

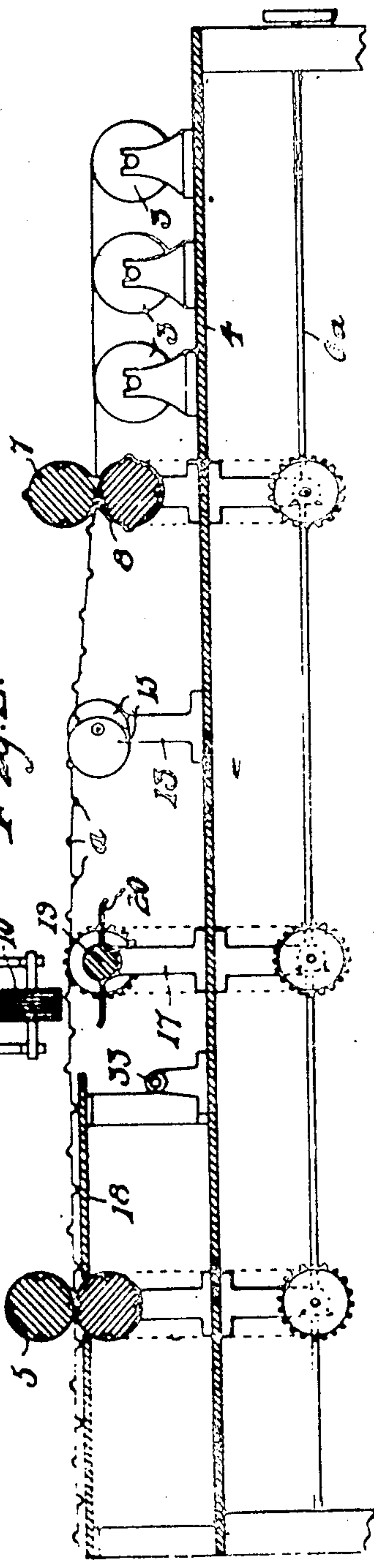
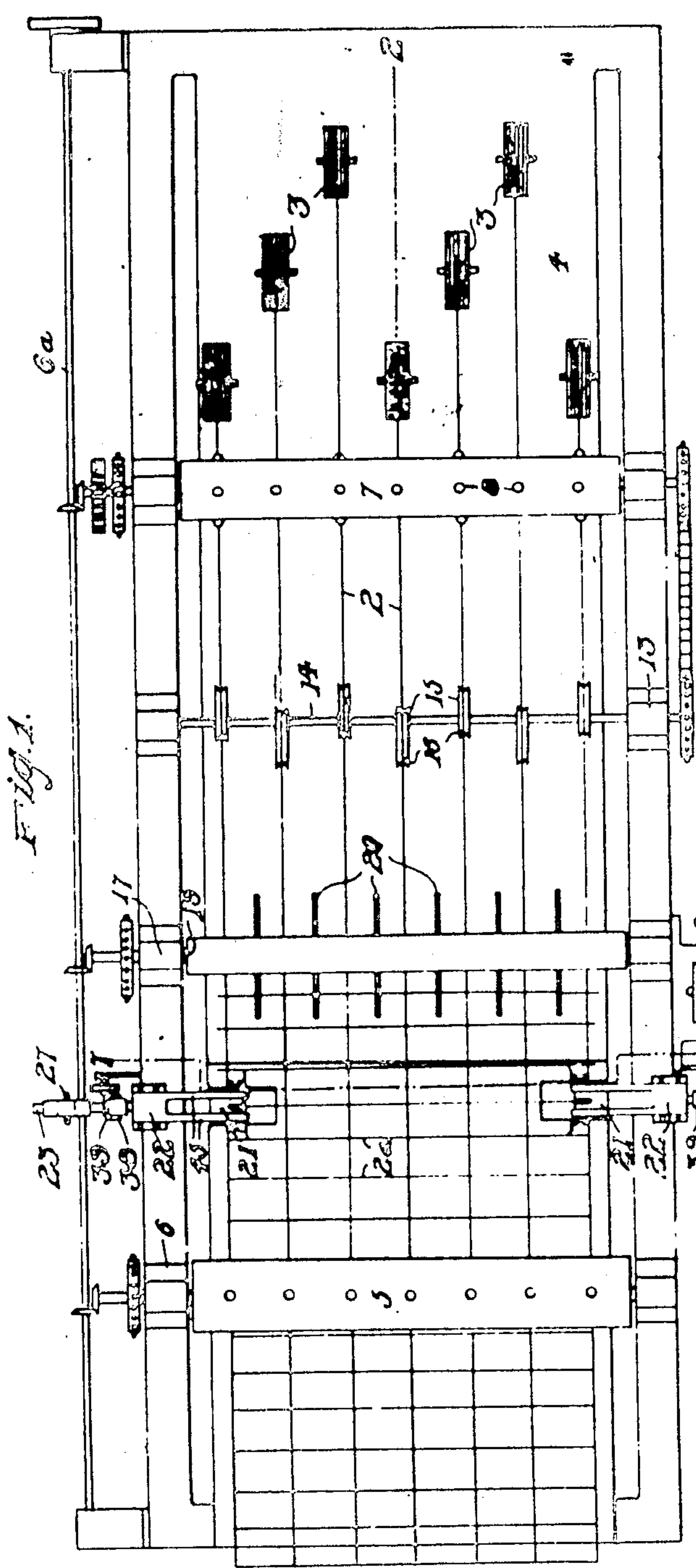
H. ROBERTS.
FENCE MACHINE.

APPLICATION FILED OCT. 26, 1909.

Patented Apr. 26, 1910.

5 SHEETS—SHEET 1.

955,907.



witnesses:
J. P. [Signature]
M. [Signature]

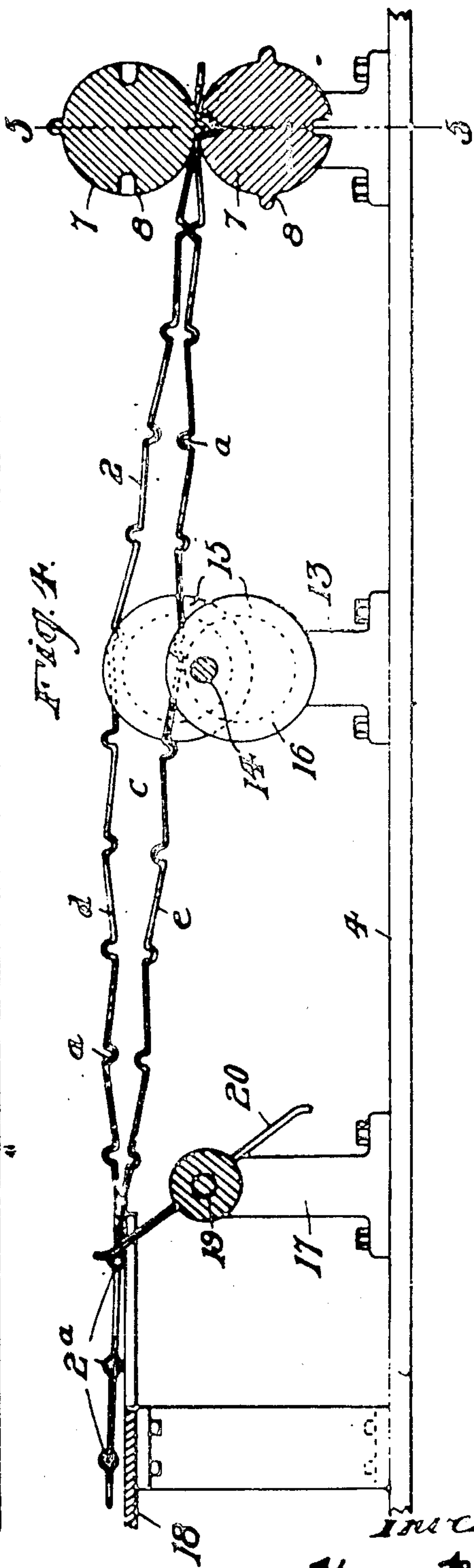
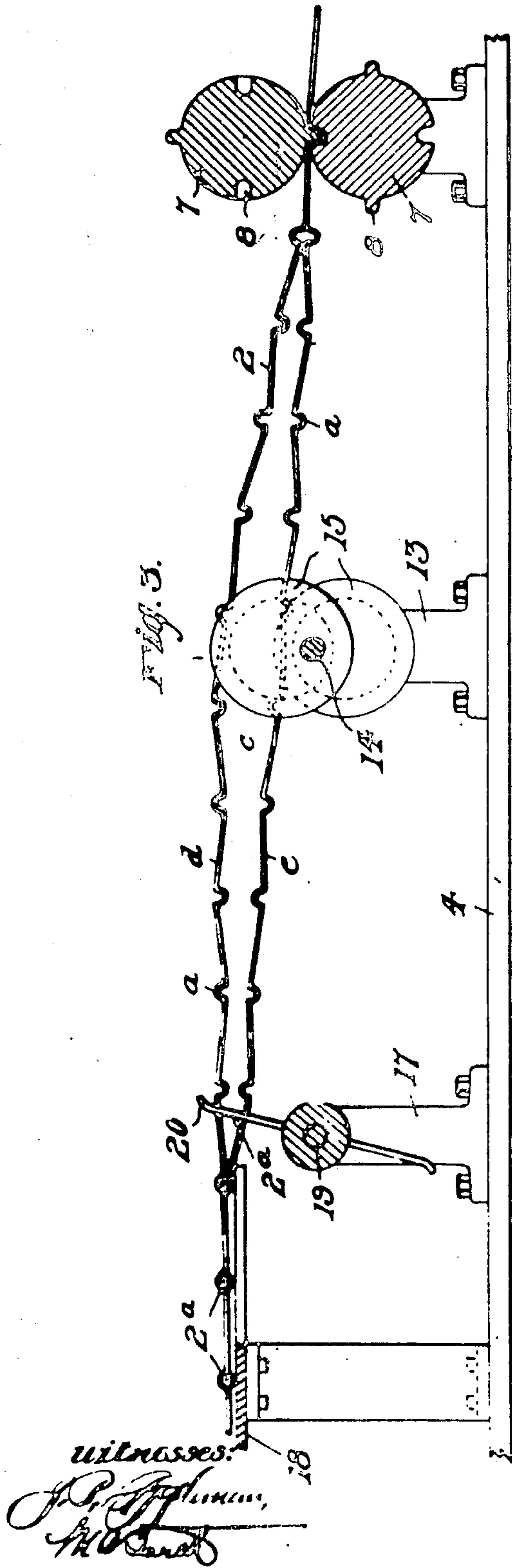
Inventor
Harry Roberts
by Bakerwell & Keller
his Attorneys

955,907.

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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

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Fig. 5.

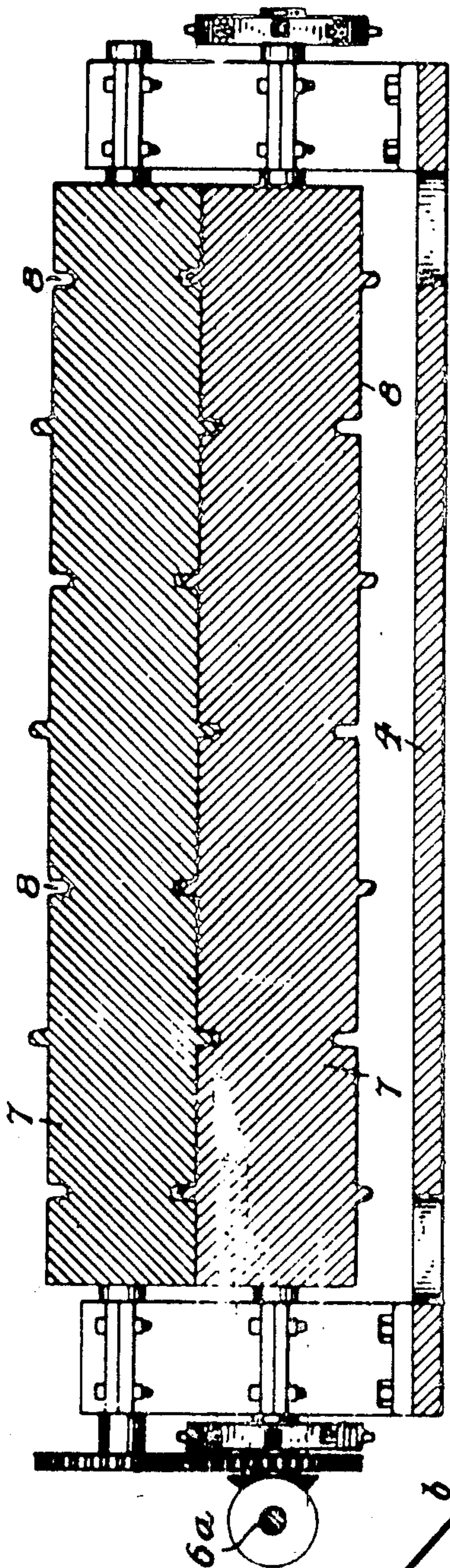


Fig. 6.

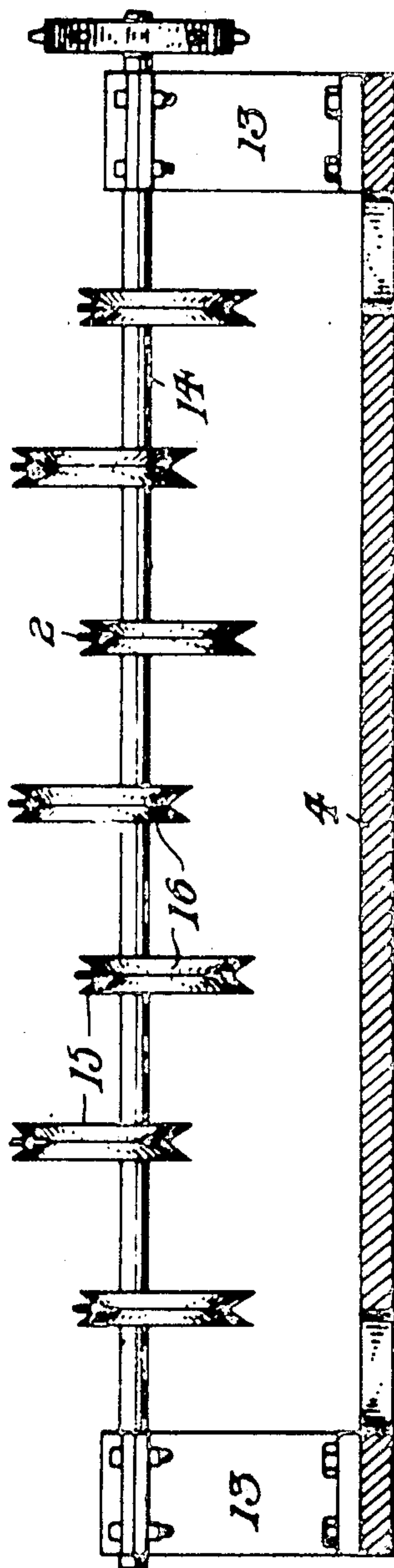
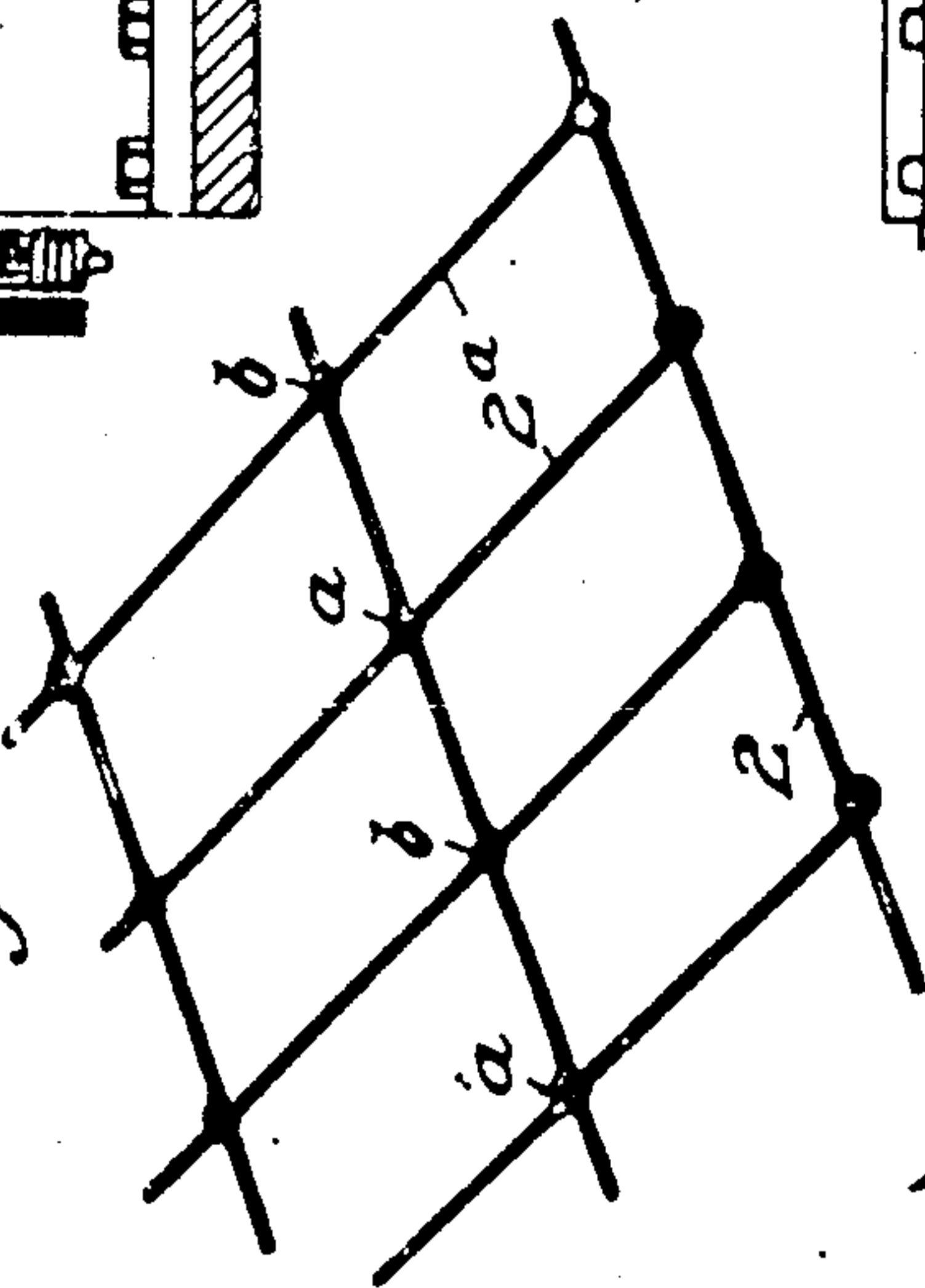


Fig. 13.



witnesses:
J. P. Hoffman,
Attorney.

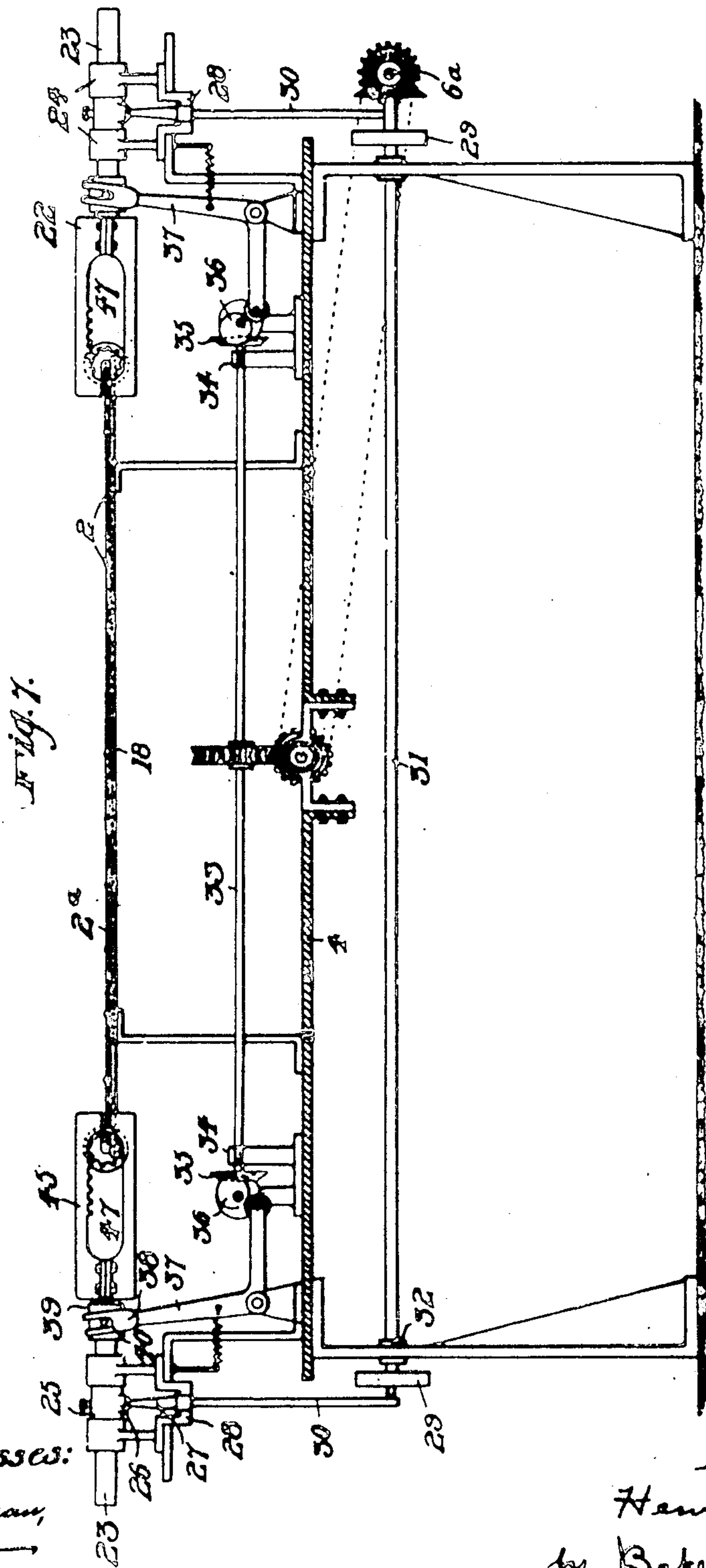
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955,907.

H. ROBERTS.
FENCE MACHINE.
APPLICATION FILED OCT. 23, 1900.

Patented Apr. 26, 1910.

5 SHEETS-SHEET 4.



witnesses:
J. A. Hoffman,
W. A. Carter

Inventor
Henry Roberts
by *Baker & Keller*
his Attorneys

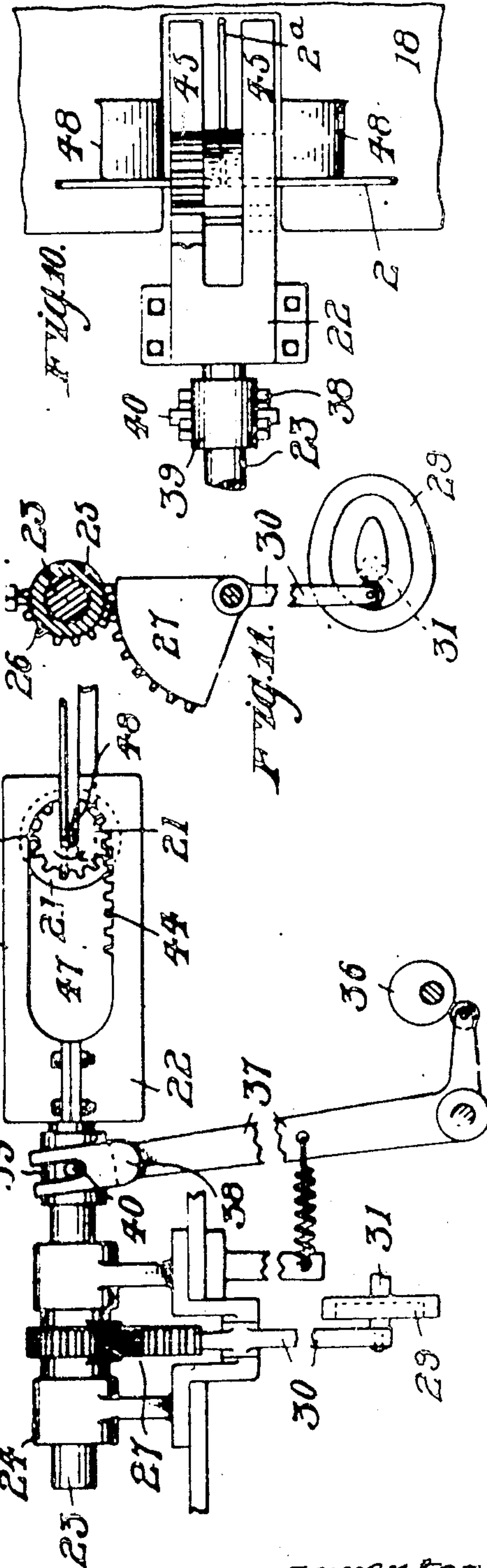
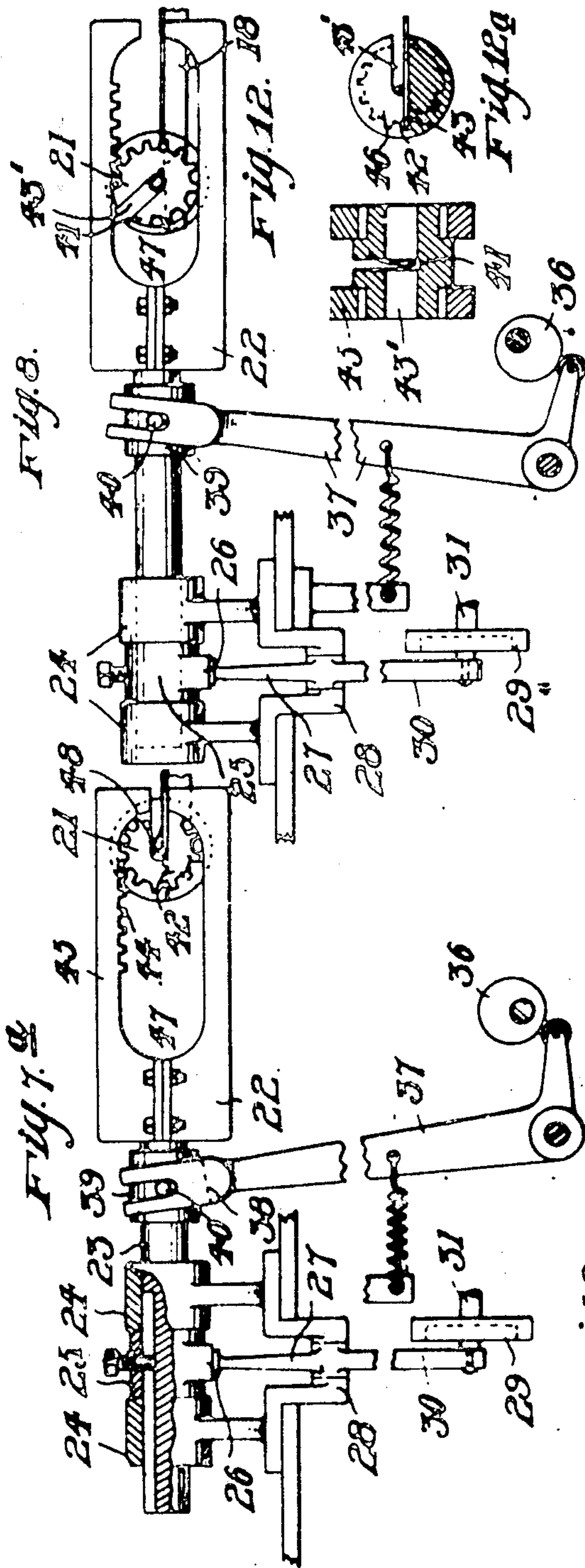
H. ROBERTS.
FENCE MACHINE.

APPLICATION FILED OCT. 26, 1909.

Patented Apr. 28, 1910.

5 SHEETS-SHEET 5.

955,907.



Witnesses:
J. P. Hoffman,
H. B. Smith

Inventor
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UNITED STATES PATENT OFFICE.

HENRY ROBERTS, OF PITTSBURG, PENNSYLVANIA.

FENCE-MACHINE.

955,907.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed October 26, 1909. Serial No. 524,655.

To all whom it may concern:

Be it known that I, HENRY ROBERTS, of
Pittsburg, in the county of Allegheny, State
of Pennsylvania, have invented a certain
5 new and useful Improvement in Fence-Ma-
chines, of which the following is a full,
clear, and exact description, reference being
had to the accompanying drawings, forming
part of this specification.
10 The object of my invention is to provide
apparatus for weaving wire fencing and the
like, and it consists in the combination and
arrangement of parts as will be hereinafter
more fully set forth.
15 I will now describe, referring to the ac-
companying drawings, my invention, so that
others skilled in the art to which it apper-
tains, may understand and construct the
same.
20 In the accompanying drawings illustrat-
ing my invention, Figure 1 is a top plan
view; Fig. 2 is a longitudinal sectional view
on the line 2--2 of Fig. 1; Figs. 3 and 4 are
enlarged longitudinal vertical sectional
25 views showing the heddle for forming the
shed in the longitudinal strands, mechanism
for crimping said strands, and mechanism
for laterally shifting the transverse strands
or stay wires; Fig. 5 is a longitudinal verti-
30 cul sectional view through the rolls for
crimping the longitudinal strands; Fig. 6
is an elevation of the rotary heddle; Fig. 7
is an enlarged sectional view taken on the
line 7--7 of Fig. 1 and showing mechanism
35 for twisting or wrapping the ends of the
transverse strands or stay wires around the
twosidelongitudinalstrandsorrunningwires;
Figs. 7^a, 8, and 9 are enlarged side eleva-
tions of the transverse strand or stay wire
40 twisting mechanism, and showing the same
in normal, advanced, and reversed positions,
respectively; Fig. 10 is a top plan view of the
same; Fig. 11 is a transverse section taken
through the collar 25; Figs. 12 and 12^a are
45 sectional views of the rotatory transverse-
strand or stay wire twisting head; and Fig.
13 is a fragmentary perspective view of the
fencing which may be woven by my im-
proved apparatus.
50 The strands 2 adapted to form the longi-
tudinal or running wires of the fabric, are
adapted to be fed from suitable reels 3

by means of the feed rolls 5 journaled at
the opposite end of the frame-work in suit- 55
able bearings 6, and which are adapted to
operatively engage with the fence fabric.
These rolls 5 are operatively connected to
the horizontal shaft 6^a which may be driven
in any suitable manner. As the strands 2 60
pass from the reels 3 they are adapted to
receive the crimps *a* which project alter-
nately in diametrically opposite directions;
which crimps are adapted to interlockingly
engage with similarly formed crimps *b* of 65
the transverse or stay-wires 2^a. This crimp-
ing of the strands 2 is accomplished by
means of the rolls 7 which are provided with
the crimping surfaces 8, which are provided
with suitable alternately disposed crimping 70
projections and recesses, and between which
the strands are passed, while the crimps
b are imparted to the stay-wires by means of
the similarly constructed rolls 9. The rolls
7 may be operatively connected to the shaft 75
6^a. The stay-wire is carried by the suitable
reel 10, from which it is caused to be drawn
through suitable straightening and shear-
ing mechanisms 11 and 12, respectively, and
fed to the running wires by means of the 80
rolls 9. This shearing mechanism and the
rolls 9 may be operatively connected to any
suitable source of power. And in order to
present a straight wire to the shearing mech-
anism, I mount this shearing mechanism in- 85
termediate the straightening mechanism and
the crimping and feeding rolls.

Journaled in suitable bearings 13 is the
horizontal shaft 14 provided with the
series of eccentrically mounted peripherally- 90
grooved disks 15 which are alternately, di-
ametrically, oppositely disposed (see Figs. 1,
3, and 4). Over these disks the strands 2
are adapted to be threaded, being received
by the peripheral grooves 16. With a shift 95
ing of the position of the disks 15 by a ro-
tation of the shaft 14 the longitudinal
strands or running wires 2 are caused to
be alternately, oppositely, vertically shifted
so as to separate and form an opening *c* be- 100
tween the strands for the reception of a
transverse or stay-wire. This opening is
known in the art as a shed, and its forma-
tion is clearly shown in Figs. 3 and 4; in
Fig. 3 the series *d* of longitudinal strands 105
forming the top of the opening or shed,

while the bottom or lower series is indicated by the letter *e*. A shifting of the position of the eccentrically disposed disks 15 will cause a reversal of the position of the series *d* and *e* with the consequent binding of a stay-wire within a shed and the formation of another shed for the reception of another stay-wire, as shown in Fig. 4.

Journalled in suitable bearings 17, forward of the table 18 over which the fabric is adapted to be drawn by the rolls 5, is the horizontal shaft 19, provided with the radial arms or fingers 20 which, in the rotation of the shaft 19, are caused to sweep around in a vertical plane between the strands 2 and laterally shift the stay-wire into engagement with the crimps of the longitudinal or running wires, after the stay-wire has been fed into the shed or opening between the running wires. The operation of this stay-wire shifting mechanism is clearly shown in Figs. 3 and 4; Fig. 3 showing the fingers 20 advancing to shift the stay-wire 2^a and Fig. 4 showing the fingers as shifting the stay-wire into position simultaneously with the formation of another shed for the reception of another stay-wire.

Means for wrapping or twisting each end of the stay-wire, around its respective running side-wire, are mounted at each side of the table 18 and each comprises the twister head 21 carried by the support 22 which in turn is carried by the shaft 23 mounted in the bearings 24 between which and splined to the shaft 23 is the collar 25, which collar is provided with the gear face 26 which meshes with the segment 27 pivoted to the depending bearings 28. This segment is adapted to be rocked by means of the cam 29 which is operatively connected to the segment by the depending arm 30. The purpose of this collar and segment arrangement is to cause a rocking of the shaft 23 for a reversal of the position of the support 22 for the purpose set forth below. The cam 29 is carried by the horizontal shaft 31 journalled in suitable bearings 32 and which may be driven in any suitable manner. Lying parallel to this shaft 31 is the shaft 33 journalled in the bearings 34 and which by means of suitable bevel gearing 35 is operatively connected to the cam 36. This cam 36 is adapted, through the intermediary of the double arm lever 37, to cause a reciprocation of the shaft 23 in the bearings 24. To permit of a rotation of the shaft 23 while still maintaining operative connection with the rocker arm 37, this arm is provided with the fork 38 which embraces the collar 39 loosely carried in an annular seat in the shaft 23, which collar carries the suitable studs or rollers 40 by means of which the fork 38 operatively engages with the collar 39.

The construction and operation of the twister head 21 will be readily understood by referring to Figs. 7^a, 8, 9, and 10. The head is provided with the fingers 41 which are adapted to overhang the running wire on each side of the stay-wire, when the head has been caused to be shifted into engagement with the said wires, as shown in Fig. 7^a. And in such advance and engagement with the wires, the end 42 of the stay-wire is caused to enter the space or opening between the fingers 41, lying along the shoulder 43 which is adapted, when the head is caused to be rotated, to twist or wrap the end of the stay-wire around the strand 2 lying within the radial recess 43' which is formed by the overhanging fingers 41 and the parallel extending shoulder or face 43. The rotation of the twister head is accomplished by means of the rack face 44 carried by the arms 45 between which the head 21 is mounted. This rack is adapted to mesh with the pinions 46 carried by the head 21 and which are adapted to travel in the ways 47 in the arms 45. The rotation of the head 21 is effected by the forward travel of the support 22 after operating to bring the head 21 into the operative position shown in Fig. 7^a. As will be seen in Fig. 7^a the head 21 will be prevented by reason of its engagement with the edge running wire 2, from further advancing with the support 22 after the head has been brought to the position shown, and the continued forward movement of the support 22 will cause the rack face 44 to act on the pinions 46 of the head thereby causing the head 21 to be rotated around the strand 2, as shown in Fig. 8; such rotation of the head 21 causing the end 42 of the stay-wire to be folded over or wrapped around the longitudinal strand 2 by reason of the shifting of the wrapping shoulder or face 43 against which the stay-wire end 42 is adapted to rest, as described above. And means for supporting the strand 2 against lateral shifting, when the head 21 is caused to be brought into engagement therewith in the above described manner, comprises the projecting face or shoulder 48 carried by the table 18 and against which the strand 2 is adapted to bear in the forward travel of the support 22. After operating and twisting the stay end in the manner above set forth, a reverse shifting or return travel of the support 22 will cause the rack faces of the support 22 to act on the pinions of the head 21 in a reverse direction, with a consequent return of the head 21 to normal position.

If, in the weaving of the fabric, the formation of the sheds is such as shall cause the stay-wires to assume a position in alternation on opposite sides of each side or edge running wire as shown in Fig. 13, to

effect a twisting or wrapping of the end of the stay-wire around the edge running wire, when the stay-wire is caused to be fed over instead of under the running wire, as shown in Fig. 9, it is necessary that the twister head 21, when advanced by the support 22 into engagement with the strands, as above described, be caused to rotate in a reverse direction as indicated by the arrow in Fig. 9. This is accomplished by giving the support 22 a one-half revolution so as to reverse the position of the head 21 as is clearly shown in Fig. 9. This rocking or turning of the support 22 is adapted to take place when the support has been retracted to normal position; the collar, segment and cam arrangement for causing this rotation of the support being described above.

From the foregoing description, the operation of the apparatus will be readily understood. The feeding of the fabric should be intermittent so as to enable the stay-wires to be momentarily held for the advancement of the edge twisting mechanisms.

It will be apparent that many changes may be made in the different mechanisms without departing from my invention.

The advantages of my invention will be found to reside in the simplicity of the different mechanisms and their effectiveness.

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

1. In an apparatus of the character described, the combination of mechanism for feeding the warp strands, means for crimping the warp strands, a heddle, mechanism for feeding weft strands to the warp strands, and means for laterally shifting the weft strands into engagement with the crimps of the warp strands.

2. In an apparatus of the character described, the combination of mechanism for feeding the warp strands, means for crimping the warp strands, a heddle, mechanism for crimping and feeding weft strands to the warp strands, and means for laterally shifting the weft strands into engagement with the crimps of the warp strands.

3. In an apparatus of the character described, the combination of mechanism for feeding and means for crimping the warp strands, a heddle, mechanism for feeding weft strands to the warp strands, means for laterally shifting the weft strands into engagement with the crimps of the warp strands, and means for twisting the ends of the weft strands around the edge warp strands.

4. In an apparatus of the character described, the combination of mechanism for feeding and means for crimping the warp strands, a heddle, mechanism for crimping and feeding weft strands to the warp

strands, means for laterally shifting the weft strands into engagement with the crimps of the warp strands, and means for twisting the ends of the weft strands around the edge warp strands.

5. In an apparatus of the character described, the combination of a support, a twister head carried thereby, means for reciprocating the support so as to bring the twister head into and out of operative position, and means whereby the reciprocation of the support is adapted to cause a rotation of the twister head.

6. In an apparatus of the character described, the combination of a support, a twister head carried thereby, means for shifting the support so as to bring the twister head into and out of operative position, and means for rotating the twister head, comprising a toothed face carried by the support and adapted to mesh with a toothed face on the twister head.

7. In an apparatus of the character described, the combination of a support, a twister head carried thereby, means for rotating the twister head, means for advancing the head to operative position for a rotation thereof in one direction, and means for advancing the head to operative position in a reverse position for a rotation in an opposite direction.

8. In an apparatus of the character described, the combination of a support, a twister head carried thereby, means for rotating the twister head, means for shifting the support so as to bring the twister head into and out of operative position, and means for reversing the support so as to cause the twister head, after advancing to operate in one direction, to be reversed so as to cause it when again advanced to operate in an opposite direction.

9. In an apparatus of the character described, the combination of a support, a twister head carried thereby, means for shifting the support so as to bring the twister head into and out of operative position, means carried by the support whereby the twister head is caused to be operatively rotated when the support is caused to be advanced, and means for causing the support to be reversed intermittently whereby the twister head will be caused to be advanced to rotate alternately in opposite directions.

10. In an apparatus of the character described, the combination of a support, a twister head carried thereby, means for shifting the support so as to bring the twister head into and out of operative position, means for rotating the head, comprising a toothed face carried by the support and adapted to mesh with a toothed face carried by the twister head, and mean for reversing the support for a reversal of the

direction of the rotation of the twister head when caused to be rotated by the advance of the support.

11. In an apparatus of the character described, the combination of a support, a twister head carried thereby, means for shifting the support so as to bring the twister head into and out of operative position, means for rotating the twister head
5
10 when it has been caused to be brought to

operative position, and means for preventing displacement of the longitudinal strand when the twister head has been caused to be brought into engagement therewith.

In testimony whereof, I have hereunto set
my hand.

HENRY ROBERTS.

Witnesses:

M. ARTHUR KELLER,
M. A. BARTH.