June 10, 1924. 1,497,306

N. SCHLUMBERGER

GILL BOX HAVING CROSSED FALLERS

Filed Aug. 27, 1919 2 Sheets-Sheet 1

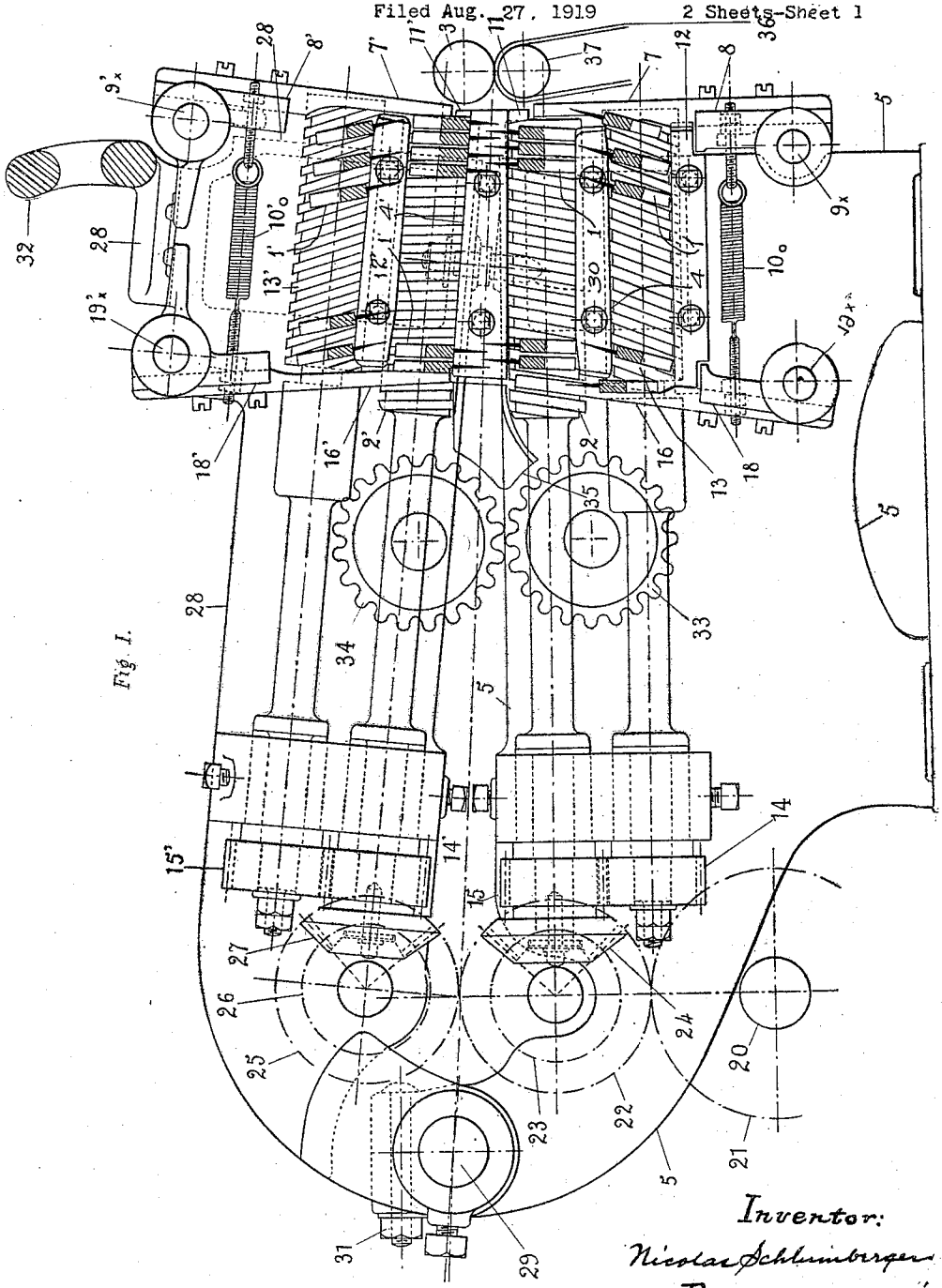


Fig. I.

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Fig. 2.

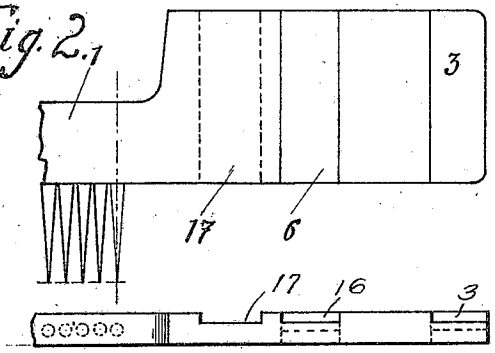


Fig. 4.

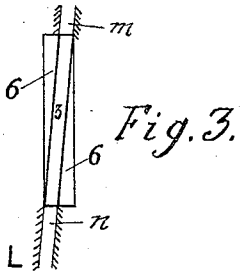
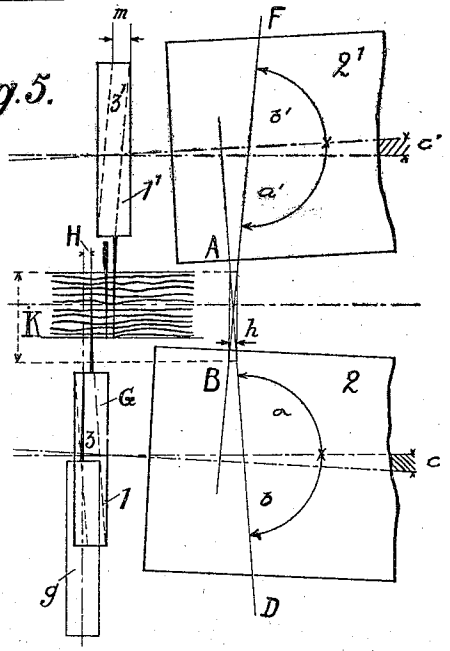


Fig. 3.

Fig. 5.



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Patented June 10, 1924. 1,497,306

UNITED STATES PATENT OFFICE.

NICOLAS SCHLUMBERGER, OF GUEBWILLER, FRANCE.

GILL BOX HAVING CROSSED FALLERS.

Application filed August 27, 1919. Serial No. 320,222.

To all whom it may concern:

Be it known that I, NICOLAS SCHLUMBERGER, citizen of the French Republic, residing at Guebwiller, Alsace, France, have invented certain new and useful Improvements in Gill Boxes Having Crossed Fallers, of which the following is a specification.

This invention has for its object to provide an improved gill box comprising crossed sets of gill bars or fallers working with gradual penetration, and the invention consists substantially in arranging the planes of the axes of the pairs of screws serving for moving the bars, to be inclined at an angle to the drawing plane.

It has already been proposed to employ for drawing textile fibres, crossed sets of gill bars or fallers whereof the planes constituted by the points of each set of gill needles are inclined to each other. In that arrangement the axes of the screws moving the fallers are parallel to each other and to the strick of fibres, and the gradual penetration of the needles in the said strick is effected by arranging the slideways of the fallers in such a manner as to enclose with the axes of the screws, angles corresponding to the extent of such penetration between the points of entrance and exit.

In that same arrangement since the faller at the end of its stroke, issues from the strick of fibres with a movement at right angles to the axis of the screw, the advance of its needles in the direction of the travel of the strick of fibres, is arrested, so that a certain retaining of material results, which causes irregularities in the draw of fibres. That arrangement has further the drawback that the heels of the fallers engaged in the screws are necessarily tapered upwardly and downwardly by reason of the limited thickness of the fallers due to the pitch of the screws. Consequently they are soon worn out by the blows which they receive from the hammers for the purpose of causing them to pass from their operative positions into the return screws, and vice versa.

In the improved gill box of the present invention the stroke of the foremost faller is not slowed down during the time that its needles are passing out of the strick of fibres. This advantage is gained by arranging the axes of the screws at a certain angle to the drawing plane. This arrangement has the further advantage of enabling the heels of the fallers to be made of the same thickness throughout their height.

In the accompanying drawings:—

Fig. 1 is a section of a constructional example of an improved apparatus according to this invention.

Figs. 2 and 3 are respectively a front view and a side view of a gill bar or faller.

Fig. 4 is a plan of the faller or bar shown in Figs. 2 and 3.

Fig. 5 illustrates the angles of exit of the fallers from the strick, and their positions in the improved apparatus of this invention.

The fallers 1 of the horizontally arranged lower set of fallers are moved by the forwardly travelling screws 2 with which their heels 3 (Figs. 2 and 3) mesh, along the slideways 4 (Fig. 1) that are fixed to the supporting frames 5. In their foremost positions the fallers 1 (Figs. 2 and 3) encounter with their grooves 6 the movable guides 7 (Fig. 1) fixed to arms 8 which are adapted to turn on a pin 9_x fixed in the frame 5, and are acted upon by a coiled spring 10^c. The fallers also have the usual side slots 17.

In order to prevent the faller from going beyond the screw 2 by reason of the pull of the fibres, the slideway 4 which is situated above the lower set of fallers, is provided with a stop 11. A hammer (not shown) on the end of screw 2, moves the faller 1 that has reached into its foremost position, downwardly on to the return slideways 12, by means of its heels 3 (Figs 2 and 3) in the coarse-pitched screw-thread 13 (Fig. 1) that is actuated by the toothed wheels 14, 15. An arrangement similar to the one employed for causing the fallers to pass from the forward screw 2 on to the return screw 13, serves to raise the fallers from the screw 13 on to the screw 2, when these fallers have reached the end of their stroke in the screw 13.

With this horizontal set of fallers there

cooperates a second set of fallers situated above the first, and comprising the same parts as the first or underneath set, the said parts being indicated by the same numerals followed by a tick mark (′). The main-shaft 20 drives the forward and return screws by means of toothed wheels 21, 22, 23, 24, 25, 26, 27.

The upper set of fallers and its component parts are mounted on a support 28, fixed by means of adjusting pins 30 in the frame 5 and clamping bolts 31 on the hinge pin 29. On undoing these bolts 31, the upper set of fallers can be raised by turning it on the hinge pin 29 by means of the handle 32, whereupon the lower set of fallers is rendered accessible.

The screws 21′ and 13′ of the upper set of fallers are arranged at an angle of about 6 degrees to the screw 2 and 13 of the lower set of fallers.

The machine is adapted to operate on wool, silk, cotton, ramie, hemp, linen, oakum, artificial silk, etc., and the strick of fibres is fed by the feed rollers 33, 34 and the vertically adjustable supporting plate 35, then passing through the needles of the fallers 1, 1′, it is conveyed to the outside by the rollers 37, 38 the lower one being furnished with a conveying belt 36.

Each faller engages by its heel 3 in the thread of the screw and when it reaches its extreme position G and striking the front guide begins its upward travel for a vertical height equal to the distance K (Fig. 4) it would, if this front guide were rigid and at right angles to the screw, descend vertically and, while doing so, diminish its distance from the following faller, as the latter would simultaneously be moved forward by the lead of the screw through a horizontal distance expressed by h. This, of course, is only part of the distance through which a complete revolution of the screw moves its fallers and this movement is accomplished within approximately $\frac{1}{6}$ of a revolution. If, however, it is intended to keep the faller l during its descent at the same distance from the next one, it would have to be moved simultaneously by a cam or guide through a horizontal distance H, equal to h, until it reaches the position g. The resultant of these combined movements through K and H would go in a direction indicated by a line F B, which as indicated, forms an angle c with the pitch line of the thread of the upper screw. However, as the pitch lines of the two screws form supplementary angles b and a with their respective parallel axes, it may be said that the direction in which the faller should travel in order to keep the same distance from its follower deviates by an angle c from the theoretical direction which is the supplement of the pitch line. In their travel, the upper and lower fallers are guided by the sliding engagement of their heels in the threads of the screws with which they engage, as well as by the edges of the faller along the guiding surfaces L and r (see Fig. 3). The "play" between the heels of the fallers, which is found in prior devices, is obviated in this improved apparatus by the means now described.

By inclining the screws 2 and 2′ through an angle c relatively to the stick of fibres, the lines representing the pitch of the threads of the screws are so selected that the distance h equals H (see Fig. 4).

By forming in the ends of the fallers grooves 6 (Figs. 2 and 3) having the same inclination as the screw thread pitches represented in the drawing by the lines A D and B F a perfect guidance is obtained along the surfaces L and r (Fig. 3) which obviates the occurrence of excessive wear.

Owing to the inclination of the screws whilst retaining a vertical position of the faller, the heels 3 and 3′ engaged in the threads of the screws 2 and 2′ can be arranged at the desired inclination that allows the heel indicated by dotted lines to present to the blows of the hammer its entire thickness m (see Figs. 3 and 4) instead of the partial thickness of the old construction (Fig. 4), with a consequent diminution of wear of the fallers.

The improved apparatus has also the following other advantages:—

By lifting the support 28 about the pivot 29 by means of the screws 30, it is easy to vary the degree of penetration of the needles to suit any kind of fibres. Moreover, the lifting of the upper set of fallers facilitates the cleaning and maintenance of both sets.

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

1. A gill box having crossed sets of fallers, wherein the pair of screws of the upper set of fallers is inclined relatively to the pair of screws on the lower set.

2. A gill box having crossed sets of fallers, wherein all the parts of the upper set of fallers are mounted in supports capable of pivoting around a common centre so as to allow of adjusting the inclination of the upper set of fallers relatively to the lower set.

3. A gill box having crossed sets of fallers wherein the pair of screws of the upper set of fallers is inclined relatively to the pair of screws of the lower set, and all the parts of the upper set of fallers are mounted in supports capable of pivoting around a common centre so as to allow of adjusting the inclination of the upper set of fallers relatively to the lower set.

4. A gill box having crossed sets of fallers wherein the pairs of screws of the sets of

fallers on opposite sides of the fiber are disposed convergent relatively to one another in the direction of travel of the fibre.

5. A gill box having crossed sets of fallers wherein the pairs of screws of the sets of fallers on opposite sides of the fiber are disposed convergent relatively to one another in the direction of travel of the fibre, one pair of the screws being adjustable relatively to the other pair to vary the degree of convergence.

In testimony whereof I affix my signature.

NICOLAS SCHLUMBERGER.

Witnesses:

O. SCHLUM,

TURCKHEIM.