner and outer sets of bobbins, means for rotating said sets of bobbins in opposite 105 directions, a rising and falling central sliding sleeve operable to throw the threads of the outer bobbins and having pins thereon, crank arms engaging said pins on the sleeve to transmit the reciprocating motion of the 110 sleeve to the thread throwing arms, said crank arms having angular slots to enable part of the movement of the sleeve to take place without operating the arms.

In testimony whereof I have affixed my 115 signature, in presence of two witnesses.

EUGENE RANKIN.

Witnesses:

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F. L. RAND.