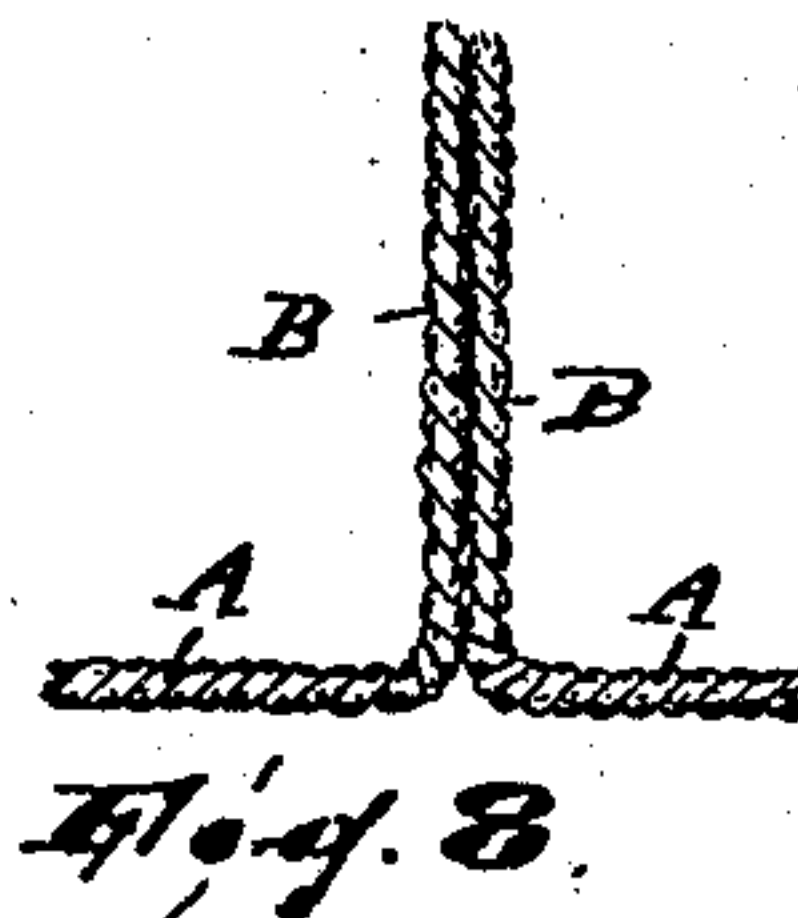
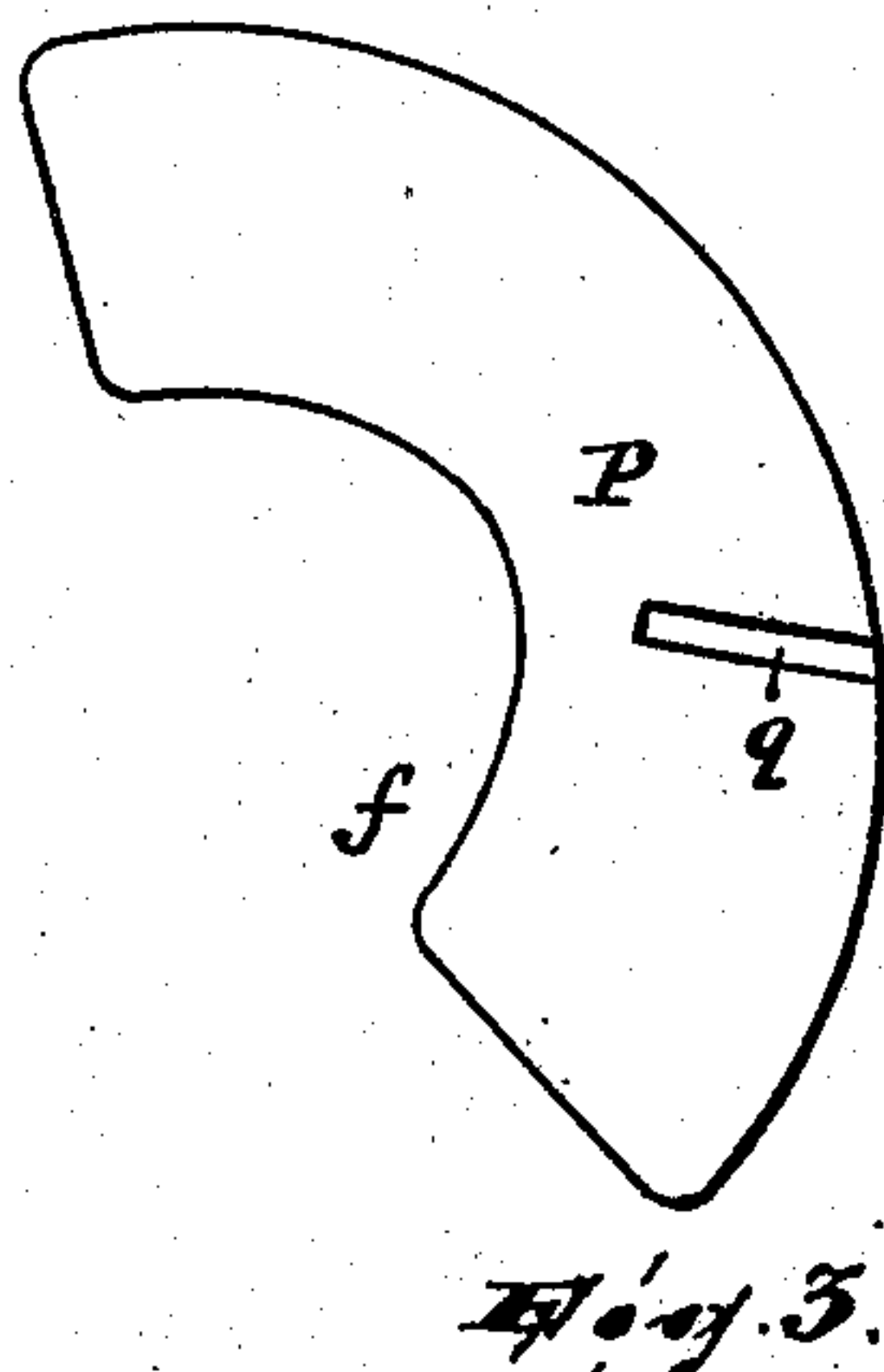
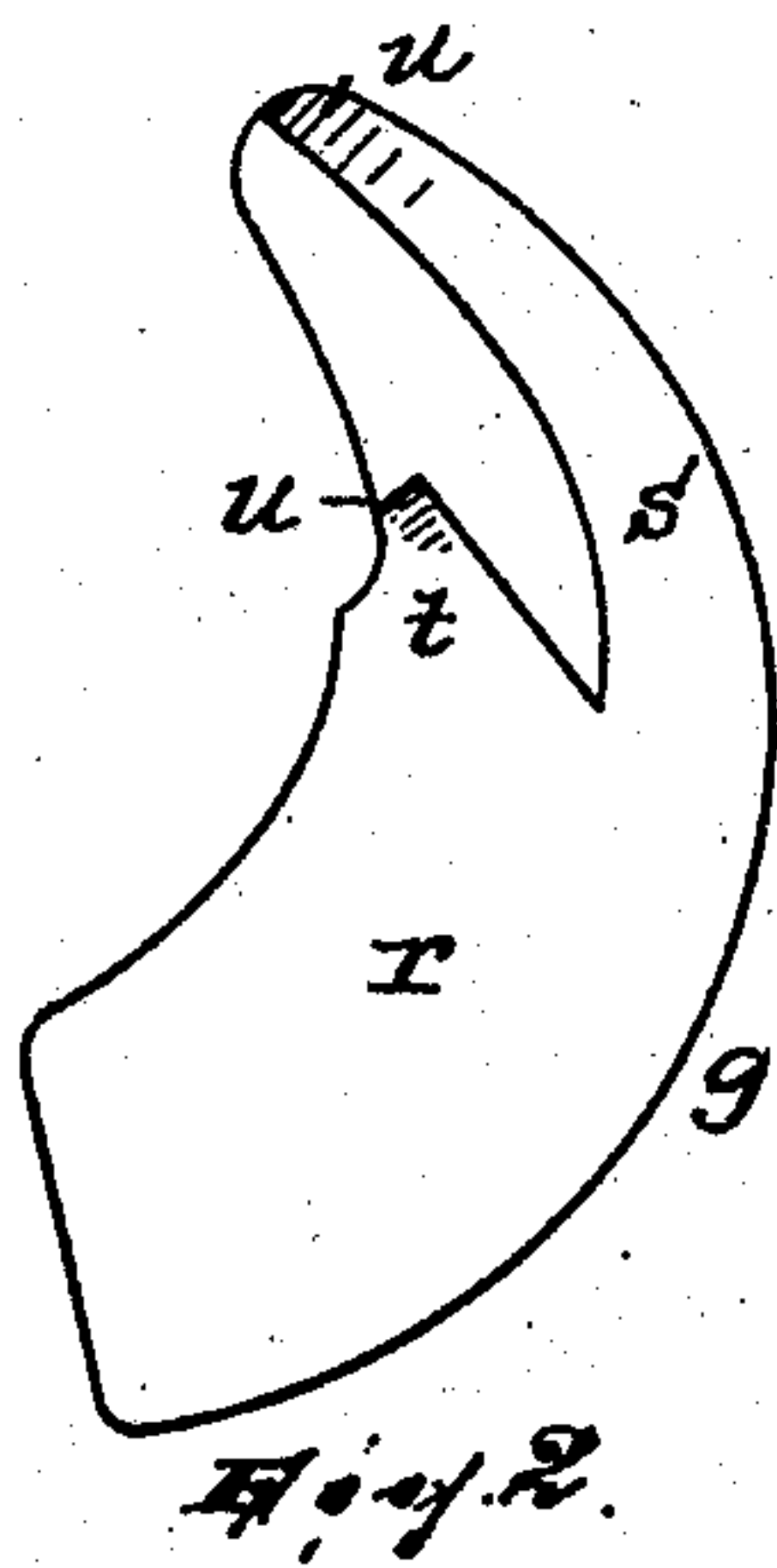
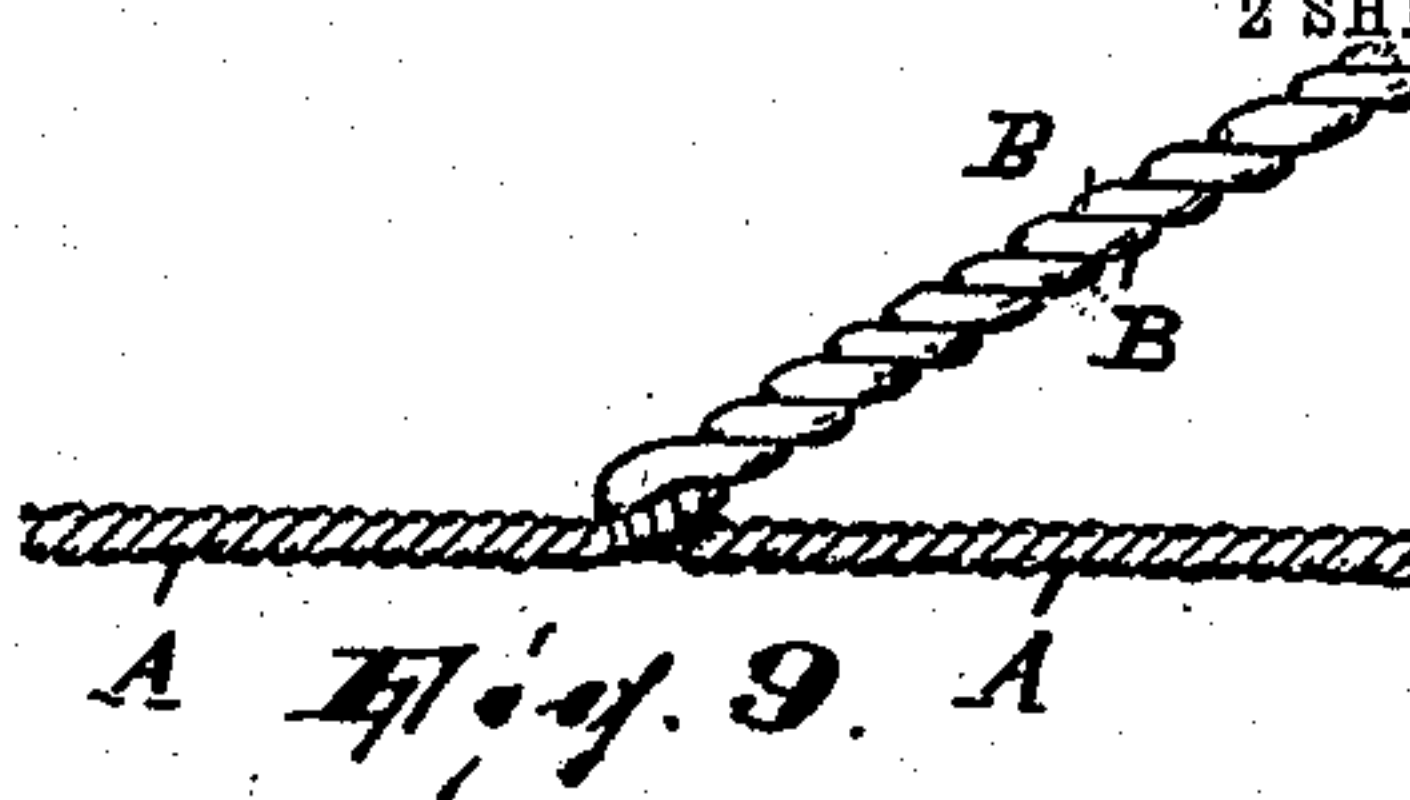
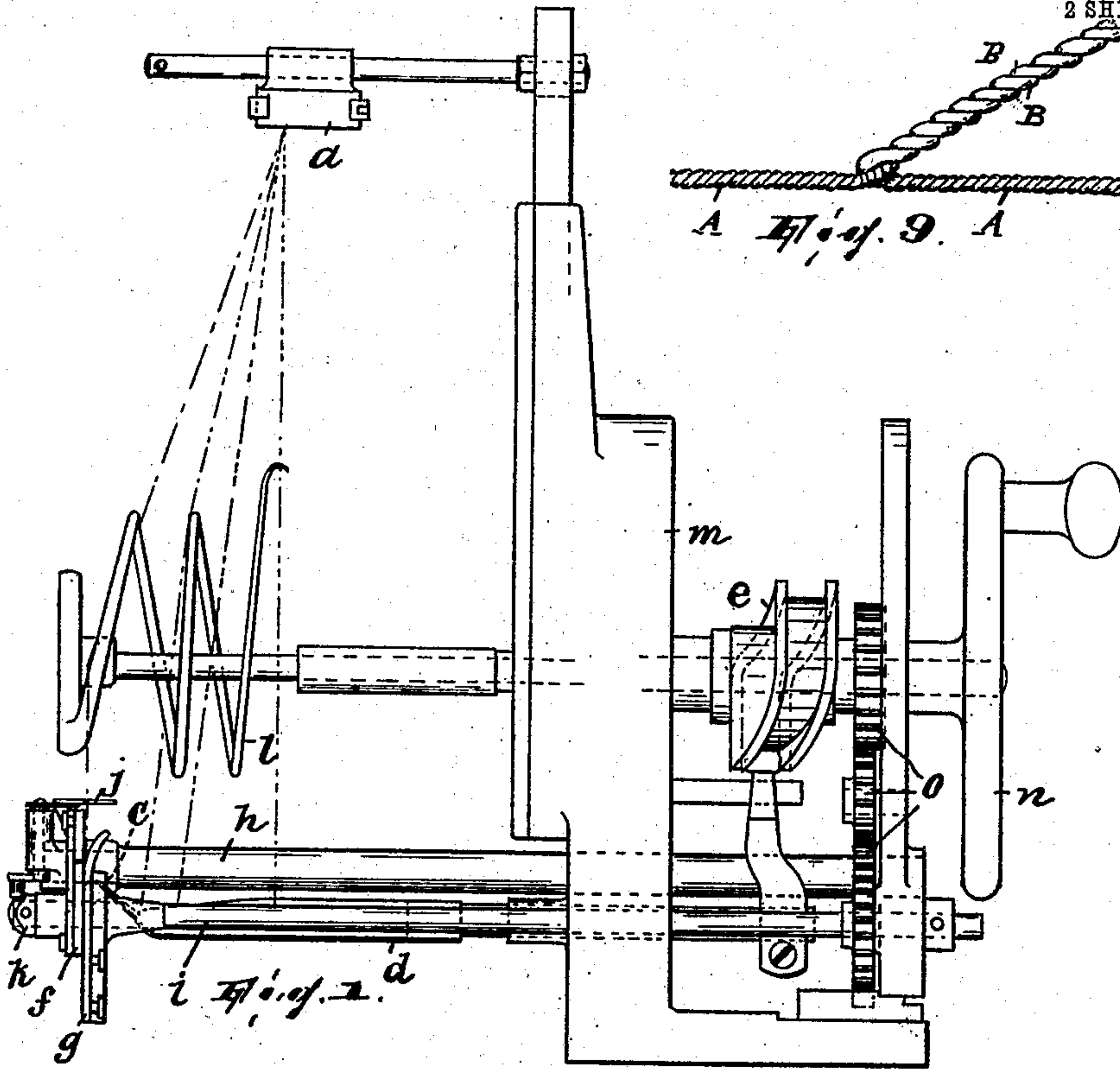


W. R. LANDFEAR.  
 TWISTING-IN MACHINE.  
 APPLICATION FILED JUNE 9, 1908.

911,885.

Patented Feb. 9, 1909.

2 SHEETS—SHEET 1.



WITNESSES  
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 A *Fig. 10.*

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2 SHEETS—SHEET 2.

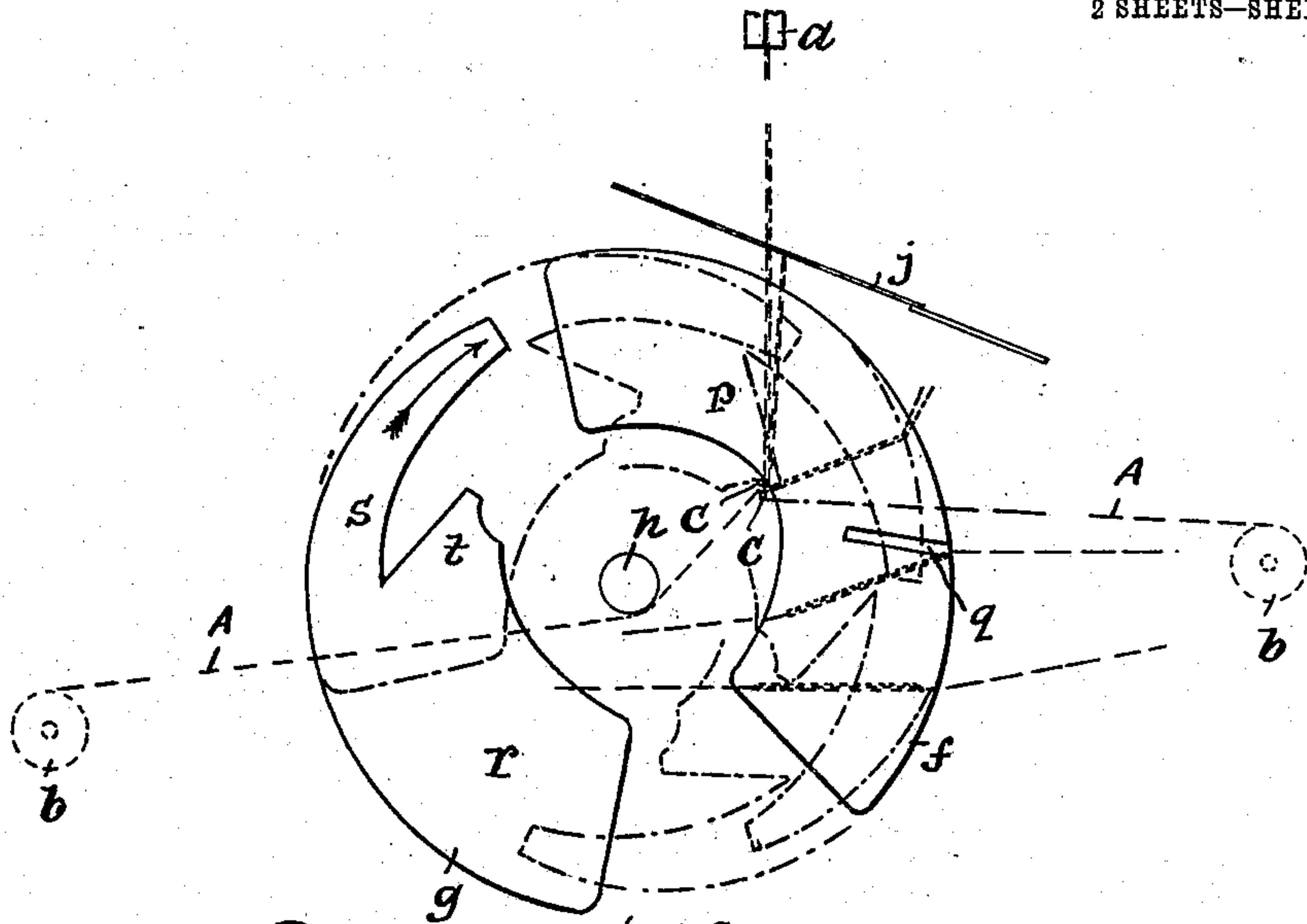


Fig. 6.

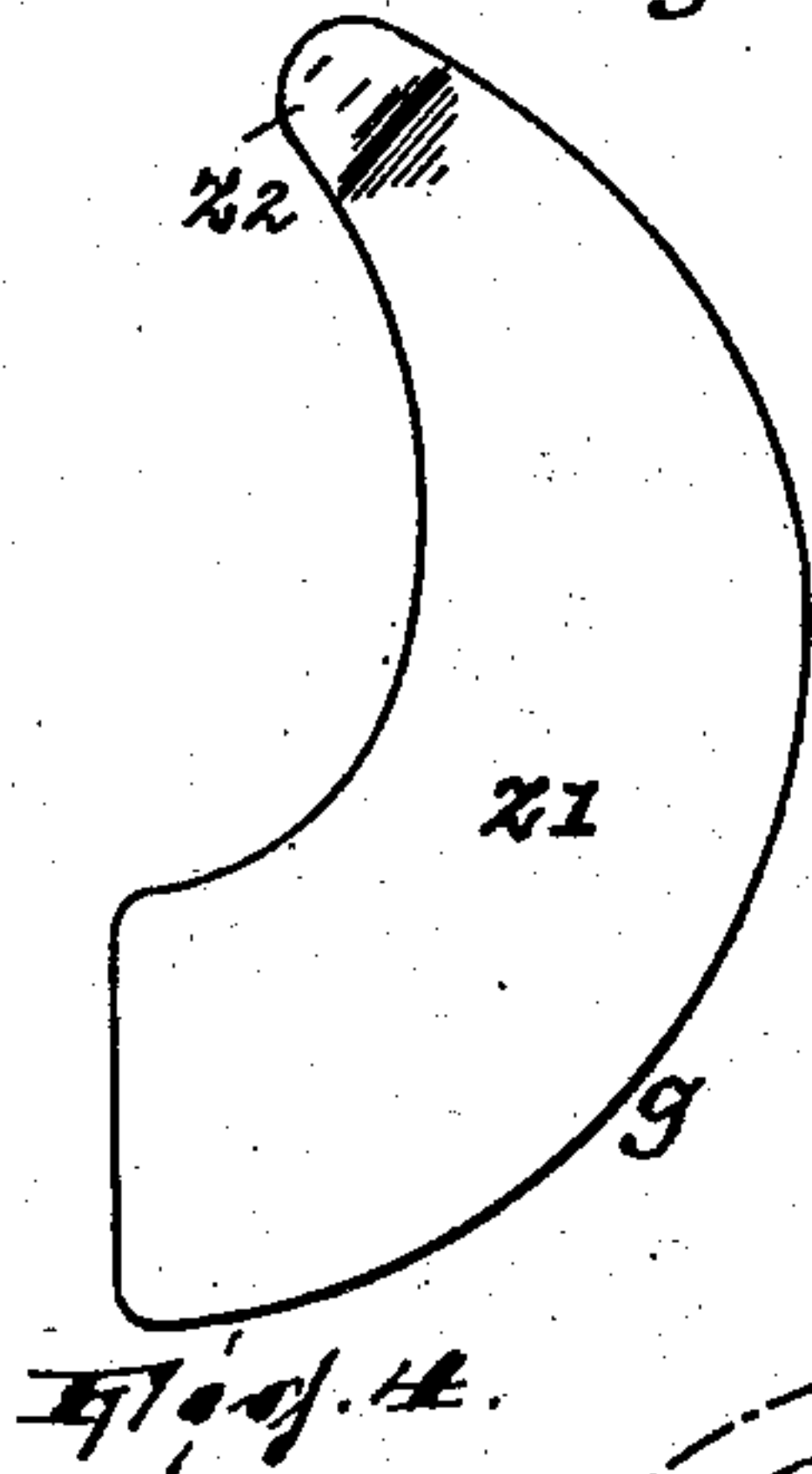


Fig. 4.

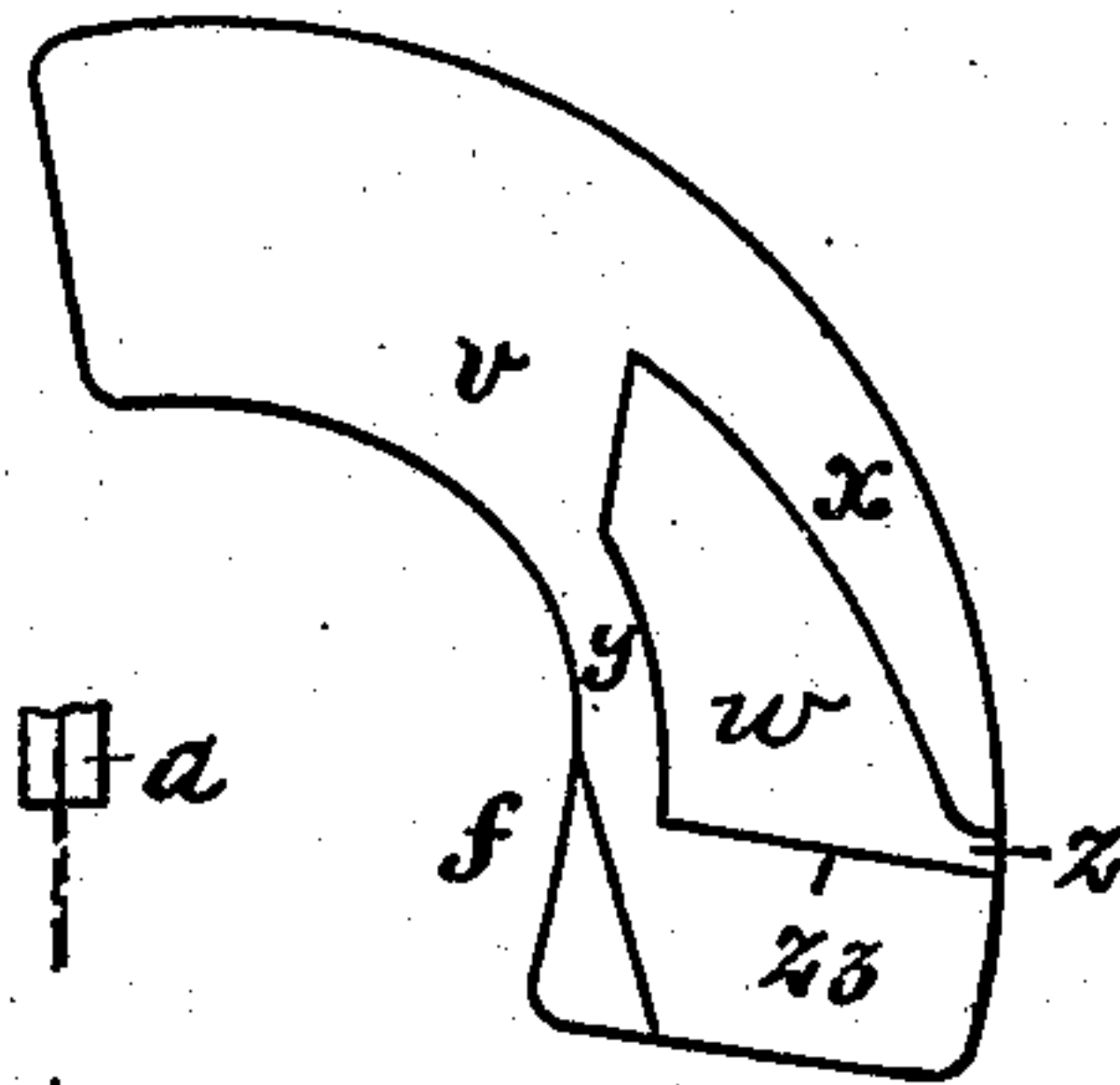


Fig. 5.

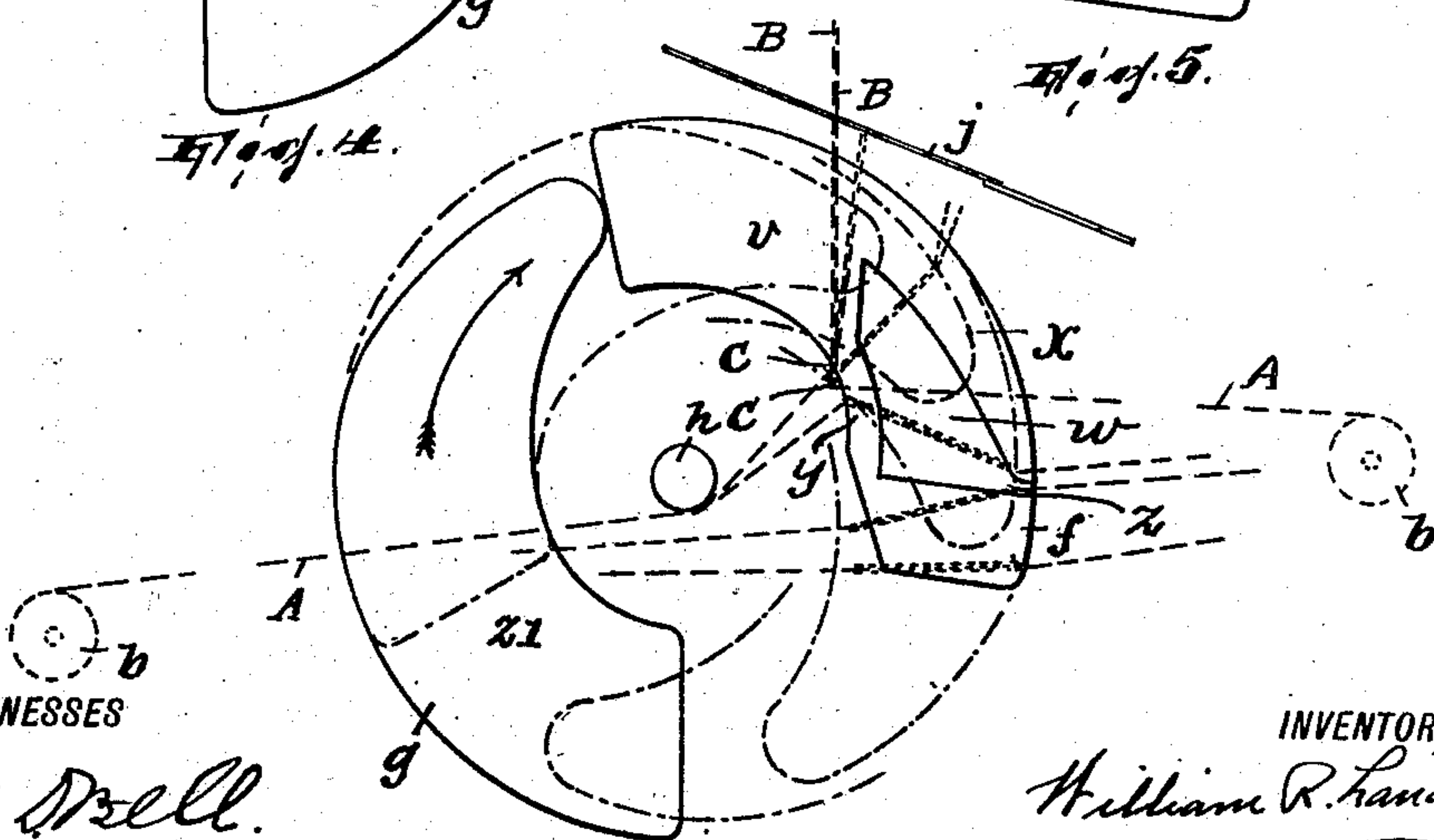


Fig. 7.

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## TWISTING-IN MACHINE.

No. 911,885.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed June 9, 1908. Serial No. 437,530.

*To all whom it may concern:*

Be it known that I, WILLIAM R. LANDFEAR, a citizen of the United States, residing in Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Twisting-In Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that operation in weaving in which, when it becomes necessary to replenish the warp of the loom, the end-portions of the threads of the new warp are so intertwisted with those of the old warp that a single, continuous thread is produced the twist in which will pass through the harness heddle-eyes. This operation involves first twisting together the extremities of each old and new warp thread to be joined, then at this time projecting in approximately the same direction, and then twisting the intertwisted extremities about the body-portion of the new warp thread.

This invention has for its object so to effect the joining of the end-portions of the threads as to produce a more compact, substantial, durable and otherwise perfect twist, and this object I find can be accomplished by keeping in view the fact that twisted strands tend to retain their twisted relation when they are twisted together in a direction reverse to the direction of twist present in one of them. I have therefore found it essential to the formation of a twist of the kind mentioned and possessing the qualities desired, that the first twisting application should be definitely at substantially the free end of the extremities-portion of the threads and the second twisting application definitely at substantially the point of juncture between the twisted extremities-portion and the body-portions of the threads; to this end I have provided two twisting members adapted, in the twisting operation, to wipe the one on the other and the one having separated acting face-portions the one of

which is extended further than the other relatively to the other member so that the extremities-portion of the threads will first be gripped between the members at or near the end thereof and subsequently the threads will be gripped at substantially the point of juncture between the extremities-portion thereof and the contiguous part of the body-portion of one of the threads.

I have illustrated my invention in the accompanying drawings in connection with a known twisting-in machine in which one of the two twisting members has a rotary motion against the other.

In said drawings, Figure 1 is a semi-diagrammatic view of the said known twisting-in machine, only such parts thereof as are pertinent to the present invention being illustrated; Figs. 2 and 3 are acting-face views of one type of the improved twisting members; Figs. 4 and 5 are similar views of another type of the improved twisting members; Fig. 6 is a semi-diagrammatic view of the twisting members of Figs. 2 and 3 and certain other parts shown in Fig. 1, the various positions of the moving twisting member being illustrated by dot-and-dash lines; Fig. 7 is a semi-diagrammatic view of the twisting members of Figs. 4 and 5 and certain other parts shown in Fig. 1, the various positions of the moving twisting members being illustrated by dot-and-dash lines; and, Figs. 8, 9 and 10 show the two threads (1) before twisting, (2) during the twisting together of their extremities and, (3) during the twisting together of the twisted extremities and the body-portion of one of the threads.

A, A designates the warp threads to be joined. The means for holding the threads with their extremities projecting in approximately the same direction is shown as comprising a clamp *a*, the beams *b*, *b* and the points *c*, *c* of a fork *d*. This fork has a horizontal longitudinally reciprocating movement imparted to it from a cam *e*. The twisting members, marked *f* and *g* in Fig. 1, are arranged the former on a fixed shaft *h* and the latter on a rotary shaft *i* so that the latter will intermittently wipe against the other, first rolling the extremities of the threads around each other and then rolling



the thus twisted extremities-portion around the body-portion of one of the threads A, A. Just after the twisting members grip the extremities the latter are severed by the knife *j* which is pivotally supported on shaft *h* and is actuated by a cam *k* on shaft *i*.

*l* is a spiral device for advancing the threads A, A to the twisting mechanism. The parts *d*, *e*, *h*, *i* and *l* are all arranged in a suitable frame *m* and are actuated from a driving member *n*, the parts *e* and *i* being connected by gearing *o*.

Referring, now, to Figs. 8, 9 and 10 the extremities B, B, are first caused to be twisted by the twisting members around each other (Fig. 9) the application of the twisting operation being at or near their severed ends; thereupon, the thus-twisted extremities-portion of the threads is twisted around the body-portion A of the right-hand thread, such second twisting beginning where the extremities merge into the body-portion A, A. While these two twists are relatively reverse to each other, the rotary twisting member does not change its direction of rotation because, although the direction of its movement remains constant, the application of the twisting operation is in the first instance at or near the free ends of the extremities B, B and in the second instance at substantially their point of juncture with the body-portions. It will be understood that the acting-face portions of the twisting members are formed of, say, a rubber composition which will actively twist threads placed between the members around each other when one member wipes over the other.

Referring, now, to Figs. 2 and 3: The acting-face *p* of member *f* is here shown as having an arc-shaped form, being generally plain or flat except for an elongated recess *q* formed to extend from its outer edge toward but not to its inner edge and standing slightly below the plane of the body-portion A of the right-hand thread (Fig. 6). The acting-face *r* of member *g* is here shown as having a generally tapering arc-shaped form and generally plain or flat and as having its advance end comprising two separated acting-face portions *s* and *t*, the former adjoining the outer perimeter of the member and being extended, curved, further than the other; such acting-face portions have their free ends beveled, as at *u*, so that they will ride up on the threads to start the rolling thereof. The acting-face portion *t* preferably has the obtuse angular form shown. When members *f* and *g* have their acting-faces thus formed, the operation is substantially as follows: Two threads A, A, one from the old and one from the new warp, being advanced by the spiral *l* to the plane of the acting faces of the members, member

*g* comes into wiping contact with member *f* and its acting-face portion *s* first grips the extremities B, B near the knife *j*; the latter is now caused to sever the extremities which are now held by the members *f* and *g*, acting-face portion *s* rolling the end-portions of the extremities around each other while still held by the points *e*, *e* of fork *d*. This rolling, and the consequent twisting of the extremities on each other, continues, the extremities-portion constantly changing its radial position with reference to the points *e*, *e*, until the acting-face portion *t* of member *g* begins to roll the other end of the extremities-portion around the contiguous part of the body-portion of the right-hand thread A; after the acting-face portion *t* has coöperated with member *f* to grip the threads sufficiently, the form recedes so that the points *e*, *e* release the threads. The obtuse formation of the acting-face portion *t* of member *g* results in a gradually widening wiping action on the threads which works outwardly from the juncture of the extremities-portion with the body-portions of the threads, the extremities-portion being twisted meanwhile around the body-portion of the right-hand thread. The twist of the twisted extremities-portion around the body-portion of the right-hand thread being now more or less complete the twist is rolled into the recess *q* whose function it is to produce a pause in the rolling of the outer portion of the twist because, since now the portion *r* of the acting-face of member *g* is bearing against the twist, if some means were not interposed to prevent it, there would be a tendency to untwist because the outer perimeter of member *g* moves more quickly through the same number of degrees in its circular path than its inner perimeter. The twist having, as to its outer portion, thus dropped into the recess *q* and being arrested by the abutment formed by the lower edge of said recess, member *g* for a time wipes over such outer portion idly, while it continues to roll the inner portion of the twist; this (at first) limited rolling gradually affects more and more of the outer portion of the twist, the rolling inner portion pulling the recessed outer portion out of recess *q*. From then on the action of the twisting members on each other is merely to roll or iron out the threads.

Referring, now, to Figs. 4 and 5: The acting face *v* of member *f* is here shown as having an arc-shaped form, being generally plain or flat, except for a substantially triangular recess *w* which produces two separated acting-face portions *x* and *y*, the former adjoining the outer perimeter of the member and being extended upwardly (Fig. 5) further than the other. The lower right-hand corner (Fig. 5) of recess *w* is a notch



2 which extends to the perimeter of the member. The acting-face portion  $z^1$  of the member  $g$  has a curved tapering form, its free end  $z^2$  being beveled. When member  $g$  is rotated against member  $f$ , thus formed (Fig. 7), the twisting effect is substantially the same as that already described with reference to Figs. 2, 3 and 6. Member  $g$  first wipes over the extremities B, B of the threads near the knife and starts to roll them around each other; the knife now severs the extremities and, the threads being still held by the needle points, member  $g$  first wipes against the acting-face portion  $x$  of member  $f$ , rolling the ends of the extremities around each other and twisting the extremities. Ultimately member  $g$  wipes against portion  $y$  of member  $f$  and starts to twist the other end of the twisted extremities-portion around the contiguous part of the body-portion of the right-hand thread. Meanwhile fork  $d$  withdraws its needle points  $c, c$  from the threads, and the twisting of the extremities-portion around the body-portion of the right-hand thread proceeds until the twist drops into the notch  $z$ . The twist now abuts against the abutment formed by the lower-edge  $z^3$  of recess  $w$ , but is later gradually rolled out of said recess because its inner portion continues to be rolled by the action of the two twisting members, from which time on the operation of the twisting members is to iron out or finish the twist.

35 Having thus fully described my invention, what I claim and desire to secure by Letters Patent is:

1. The combination, with means for maintaining threads to be joined with their extremities projecting in approximately the same direction, of twisting members movable the one against the other across the extremities, and the body-portion of one, of the threads to effect the twisting, first, of the extremities on each other and, then, of the twisted extremities on said body-portion, one of said members having separated acting-face portions one of which is extended further than the other relatively to the other member, substantially as described.

2. The combination, with means for maintaining threads to be joined with their extremities projecting in approximately the same direction, of twisting members movable the one rotatively around the point of juncture between the extremities and body-portions of the threads and against the other member across the extremities, and the body-portion of one, of the threads to effect the twisting, first, of the extremities on each other and, then, of the twisted extremities on said body-portion, one of said members having separated acting-face portions the relatively outer one of which is

extended further than the other relatively to the other member, substantially as described.

3. The combination, with means for maintaining threads to be joined with their extremities projecting in approximately the same direction, of twisting members movable the one rotatively around the point of juncture between the extremities and body-portions of the threads and against the other member across the extremities, and the body-portion of one, of the threads to effect the twisting, first, of the extremities on each other and, then, of the twisted extremities on said body-portion, one of said members having separated acting-face portions the relatively outer one of which is extended further than the other relatively to the other member, and one of said members having, adjoining its outer perimeter, means for temporarily arresting the rolling action in the outer portion of the twist formed between the twisted extremities, and said body-portion of one, of the threads, substantially as described.

4. The combination, with means for maintaining threads to be joined with their extremities projecting in approximately the same direction, of twisting members movable the one rotatively around the point of juncture between the extremities and body-portions of the threads and against the other member across the extremities, and the body portion of one, of the threads to effect the twisting, first, of the extremities on each other and, then, of the twisted extremities on said body-portion, one of said members having separated acting-face portions the relatively outer one of which is extended further than the other relatively to the other member, and one of said members having, extending from its outer perimeter inwardly toward but not to its inner perimeter, a thread-abutment adapted to temporarily arrest the rolling action in the outer portion of the twist formed between the twisted extremities, and said body-portion of one, of the threads, substantially as described.

5. The combination, with devices for holding threads to be joined with their extremities at an angle to the body-portion of one thread, of twisting members movable the one rotatively around the holding device at the juncture between the extremities and body-portions of the threads and against the other member across the extremities, and the said body-portion of one, of the threads to effect the twisting, first, of the extremities on each other and, then, of the twisted extremities on said body-portion, one of said members having separated acting-face portions the relatively outer one of which is extended further than the other



relatively to the other member, and means,  
operative to withdraw said device after the  
beginning of the second twisting operation,  
for rotating said rotatable member and  
5 reciprocating said device, substantially as  
described.

In testimony, that I claim the foregoing,

I have hereunto set my hand this 5th day  
of June, 1908.

WILLIAM R. LANDFEAR.

Witnesses:

JOHN W. STEWARD,  
ALBERT NANNES.