Aug. 14, 1923. 1,464,820

E. H. HEINRICH

SWINGING NIPPERS IN FLAT COMBING MACHINES

Filed Jan. 27, 1923 3 Sheets-Sheet 1

Fig. 1.

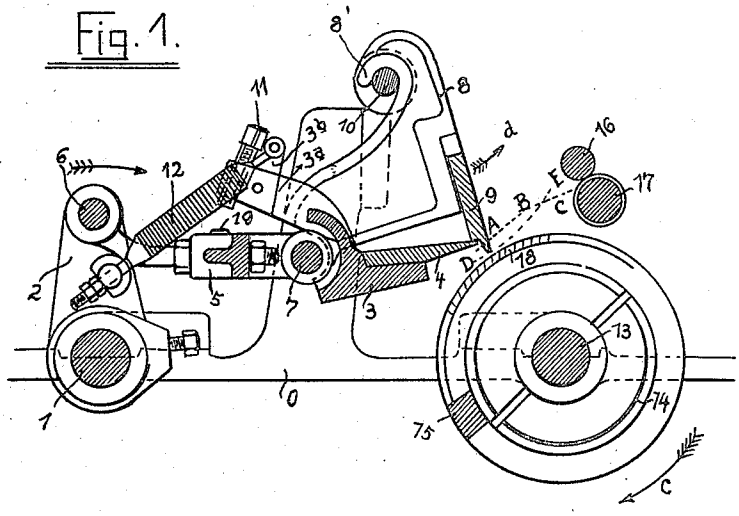
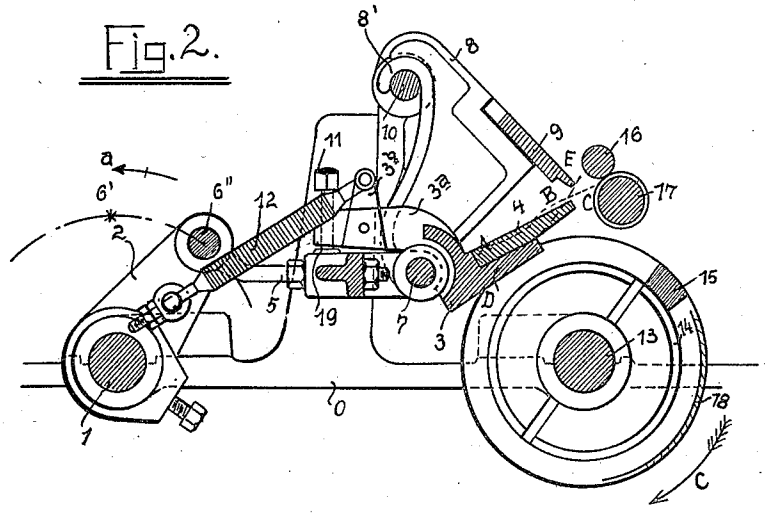



Fig. 2.




Inventor:
E. H. Heinrich
by: Herbert S. Ry
Attorney.

Aug. 14, 1923. 1,464,820

E. H. HEINRICH

SWINGING NIPPERS IN FLAT COMBING MACHINES

Filed Jan. 27, 1923 3 Sheets-Sheet 2

Fig. 3.

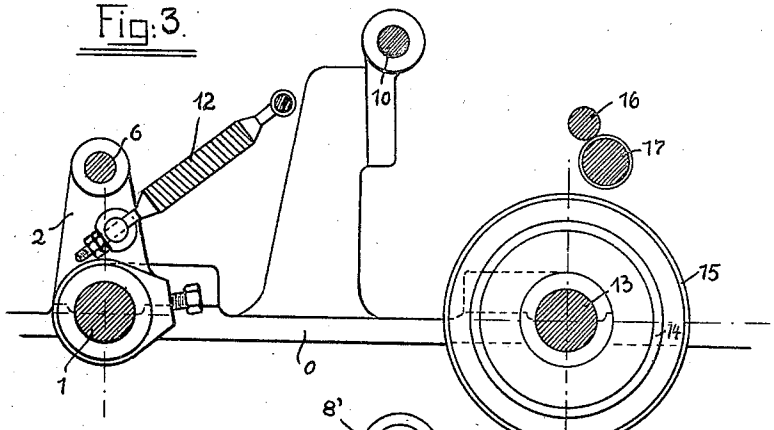



Fig. 4.

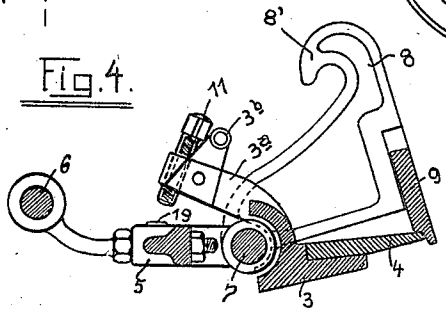



Fig. 5a

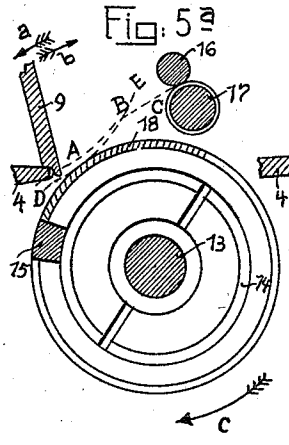



Fig. 5b

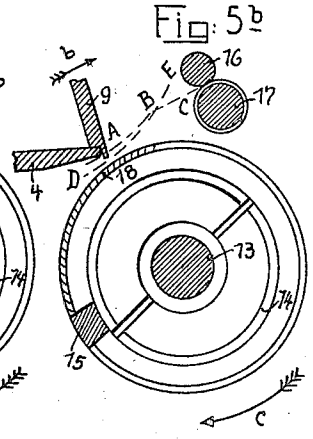
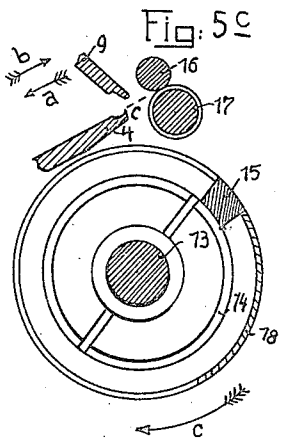



Fig. 5c




Inventor.
E. H. Heinrich
by: Hebert S. Ry.
Attorney.

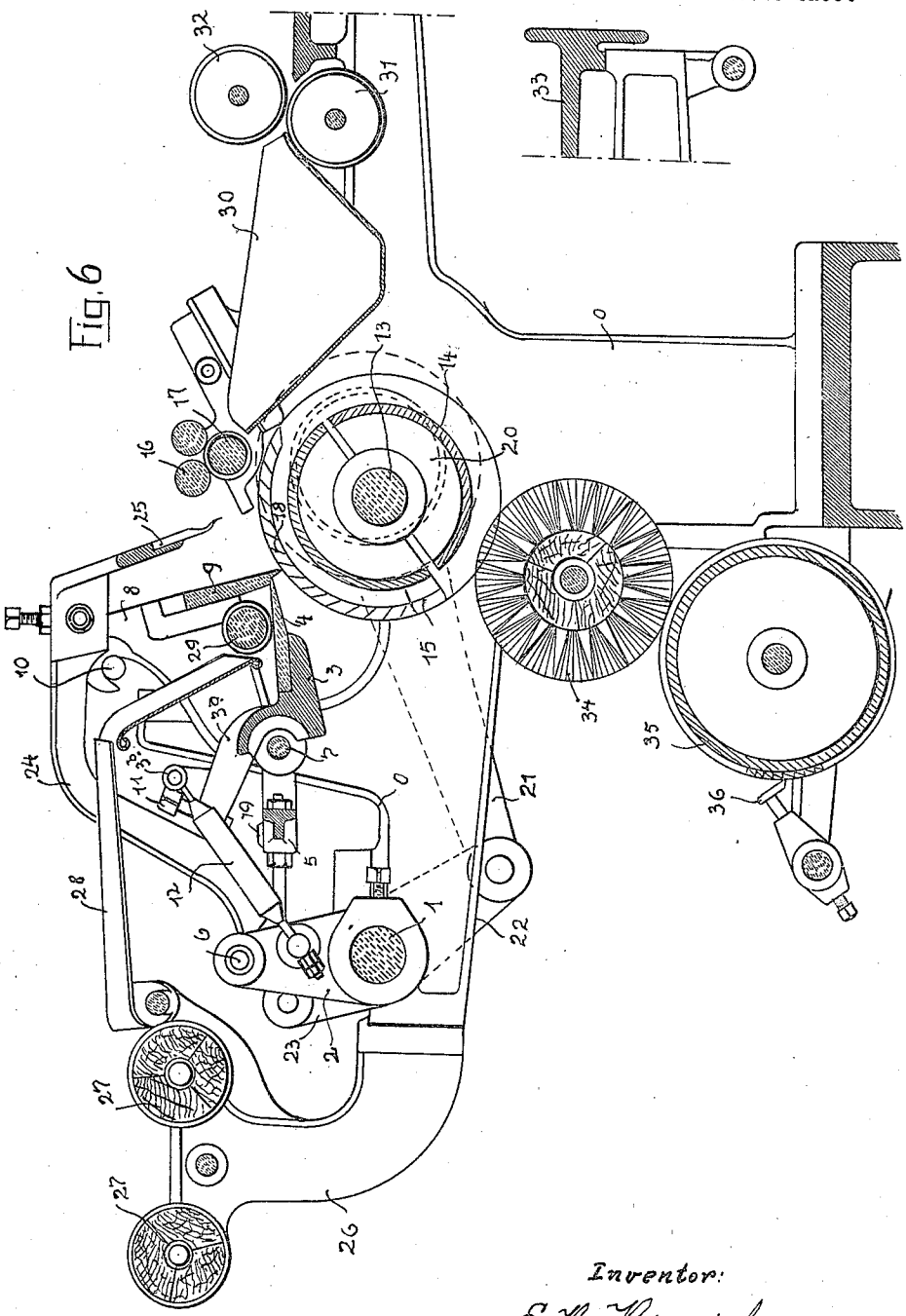
Aug. 14, 1923. 1,464,820

E. H. HEINRICH

SWINGING NIPPERS IN FLAT COMBING MACHINES

Filed Jan. 27, 1923 3 Sheets-Sheet 3

Fig. 6




Inventor:
E. H. Heinrich
by Howson & Howson
Attorney.

Patented Aug. 14, 1923. 1,464,820

# UNITED STATES PATENT OFFICE.

ERNST HERMANN HEINRICH, OF CHEMNITZ, GERMANY.

## SWINGING NIPPERS IN FLAT COMBING MACHINES.

Application filed January 27, 1923. Serial No. 615,339.

*To all whom it may concern:*

Be it known that I, ERNST HERMANN HEINRICH, a citizen of the German Republic, and a resident of Chemnitz, Germany, have invented certain new and useful Improvements in Swinging Nippers in Flat Combing Machines, of which the following is a specification.

A disadvantage of the known flat combing machines with swinging nipper in regard to the operation and arrangement of the machine is, that the nipper can only be removed from the machine after a large number of parts has been loosened and further that the forward and rearward movement as well as the opening and closing of the nipper can be effected only by means of setting in motion a rather large number of levers or the like.

The purpose of my invention is to reduce this number of parts, which are necessary for the starting as well as for the closing of the nipper, and further to improve the arrangement or construction of the machine and to facilitate the operation of the same.

A special novel feature is considered the arrangement and the construction of the lower nipper jaw as a double lever, which enters into engagement with the connecting rod of the oscillating lever at the forward oscillating movement of the nipper, whereby the opening and closing of the nipper mouth is effected.

A further novel feature is, that the suspension bearing of the nipper is shaped hooklike; thereby it is possible to remove the nipper from the machine in the most simple manner by loosening a single screw and disengaging a spring without causing an alteration of the adjustment of the nipper.

In the accompanying drawing—

Fig. 1 shows the suspended nipper with closed nipper mouth during the combing operation and in the moment of the return movement towards the detaching rollers (direction of the arrows *b* and *d*).

Fig. 2 shows the same nipper with opened mouth at the end of the forward movement or of the detaching operation at the beginning of the rearward movement of the nipper (direction of the arrow *a*).

Fig. 3 shows the respective part of the machine after the nipper has been removed.

Fig. 4 shows the nipper alone after its removal from the machine.

Fig. $5^a$–$5^c$ show three different positions of the nipper, less important parts (primary comb, feeding device and the like being omitted). In Fig. $5^a$ the nipper mouth is shown in the position in which it is beginning to oscillate forwardly (arrow *b*), in Fig. $5^b$ in its lowest position in regard to the needle-segment of the combing drum adjacent to the tangentially contacting point of the nipper and the needles, and Fig. $5^c$ shows the nipper approximately at the end of the forward or at the beginning of the rearward movement respectively (arrow *a*). The direction of movement of the drum is indicated by the arrow *c*, while the curves described by each of both nipper jaws respectively are indicated by the dotted lines DE or ABC.

Fig. 6 illustrates in cross-sectional view the head of a combing machine and shows the relation of the subject matter of the invention to the remaining parts of the machine.

On the shaft 13 of the combing drum an eccentric 20 is secured (Fig. 6), to which the eccentric rod 21 is attached, which in its return is pivotally connected to the lever 22. The latter is rigidly secured by means of a screw to the oscillating shaft 1 of the nipper. On said shaft are further secured by means of screws the levers 23 (Figs. 2 and 6), to which are pivotally connected the levers 24, supporting the primary comb 25. The oscillating upper shaft 1 carries further the rigidly secured lever 2, (Figs. 1 and 2) in the outer end of which the bolt 6 is mounted. On this bolt the rod 5 is loosely mounted, the outer end of which is pivotally connected to the shaft 7 of the nipper. This shaft 7 is mounted in the upper nipper arm 8 having a bearing 8′ and supports rotatably the lower nipper arm 3 which is constructed as a double lever by the aid of its extension member $3^a$.

The upper nipper arm 8 can oscillate around the shaft 19 of the frame O, so that the whole nipper is suspended in such a manner as to be freely movable in the machine.

In order to make it possible to remove the nipper arm 8, its bearing 8′ is shaped hooklike according to the invention, so that the nipper itself can be suspended from the shaft 10. To the upper arm 8 are secured the upper jaws 9 and to the lower arm 3 the lower jaws 4. The lower arm 3 has two further extensions $3^a$ and $3^b$. To $3^a$ is secured the

set-and stop-screw 11 and to $3^b$ is pivotally connected the spring 12 which serves to press together the jaws 4 and 9; the other end of said spring is pivotally and adjustably connected to the lever 2. On the shaft 13 is mounted the combing drum 14 with the needle segment 18 and the carding rail 15. Below the combing drum 14 (Fig. 6) the brush 34 is arranged and below said brush is mounted the doffer 35 with the doffer comb 36, while above the combing drum 14 in the known manner the detaching rollers 16, 17 are arranged. In front of the latter the fleece trough 30, the pair of doffing rollers 31, 32 and the table 33 are disposed.

Upon the lower nipper jaw 4 the feeding roller 29 is rotatably disposed and behind the same the pivotally arranged trough 28 and on the bracket 26 the bobbin rollers 27 are arranged.

The upper jaw 9 (Figs. 1, 2, $5^a$) describes during its oscillating movement the circular course DE and the lower jaw the broken course ABC. Approximately at the breaking point B the nipper mouth opens, until the point C is reached.

The removal of the nipper (Figs. 3, 4) is effected in the most simple manner, by lifting the spring 12 out of the extension $3^b$ and by withdrawing the bolt 6. By this operation the nipper is entirely released from any connection with the machine and can be removed at once from its suspension point 10 without necessitating a readjustment, as the nipper remains a homogeneous entirety in itself, and as the screw 11, regulating the adjustment of the nipper mouth, is not dislocated thereby. The reattachment is achieved by placing the nipper again on the bolt 10, attaching the spring 12 to the extension $3^b$ and by inserting the bolt 6, so that the nipper immediately assumes its previous position.

The actuation of the nipper is as follows: The shaft 1 is oscillated forwardly and rearwardly in the usual manner by means of the eccentric 20, the eccentric rod 21 and the lever 22 around the axis of said shaft, so that the lever 2, mounted on the shaft 1, is also caused to oscillate and the bolt 6 which is mounted in the lever 2, describes the arc between the two points 6′ and 6″ (Fig. 2). By means of the connection of the rod 5 with the nipper shaft 6 the nipper is also caused to oscillate so that the whole nipper is oscillating around the suspension point 10. The jaw 9 of the upper arm 8 then describes the arc DE (Figs. 1 and 2) while the jaw 4 of the lower arm 3, which jaw is pressed by the spring 12 against the upper jaw 9 also makes this movement in accordance with the curve AC (direction of the arrow *d*), that is to say, parallel with the arc DE approximately up to the point B, which corresponds to the point, where the set screw 11 of the lower arm extension $3^a$ engages with the knob 19 of the draw rod 5, and accordingly is prevented from the further oscillating movement around the bolt 10 and is deviated from the circular course AB towards C. On account of this operation the combed pile tuft of the rolled band, passing from the bobbin rollers 27 over the trough 28 and between the feeding roller 29 and the lower jaw 4 or between the upper jaw 9 and the lower jaw 4 respectively comes into the reach of the detaching rollers 16, 17 and is detached by the same and is further conducted over the trough 30 by means of the doffing rollers 31, 32 and finally reaches the table 33 in the form of web. The longer or shorter fibers combed out from the pile tuft by means of the combing drum are transferred by means of the brush 34 to the doffer 35, from which they are removed in the form of loose fleece by the doffer comb 36.

In Fig. 1 the lever 2 or the nipper respectively occupies nearly its rearmost position, nearest to the needle segment, corresponding nearly to the position of Fig. $5^b$, and accordingly in the moment of the most intensive combing activity and is just going to further oscillate forwardly (direction of the arrow *d*). Accordingly the nipper proceeds slowly in the same direction as the combing drum 14, which rotates in the direction of the arrow *c*. When the nipper mouth has reached the point B, all needles have passed through the tuft. Meanwhile the stop-and set-screw 11 has descended on the knob 19 of the rod 5 and in the further oscillating moment, after having reached point B presses on this rod and prevents thereby the lower jaw 4 from participating in the circular movement around the bolt 10. As accordingly the upper jaw 9 maintains this movement (DE), the nipper mouth opens from B–C, so that the free hanging tuft is conducted to the pair of detaching rollers 16/17 and is slowly detached by the same (Figs. 2 and $5^c$), at the same time the spring 2 is somewhat relaxed.

That during this operation the not shown primary comb enters between the nipper and detaching rollers and performs a subsequent combing operation is known and is of no importance to this invention.

When the detaching operation is finished the nipper oscillates rearwardly in the direction of the arrow *a*, and closes at the point B, as the screw 11 disengages from the knob 10 and the spring 12 contracts again after the new tuft has been advanced by means of the (not shown) feeding device, which latter does not form a part of the subject matter of this invention. This tuft is clamped and slowly brought into reach of the meanwhile arriving first needles of the drum 14, the most intensive combing tak-

ing place at A (Figs. 1 and 5) and continuing up to the reversing point D (Fig. 5a) from which point all operations are repeated.

In case, the needles of the nipper are damaged in some way, the nipper can be easily and quickly removed from the machine as a whole in accordance with the invention and eventually damaged needles can be straightened within the machine contrary to the previous construction, in which the combing segment had to be removed. Further it is not necessary to change the adjustment of the nipper mouth.

Having now particularly described and ascertained the nature of this said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. A flat combing machine, comprising, in combination, a combing drum; nippers, the lower jaw of each of which is formed as a double lever, and which are suspended above said drum; a lever, and means for oscillating it; a rod connecting said lever with the nippers; detaching rollers; the free arm of each of said double levers being adapted to engage, at the forward movement towards said detaching rollers, said connecting rod in such a manner that the nipper mouth opens, and to be disengaged from said rod at the rearward movement of the said nippers, as set forth.

2. A flat combing machine, comprising, in combination, a combing drum; nippers, the lower jaw of each of which is formed as a double lever, and which are suspended above said drum; a lever, and means for oscillating it; a rod connecting said lever with the nippers; detaching rollers; the free arm of each of said double levers being adapted to engage, at the forward movement towards said detaching rollers, said connecting rod in such a manner that the nipper mouth opens, and to be disengaged from said rod at the rearward movement of the said nippers; and a set screw arranged on the free end of the lower jaw of each nipper and adapted to be adjusted relatively to the said connecting rod, as set forth.

3. A flat combing machine, comprising, in combination, a combing drum; nippers, the lower jaw of each of which is formed as a double lever, and which are suspended above said drum at their upper arms supporting their jaws; a lever, and means for oscillating it; a rod connecting said lever with the nippers; detaching rollers; the free arm of each of said double levers being adapted to engage, at the forward movement towards said detaching rollers, said connecting rod in such a manner that the nipper mouth opens, and to be disengaged from said rod at the rearward movement of the said nippers; and hook-shaped suspension bearings for said upper nipper arms, as set forth.

4. A flat combing machine, comprising, in combination, a combing drum; nippers, the lower jaw of each of which is formed as a double lever, and which are suspended above said drum at their upper arms supporting their jaws; a lever, and means for oscillating it; a rod connecting said lever with the nippers; detaching rollers; the free arm of each of said double levers being adapted to engage, at the forward movement towards said detaching rollers, said connecting rod in such a manner that the nipper mouth opens, and to be disengaged from said rod at the rearward movement of the said nippers; and a set screw arranged on the free end of the lower jaw of each nipper and adapted to be adjusted relatively to the said connecting rod, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ERNST HERMANN HEINRICH.

Witnesses:

JOSEPHE VON FESCHAN CROBE.