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METHOD AND APPARATUS FOR REGULATING THE WEIGHT OF THE LAPS PRODUCED BY THE SCUTCHER IN A SPINNING MILL

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Fig. 1

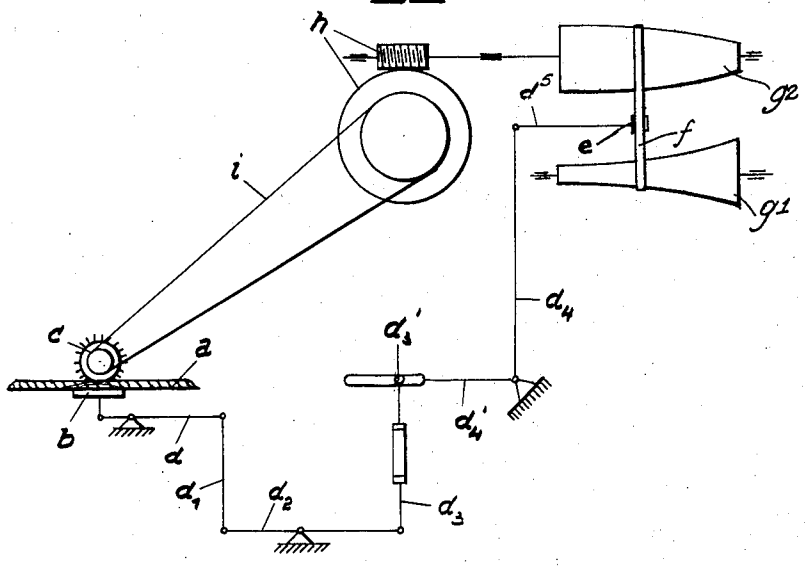


Fig. 2

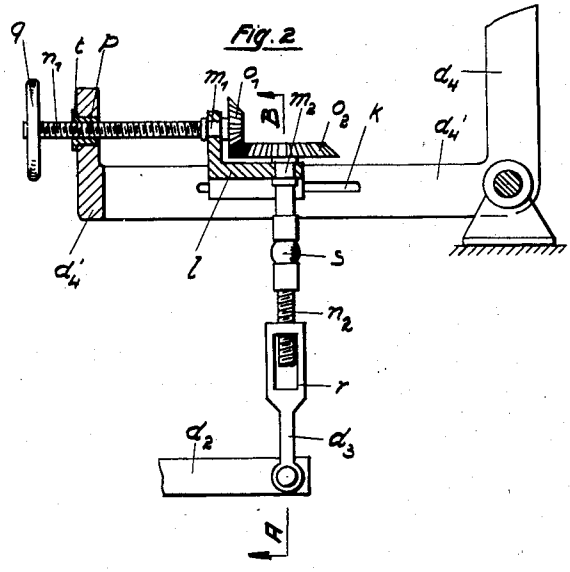
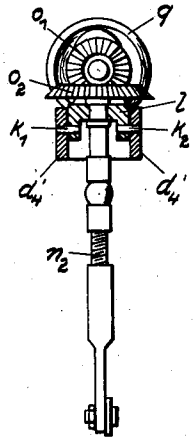


Fig. 3



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METHOD AND APPARATUS FOR REGULATING THE WEIGHT OF THE LAPS PRODUCED BY THE SCUTCHER IN A SPINNING MILL

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3 Claims. (Cl. 19—70)

This invention relates to scutchers and other machines for preparing cotton and other fibrous materials to which the cotton and the like to be treated is supplied by means of a feed roller. A uniform weight of the laps is an absolute necessity in every spinning mill, in order to be able to keep uniform in the further spinning operation the size of thread to which the spinning machine is set. In the known machines it has been endeavored to solve this problem by automatically changing the passage speed of the raw material band depending upon the thickness of the band by means of a belt change gear with double cone-shaped or hyperbolic belt drums. The known machines however do not enable the passage feed of the raw material band to be regulated in exact dependency upon its specific weight. The difference in the specific weight is due to the use of different raw materials, especially in the case of wool and cotton of different weights.

The present invention solves the problem in that, when changing the specific weight of the raw material, another initial position of the belt fork of the belt changing gear is set, which counteracts the changing the total weight of raw material running through the scutcher and caused by the alteration of the specific weight, and simultaneously such an alteration in the ratio of transmission of the adjusting mechanism actuating the belt fork is effected, that this alteration counter-acts the change in the ratio of transmission of the belt changing gear caused by the new initial position of the belt fork, and that therefore in the case of a changing of the band thickness the same total raw material weight will run through the machine per revolution in any case. The adjustment of the initial position of the belt fork is effected by changing the length of a link in the adjusting mechanism of the belt fork and the alteration in the ratio of transmission of the adjusting mechanism by shifting the point of engagement of this link on one of the levers actuated by it.

An embodiment of the invention is illustrated by way of example in the accompanying drawing in which

Fig. 1 is a diagrammatic view of the apparatus.
Fig. 2 is a side elevation of the adjustable parts.
Fig. 3 is a cross section on line A—B of Fig. 2.

In Fig. 1 the raw material band running through the scutcher is designated by a. It is guided in known manner over a series of juxtaposed plates and limited at the top by the guide roll c. By changing the thickness of the raw material band a passing through, a pressure of different strength is exerted on the plates b, which consequently perform a movement which is transmitted through the two armed lever d, link d_1, two armed lever d_2, link d_3, bell-crank lever d_4, link d_5 to the belt fork e which shifts the belt f on the two hyperbolic belt drums g_1 and g_2. The drum g_1 is driven by the scutcher and the drum g_2 rotates the feed roll c through the worm gear h and belt i. If the raw material band a passing through is thicker for some reason or other than would correspond to the prescribed lap weight, the belt f is shifted by the adjusting mechanism towards the left and consequently the speed of rotation of the feed roll c reduced to such an extent, that the product of band thickness and passage speed, that is the quantity fed, and with uniform specific weight of the raw material also the total weight fed, remains uniform according to the running speed of the machine. The profile lines of the double hyperbolic gear are curved according to this requirement. The arrangement above described is in itself known.

The adjustment by means of the known gear suffices as long as the specific weight of the raw material remains unchanged. This is however subject to various influences. Besides, the origin of the material, the temperature and moisture in the work room play an important part. If the specific weight changes, this must be compensated for. Such a compensation can be obtained by changing the length of the link d_3 or of any other link in the adjusting mechanism of the belt fork. If, for example, the specific weight becomes less great, the belt fork e can be shifted to the right by lengthening the link d_3, so that the passage speed of the raw material band a is increased. The changing of the length of the link can be done by judgment or according to calculation. This adjustment would fulfill its purpose, if the raw material band would always remain the same, which however is actually not the case. If in such an instance, however, the thickness of the raw material band also changes, an error in the gear is introduced by the previously performed adjustment of the belt fork. As result of the hyperbolic shape of the belt drum, when the initial position of the belt f has been displaced towards the right, a further shifting of the belt, owing to the alteration of the thickness of the band a, has a greater influence on the speed ratio than hitherto, when the initial position of the belt was situated more towards the left. This is due to the fact, that the hyperbola of the drum g_1 extends more steeply on the right than on the left. If therefore the thickness of the

band changes to a certain extent in the new initial position of the belt fork, the alteration in speed caused by the additional shifting of the belt is too great. The adjustment of the speed of rotation in direct dependency upon the weight of the raw material is practically impossible, because the adjusting forces available are too small owing to the light weight of the material.

This difficulty is overcome according to the invention, in that, simultaneously with an alteration of the length of the link d_3, one of the engagement points of this link with which it engages the corresponding lever is also displaced. If for example, with a material having a low specific weight, the link d_3 is lengthened, the upper engagement point d_3' of link d_3 is at the same time shifted outwardly, i. e. towards the left on the lower arm d_4' of the lever d_4. By lengthening the link d_3 the belt fork has been shifted towards the right, that is the ratio of transmission between the pulley g_1 and the drum g_2 is increased. By shifting the engagement point d_3' of the link d_3, however, the lever arm d_4' is lengthened, i. e. the ratio of transmission of the adjusting mechanism is reduced. Consequently, in the new initial position of the belt an alteration of the band thickness will only act to a smaller extent on the shifting of the belt fork.

In Figs. 2 and 3 the constructional details of the apparatus for carrying out the method are illustrated. The lever arm d_4' of the bell-crank lever d_4 is bifurcated, i. e. it consists of two parallel arms (see Fig. 3). In each arm an elongated slot k is formed, in which the pivot pins k_1 of a carriage l can slide. These pins k_1 represent the point of engagement of the link d_3 on the lever arm d_4'. The carriage l has two bearings m_1 and m_2 for two screw spindles n_1 and n_2, which are situated substantially at right angles the one to the other. At their free ends the screw spindles n_1 and n_2 are coupled by bevel wheels o_1 and o_2, or by some other suitable transmission device. The horizontal screw spindle n_1 moves in a nut p rigidly mounted in the lever arm d_4' and carries on its outer end a hand wheel q. By rotating this wheel the carriage l is shifted in the slots k. At the same time the rotation of the spindle n_1 is transmitted through the bevel wheels to the vertical spindle n_2, which rotates in the nut r of the link d_3 like a turn-buckle. Consequently the length of the link d_3 is changed at the same time. The necessary ratio of the horizontal to the vertical adjustment can be effected by suitably selecting the toothed wheels as also the pitch of the screw spindles. At a suitable point of the device a scale with pointer is arranged, in order to indicate the shifting of a movable part relative to a stationary part. The scale may have a division, which indicates different kinds of raw material or different specific weights. A ball joint s is preferably arranged at a suitable point in the link d_3, as the angle between the link d_3 and the lever d_4' changes. In order to be able to fix the adjusted position of the carriage and the spindles, a lock nut t is provided on one of the spindles, for example on the spindle n_1, through which the adjusted position is secured.

In order that the apparatus can be easily fitted on machines with levers and rods of different length, it is advisable, to provide a second possibility of altering the effective length of the link d_3 and the lever arm d_4', for example by a further extensible part with a slot and securing device, or by a turn-buckle with oppositely directed screw threads. The apparatus need only be once fitted to any machine to remain permanently. The apparatus can be provided in any link or links or also in one or several of the lever arms of the belt fork adjusting mechanism, provided it is possible to easily effect the simultaneous adjustment of both devices from a single point.

I claim;—

1. In an apparatus for regulating the weight of laps produced by a scutcher in a spinning mill the combination of two hyperbolic pulleys, comprising a driving pulley and a driven pulley, a belt on said pulleys, a guide roller above raw material adapted to regulate the quantity of material fed, driving means for said roller connected to said driving pulley, a lever system having an end element under the material adapted to allow same to yield downwardly according to the quantity of material fed and to transmit movement according to said yielding movement, a belt shifter on the other end of said lever system adapted to shift said belt on said pulleys according to the yielding movement of the material to regulate the speed of rotation of said guide roller according to the speed at which said driven pulley is driven by said driving pulley, and means connected up in said lever system adapted to positively and simultaneously adjust two elements of said lever system to regulate the displacement of said belt according to the hyperbolic shape of said pulleys.

2. An adjusting means for the lever system specified in claim 1, comprising in combination with the belt shifter and the lever system, an operating lever for the belt in said system having a longitudinal slot adapted to transmit movement to said belt shifter, a carriage shiftable on said operating lever guided in said slot, a rocker lever in said system, a link connecting one end of said rocker lever to said carriage, a screw spindle and nut in said link adapted to vary the length of said link, a screw spindle and nut on said operating lever engaging said carriage adapted to adjust the point of engagement of said lever on said operating link, and means for transmitting the movement of the spindle on said operating lever to the spindle in said link to effect a positive simultaneous adjustment of the two elements.

3. An adjusting means for the lever system specified in claim 1, comprising in combination with the belt shifter and the lever system, an operating lever for the belt in said system having a longitudinal slot adapted to transmit movement to said belt shifter, a carriage shiftable on said operating lever guided in said slot, a rocker lever in said system, a link connecting one end of said rocker lever to said carriage, a screw spindle and nut in said link adapted to vary the length of said link, a screw spindle and nut on said operating lever engaging said carriage adapted to adjust the point of engagement of said lever on said operating link, and a pair of intermeshing bevel wheels one on the end of each of said spindles adapted to transmit the movement of the spindle on said operating lever to the spindle in said link to simultaneously effect the adjustment of the point of engagement of said link on said operating lever and the length of said link.

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