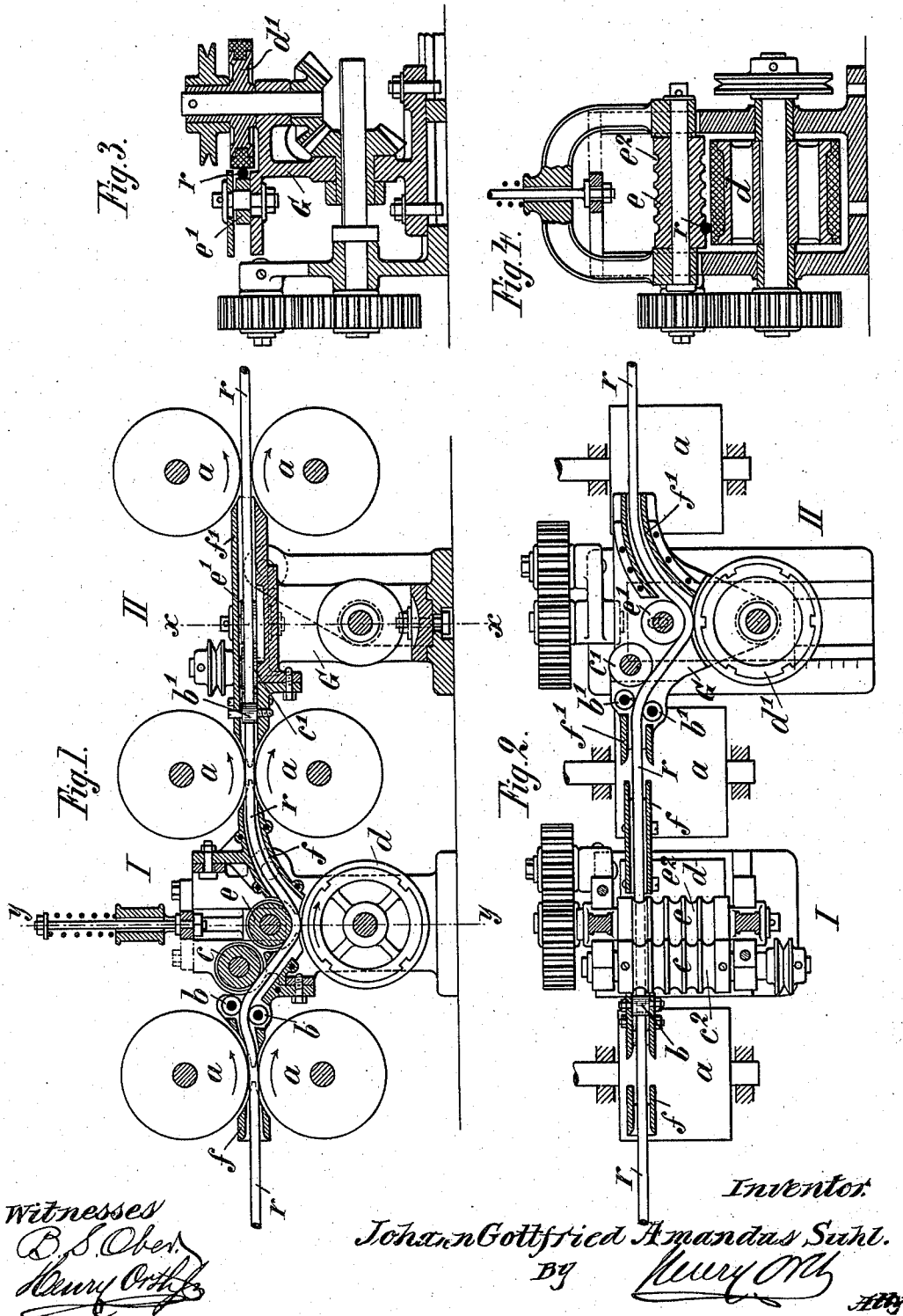


(No Model.)

J. G. A. SUHL.
APPARATUS FOR TREATING RATAN.

No. 576,237.

Patented Feb. 2, 1897.



UNITED STATES PATENT OFFICE.

JOHANN GOTTFRIED AMANDUS SUHL, OF HARBURG-ON-THE-ELBE, GERMANY, ASSIGNOR TO THE FIRM OF H. C. MEYER, JR., OF SAME PLACE.

APPARATUS FOR TREATING RATAN.

SPECIFICATION forming part of Letters Patent No. 576,237, dated February 2, 1897.

Application filed July 16, 1895. Serial No. 556,185. (No model.)

To all whom it may concern:

Be it known that I, JOHANN GOTTFRIED AMANDUS SUHL, a subject of the Emperor of Germany, residing at Harburg-on-the-Elbe, in the Province of Hanover, Germany, have invented certain new and useful Improvements in Apparatus for Treating Ratan, of which the following is a specification.

My invention has relation to ratan-machines, and particularly to means for removing the surface enamel or silex from the ratan, as will now be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation, Fig. 2 a sectional plan view, and Figs. 3 and 4 vertical transverse sections taken, respectively, on lines *x x* and *y y* of Fig. 1, of a machine embodying my invention.

Broadly speaking, the machine consists, essentially, of a plurality of pairs of what I may term "breaking-rolls," inasmuch as their function is to break up the enamel or silex on the ratan and cause it to drop off after such enamel has been cracked by bending the ratan, and for conciseness I will hereinafter refer to these rolls as the "breaking-rolls," the successive pairs of which are arranged to alternately revolve on horizontal and vertical axes and so that the nips of said rolls will lie in different planes. With these breaking-rolls I combine feed-rolls, preferably a pair of such on each side of said breaking-rolls, the nips of said feed-rolls lying substantially in the same plane; also suitable guides to guide the ratan from the feed to the breaking rolls, and vice versa. The guides on the feed side of the breaking-rolls consist, preferably, of a pair of drawing-rolls having their nip in a different plane from that of the nip of the feed-rolls and of what I may term a "deflecting-roll" interposed between said drawing-rolls and the breaking-rolls, that deflects the ratan from the plane of the nip of the drawing-rolls into the plane of the nip of said breaking-rolls.

It will be readily understood that in a machine constructed as described the ratan undergoes a series of bending operations in directions at or substantially at right angles to

one another, said bending operations taking place alternately in opposite directions, whereby the enamel or silex is thoroughly cracked and is broken up by the action chiefly of the breaking-rolls, the latter rolls, together with the drawing and deflecting or bending rolls, constituting a group of rolls.

With the above-described machine elements I combine other improvements, which will be hereinafter referred to.

The operative elements of the machine are mounted on a suitable frame, and in the drawings *e d* and *e' d'* indicate two pairs of breaking-rolls, of which there may be any desired number, arranged successively, each pair being composed of a larger roller *d* and *d'*, preferably covered with a flexible material *d²*, as soft rubber, and a smaller roller *e* and *e'*. The rolls *e* and *d* are arranged to revolve on horizontal axes and the rolls *e'* and *d'* on vertical axes, the location of the latter relatively to those of the former being such that the nip of the rolls *e'* and *d'* will lie in a different plane from that of the nip of the rolls *e d*, as clearly shown in Fig. 2. In practice and for the purpose of utilizing the entire surface of the covered roll *d* of group I all of the rolls of said group are of the same length, the smaller or pressure roller *e* being provided with a series of peripheral grooves *e²* for the passage of the ratan, any well-known means being provided to hold the smaller rolls *e e'* to their work under the desired pressure, this being also the case with one of the drawing and feed rolls of each pair of such hereinafter to be described.

It is obvious that when the covering of the bed-roll *d* becomes worn by the friction of ratans passed through the groove at one end of the pressure-roll *e* the next succeeding groove can be used, and so on until the entire covering of the bed-roll *d* is worn.

In order that the distance between the planes of the nips of the two groups of rolls may be maintained as the successive grooves of the roll *e* are used, I mount the rolls *d* and *d'* in a stand *G*, adapted to slide laterally on the framing, on which stand I also mount the drawing and deflecting rolls and the guides hereinafter referred to, so that the whole may

be shifted in accordance with the shifting of the point at which the ratan is passed between the rolls *e d*. On the feed side of each pair of rolls is arranged a pair of drawing-rolls *b b* and *b' b'*, respectively, and an intermediate deflecting or bending roller *c* and *c'*, respectively, which together constitute a group of rolls marked I and II, Figs. 1 and 2. On opposite sides of each group of rolls I provide suitable guides *f f* and *f' f'*, of such form as to guide the ratan from a normal plane to the drawing-rolls of a group and from the breaking-rolls back into such normal plane, namely, the plane of the nip of the feed-rolls. As shown in Fig. 1, there is a pair of these rolls on the feed side of group I and on the delivery side of group II, the latter acting as delivery-rolls when but two groups of such are used. In practice, however, I also arrange a pair of feed-rolls between the two groups of such, as shown in said Fig. 1, all the feed-rolls being indicated by the letter *a*, and they are arranged with their nips in substantially the same horizontal plane, so that the ratan *r*, entering the machine at the left, for instance, will first pass out of the aforesaid horizontal plane in an upward direction between the small drawing-rolls *b b*, when it will receive a sharp or abrupt bend, after which said ratan will be deflected downwardly by the deflecting-roller *c* to the nip of the breaking-rolls *e d*, where such ratan is again bent and the cracked enamel or silex broken up. From the breaking-rolls *e d* the ratan *r* will pass through the right-hand guide *f* in an upward direction to the nip of the intermediate feed-rolls *a a*, thence to the drawing-rolls *b' b'* of the second group of rolls, where such ratan will again be sharply bent, after which the ratan is deflected laterally by the roller *c'* to the nip of the breaking-rolls *e' d'*, and from the latter the ratan will be guided in an opposite direction back into the normal plane of feed to the feed or delivery rolls *a a*, as the case may be, at the right-hand side of the machine.

Inasmuch as the rolls of the second group are mounted on vertical axes the ratan will first be operated upon on two sides simultaneously by the first group of rolls and then upon the opposite two sides by the second group of rolls, whereby the enamel is more effectually and rapidly broken up and removed than would be the case if the ratan were first passed through a series of rolls arranged zig-zag fashion and revolving on horizontal axes and then through a like series of rolls revolving on vertical axes, as will be readily understood.

To properly deflect the ratans to the successive grooves of pressure-roll *e*, the deflecting-roll *c* is also provided with peripheral grooves *c²* in register with the grooves *e²* of said roll *e*.

The guides on the opposite sides of group I are adjustable independently in the plane

of the axes of rotation of the rolls of said group, while the corresponding guides for the group II are, as above stated, secured to the adjustable stand *G*, and are consequently adjusted with the rolls of group II.

The rolls of the groups of such, as well as the feed-rolls, are driven by any suitable driving-gearing. Thus, for instance, the breaking-rolls of each group can be geared together, as shown, the shaft of the bed-rolls having a belt-pulley secured thereto, driven from any suitable prime motor, which also drives the feed-rolls, while the drawing-rolls *b b b'* and the deflecting-rolls *c c'* are driven by friction.

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

1. In a ratan-machine, mechanism for removing the silex from ratan, comprising a plurality of pairs of breaking-rolls contiguous pairs of such revoluble on horizontal and vertical axes respectively and having their nips in different planes, in combination with feed and delivery rolls having their nips substantially in the plane of the nip of the vertically-arranged rolls, for the purpose set forth.

2. In a ratan-machine, mechanism for removing the silex from ratan, comprising a plurality of groups of rolls, each composed of a pair of drawing and a pair of breaking rolls having their nips in different planes, and an intermediate deflecting-roll, the rolls of the contiguous groups revolving on horizontal and vertical axes respectively and having their nips in different planes, for the purpose set forth.

3. In a ratan-machine, mechanism for removing the silex from ratan comprising a plurality of pairs of breaking-rolls contiguous pairs of such revoluble on horizontal and vertical axes respectively, each alternate pair of rolls adapted to be shifted relatively to the preceding or succeeding pairs of rolls, for the purpose set forth.

4. In a ratan-machine, mechanism for removing the silex from ratan, comprising a plurality of sets of breaking-rolls revoluble on horizontal and vertical axes alternately, each alternate pair of such rolls composed of a pressure-roll provided with a series of peripheral grooves and a bed-roll covered with a yielding or elastic material, the intermediate pairs of rolls composed of plain-surfaced rolls, said intermediate rolls adjustable jointly in a plane at right angles to their axes of rotation, for the purpose set forth.

5. In a ratan-machine, mechanism for removing the silex from ratan, comprising a plurality of sets of breaking-rolls revoluble on horizontal and vertical axes alternately, each alternate pair of such rolls composed of a pressure-roll provided with a series of peripheral grooves and a bed-roll covered with a yielding or elastic material, the intermediate pairs of rolls composed of plain-surfaced rolls, said intermediate rolls adjustable jointly in a

plane at right angles to their axes of rotation for the purpose of varying the distance between the plane of the nip of said intermediate rolls and the plane of the nips of the preceding or succeeding rolls; in combination with feed and delivery rolls revoluble on horizontal axes and having their nip in substantially the same plane, for the purpose set forth.

6. In a ratan-machine, mechanism for removing the silex from ratan, comprising a plurality of sets of breaking-rolls revoluble on horizontal and vertical axes alternately, each alternate pair of such rolls composed of a pressure-roll provided with a series of peripheral grooves and a bed-roll covered with a yielding or elastic material, the intermediate pairs of rolls composed of plain-surfaced rolls, said intermediate rolls adjustable relatively to the preceding or succeeding pairs of rolls jointly in a plane at right angles to their axes of rotation; in combination with feed and delivery rolls revoluble on horizontal axes and having their nip in substantially the same plane but in a plane different from that of the breaking-rolls, and suitable guiding devices for guiding the ratan to the different sets of rolls, for the purpose set forth.

7. In a ratan-machine, mechanism for removing the silex from ratan, comprising at least two groups of rolls one of which is composed of a pair of breaking-rolls consisting of a pressure-roll provided with a series of peripheral grooves, a cooperating bed-roll covered with a yielding or elastic material, a pair of drawing-rolls on the feed side of the breaking-rolls and an intermediate deflecting-roll also provided with a series of peripheral grooves corresponding with those in the aforesaid pressure-roll, all of said rolls revoluble on horizontal axes, the second group composed of similar but plain-faced rolls all revoluble on vertical axes, said second group of rolls adjustable in the plane of the axis of rotation of the rolls of the first group, for the purpose set forth.

8. In a ratan-machine, mechanism for removing the silex from ratan, comprising at least two groups of rolls one of which is composed of a pair of breaking-rolls consisting of a pressure-roll provided with a series of peripheral grooves, a cooperating bed-roll covered with a yielding or elastic material, a pair of drawing-rolls on the feed side of the breaking-rolls and an intermediate deflecting-roll also provided with a series of peripheral grooves corresponding with those in the aforesaid pressure-roll, all of said rolls revoluble on horizontal axes, the second group composed of similar but plain-faced rolls all revoluble on vertical axes, said second group of rolls adjustable in the plane of the axis of rotation of the rolls of the first group; in combination with a pair of feed-rolls on the feed side of the first group, a pair of delivery-rolls on the delivery side of the second group, said feed-rolls of the same length as the rolls of

the first group and revoluble on horizontal axes with their nip in substantially the same plane, for the purpose set forth.

9. In a ratan-machine, mechanism for removing the silex from ratan, comprising at least two groups of rolls each composed of a pair of breaking-rolls consisting of a pressure-roll provided with a series of peripheral grooves and a cooperative bed-roll covered with a yielding or elastic material, a pair of drawing-rolls on the feed side of said breaking-rolls, an intermediate deflecting-roll also provided with a series of peripheral grooves corresponding with those in the aforesaid pressure-roll, all of said rolls revoluble on horizontal axes, and a guide for the ratan on the feed and delivery side of said group, said guides adjustable in the plane of the axis of rotation of said rolls, the second group composed of similar but plain-faced rolls revoluble on vertical axes, and a guide on the feed and delivery side of said second group of rolls, the latter together with its guides adjustable in the plane of the axis of rotation of the rolls of the first group, for the purpose set forth.

10. In a ratan-machine, mechanism for removing the silex from ratan comprising at least two groups of rolls each composed of a pair of breaking-rolls consisting of a pressure-roll provided with a series of peripheral grooves and a cooperative bed-roll covered with a yielding or elastic material, a pair of drawing-rolls on the feed side of said breaking-rolls, an intermediate deflecting-roll also provided with a series of peripheral grooves corresponding with those in the aforesaid pressure-roll, all of said rolls revoluble on horizontal axes, and a guide for the ratan on the feed and delivery side of said group, said guides adjustable in the plane of the axis of rotation of said rolls, the second group composed of similar but plain-faced rolls revoluble on vertical axes, and a guide on the feed and delivery side of said second group of rolls, the latter together with its guides adjustable in the plane of the axis of rotation of the rolls of the first group; in combination with feed-rolls of the same length as those of the first group, one pair of feed-rolls on the feed and delivery side of each group, said feed-rolls revoluble on horizontal axes with their nip in substantially the same plane, for the purpose set forth.

11. In a ratan-machine, mechanism for removing the silex from ratan, comprising at least two groups of rolls each composed of a pair of breaking-rolls consisting of a pressure-roll provided with a series of peripheral grooves and a cooperative bed-roll covered with a yielding or elastic material, a pair of drawing-rolls on the feed side of said breaking-rolls, an intermediate deflecting-roll also provided with a series of peripheral grooves corresponding with those in the aforesaid pressure-roll, all of said rolls revoluble on

horizontal axes, and a guide for the ratan on
the feed and delivery side of said group, said
guides adjustable in the plane of the axis of
rotation of said rolls, the second group com-
5 posed of similar but plain-faced rolls revolu-
ble on vertical axes, and a guide on the feed
and delivery side of said second group of rolls,
the latter together with its guides adjustable
in the plane of the axis of rotation of the rolls
10 of the first group; in combination with feed-
rolls of the same length as those of the first
group, one pair of feed-rolls on the feed and
delivery side of each group, said feed-rolls

revoluble on horizontal axes with their nip in
substantially the same plane but in a plane 15
different from that of the rolls in either group
of such, for the purpose set forth.

In testimony that I claim the foregoing as
my invention I have signed my name, in pres-
ence of two witnesses, this 2d day of July, 20
1895.

JOHANN GOTTFRIED AMANDUS SUHL.

Witnesses:

ALEXANDER SPECKE,
JULIUS STRICKENBERRY.