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TOP SCREW FOR GILL DRAWING FRAMES.

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1,394,829. Patented Oct. 25, 1921.

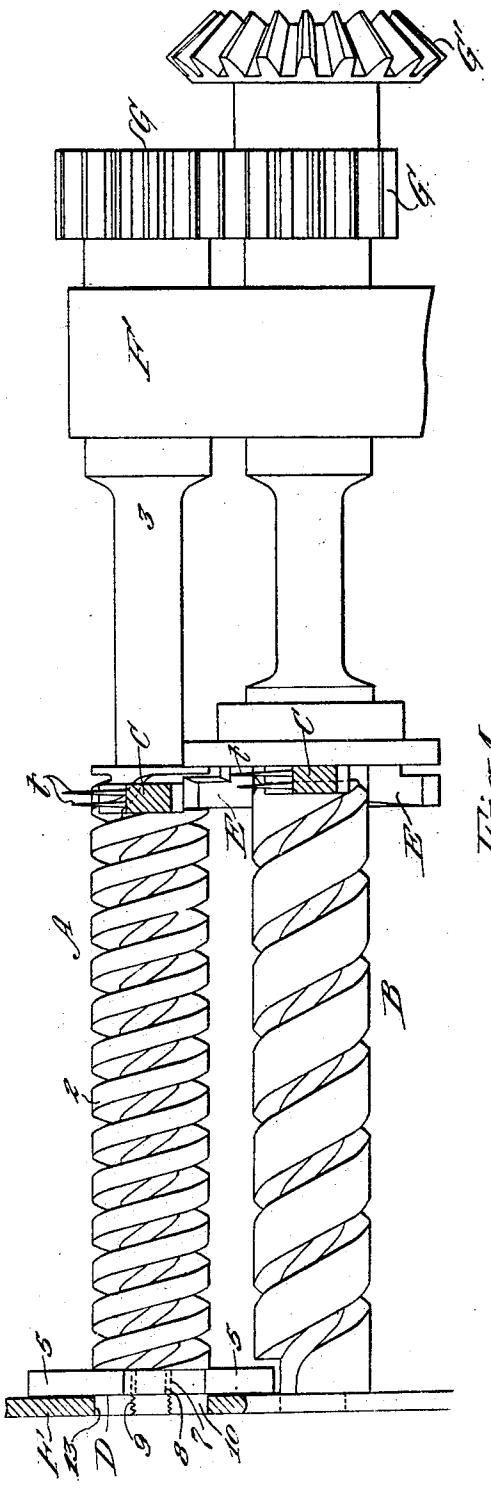


Fig. 1.

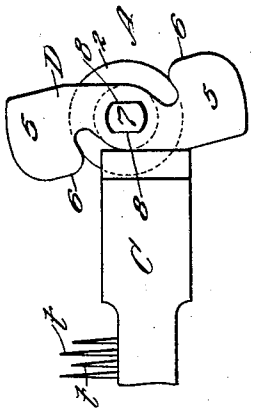


Fig. 4.



Fig. 3.

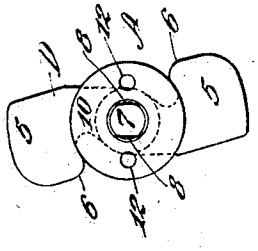


Fig. 2.

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TOP SCREW FOR GILL-DRAWING FRAMES.

1,394,829. Specification of Letters Patent. Patented Oct. 25, 1921.

Application filed May 23, 1921. Serial No. 471,677.

To all whom it may concern:

Be it known that I, WILLIE HOLDSWORTH, a citizen of the United States, residing at Providence, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Top Screws for Gill-Drawing Frames, of which the following is a specification.

My invention relates to gill-drawing frames and consists of improvements in the construction and arrangement of the top-screws therefor.

One object of the invention is to provide an improved means for mounting the faller-cam on the top-screw whereby its cam-faces will bear a definite relation to the threads of the screw; and whereof the cam may be easily removed and replaced by a new cam which will invariably assume the correct relation to the screw-threads without adjustment or fitting.

Another object of the invention is to provide an improved end-bearing for the top-screw, said bearing forming part of the fastening means which secures the faller-cam in place on the screw and being adapted to provide an enlarged bearing surface whereby to insure greater durability.

Further objects of the improvement are set forth in the following specification which describes a preferred embodiment of the invention as illustrated in the accompanying drawings. In the drawings:

Figure 1 is a side elevation of the top-screw of the gill-drawing frame, showing it mounted in its bearings in operative relation to the bottom-screw;

Fig. 2, an end-view of the top-screw showing the faller-cam mounted thereon and illustrating the manner in which it is secured in place by the bearing-member;

Fig. 3, a perspective view of the bearing-member which also serves as the fastening-means for the cam; and

Fig. 4, an end view of the top-screw showing the cam in place thereon and illustrating its relation to the faller-bar.

Referring to Fig. 1 of the drawings, the operating mechanism of the gill-drawing frame comprises, in general, two sets of top- and bottom-screws A and B (only one set being herein shown) arranged in opposite, parallel relation and adapted to traverse the gill-bars or fallers C back and forth in the machine. The faller-bars or combs C are supported to slide on horizontal guides or saddles, not herein shown, with their ends engaging the threads in the opposite screws to cause them to be traversed therefrom. The top-screws A propel the fallers C in one direction, and as they reach the end of their operative stroke they are carried down into engagement with the threads of the bottom-screws B, whereby they are traversed back in the opposite direction and then lifted and returned again to the top-screws. In this way a continuous movement is imparted to the fallers to pass them back and forth in horizontal paths at different levels. As the fallers C reach the end of the top-screws A they ride out of the screw-threads thereof and also slide off from the ends of the top-saddles. At this point they are operated upon by the faller-cams D at the ends of the top-screws A which come into contact with the bars to force them down into engagement with the bottom-screws B. The bars C are then returned to the opposite end of the bottom-screws B and as they ride out of the threads thereof another set of cams E, carried by the bottom-screws, act to lift them into position to engage their ends with the top-screws once more. The above described arrangement is common to practically all types of gill-drawing frames, one form of such a frame being described more fully in my prior U. S. Letters Patent No. 1,347,331, dated July 20, 1920.

Fig. 1 illustrates only one set of top- and bottom-screws, A and B, but it will be understood that these parts are duplicated on the opposite side of the machine; the faller-bars C being arranged to extend horizontally between the two opposite screws of each pair to engage their ends with the threads of the latter. As shown in Fig. 1, the top- and bottom-screws A and B are journaled in upright bearings F and F′ supported from the machine frame, and at one end they are connected rotatively by means of intermeshing spur-gears G—G. On the outer end of the bottom-screw B is a bevel-gear G′ through which both screws are driven from the main power-shaft of the machine, not herein shown. On one side of the machine both the top- and bottom-screws A—B have right-hand threads, as shown in Fig. 1, while the threads of the opposite set of screws, not herein illustrated, are left-handed. The top- and bottom-screws A—B

of each set are rotated in opposite directions, the arrangement being such that the fallers C will be traversed to the left, as viewed in Fig. 1, by the top-screws, and to the right by the bottom-screws. The fallers C consist of relatively narrow, flat bars having chamfered ends adapted to be received within the helical grooves of the threads of the screws A—B with the bars extending in horizontal relation therebetween. Intermediate their ends the bars C are cut away at top and bottom to reduce their width, and are studded along the upper edge with two rows of closely-spaced, sharpened pins or teeth *t* which form the comb for operating on the material passing through the gill-box or frame.

As before indicated, my present invention relates particularly to the top-screw A, its cam D, and the means for mounting the screw in its end-bearing. The screw A is usually constructed from a single length of rod or shaft having the enlarged square-threaded portion 2 at one end and the reduced shank portion 3 at the other. The threads of the screw are of double pitch or, in other words, there are two threads extending the length of the screw 2 and terminating at diametrically opposite points at its ends. The cam-member D is secured to the outer end of the screw 2 and consists essentially of a flat bar or plate having opposite radial arms 5 formed with projecting cam-faces 6 on their sides. Each of the cam-faces 6 functions in connection with its respective screw-thread to which it must bear a certain definite relation in order that it may properly engage the faller-bar as it emerges from the end of the thread-groove. Heretofore it has been the usual practice to provide a threaded stud or extension at the end of the screw 2 to adapt the cam D to be screwed onto it to seat against the screw. As before stated, the cam-faces 6 on the cam-member D must bear a certain definite relation to the points where the grooves of the screw-threads emerge at the end of the screw in order that the engagement of the cams with the faller-bars will be timed synchronously with the disengagement of the bars from the screw. That is to say, the cam-faces 6 must be brought into engagement with the tops of the faller-bars C, see Fig. 4, just as the latter slide out of the thread-grooves at the end of the screw. If this engagement is made too soon the bars will be jammed in the threads of the screw, resulting in straining or breaking the parts; while if the engagement is delayed the bars will not be carried down at the proper instant to enter the leading ends of the threads on the bottom-screws. It will thus be seen that the cam-member D must be set very accurately in relation to the screw-threads and where, as hertofore, its hub has been screwed onto the stud at the end of the screw it has been a very difficult matter to secure this exact correlation between the parts. That is to say, the thread on the stud must be started at a fixed point in relation to the end of the threads on the screw 2, and the thread in the bore of the cam D must also start at the proper point. In manufacturing the screws in quantity it has been found extremely difficult, in fact well nigh impossible, to obtain uniformity in the relation between the cams and the screw-threads. Each screw must have its cam fitted and adjusted separately, and when a cam becomes worn or broken in use it is impossible to replace it with a new cam without removing the screw from the machine and sending it back to the factory to fitted. In some cases attempts have been made to fit a new cam to the screw by filing off its face or by inserting shims or washers between its hub and the end of the screw, but such a practice does not produce satisfactory results. The cams are constructed of hardened steel and must be annealed before they can be filed or ground off, and after being so treated must be rehardened before being put into use again.

To overcome these disadvantages in the usual method of fastening the cams in place on the top-screws I have devised an improved means for attaching the cams as next described: As shown in Figs. 1 and 2, the outer end of the screw 2 is reduced in diameter to form a projecting stud 7 which has its opposite sides cut away or flattened at 8. The flat sides 8 of the stud 7 bear a definite relation to the ends of the thread-grooves in the screw 2 and the cam D is formed with an opening at its center having correspondnig flat sides to adapt the cam to fit over the stud and to be held from turning thereon. The outer end of the stud 7 is screw-threaded at 9 to adapt it to receive a collar or washer 10 having an internally threaded bore 11. The collar 10 is substantially as large in diameter as the screw 2 and is provided with openings or sockets 12 in its face for receiving the prongs of a wrench or spanner, by means of which it is screwed onto the stud 7. The collar 10 is adjustably snugly against the front face of the cam D to hold the latter against the end of the enlarged screw 2, and besides serving in this capacity to secure the cam in place it also provides an enlarged bearing-element at the end of the screw for mounting the latter in its outer bearing.

As shown in Fig. 1, the bearing-member or collar 10 is adapted to be received in a bore 13 in the vertical plate F which forms the end support for the top-screw. Owing to limitations in space the bearing-plate F is made relatively thin in cross-section so that

the bearing for the top-screw A cannot be extended axially to provide an adequate bearing surface beyond the end of the screw. However, by applying the enlarged collar 10 to the end of the top-screw and adapting it to serve as the bearing-element therefor I am enabled to materially increase the bearing surface whereby to provide against wear on both the bearing-member and the bore in which it turns. Furthermore, through this construction the faller-cam D may be set with its face abutting the side of the bearing-plate F so that the plate will act to guide the faller-bars down into the thread-grooves of the bottom-screw B after they emerge from the threads of the top-screw. The bearing-collar 10 is screwed onto the stud 7 in a direction opposite to the direction in which the screw rotates so that as the collar turns in the bore 12 there will be a tendency to tighten it in place against the side of the cam. This arrangement insures that the cam D will be held snugly against the end of the screw 2, without tendency to work loose and without danger of its becoming displaced from its proper relation to the threads of the screw.

It will be observed that my invention provides an extremely simple, efficient method of attaching the faller-cam in place on the top-screw while also furnishing an enlarged bearing for the end of the screw. By combining the fastening-means for the cam and the bearing-element for the screw in a single element I economize in space, whereby to allow for the use of a screw of maximum length between the bearings; while also providing for greater durability of the bearing surfaces, and a more rigid and substantial bearing support for the screw.

Moreover, my improved construction of the top-screw, its cam, and the bearing mounting are more economical to manufacture while being easier to install in the machine and more convenient to repair by replacement of worn or damaged parts.

Having now described my invention in its preferred embodiment, I claim:

1. An improved top-screw for gill-drawing frames comprising a shaft having screw-threads on its exterior with a stud projecting from the end thereof, said stud formed with flat sides arranged in definite predetermined angular relation to the terminals of the screw-threads, a faller-cam provided with a bore formed with flat sides fitted to the flats on the stud and having opposite cam-faces bearing a definite relation to the flats in its bore, and an enlarged collar secured to the end of the stud to hold the cam against the end of the screw, said collar adapted to serve as a bearing-element or trunnion for rotatively mounting the screw.

2. In a gill-drawing frame, the combination with the end-bearing member thereof, of a top-screw having screw-threads on its exterior and a stud projecting from its end, a faller-cam mounted on said stud to adapt it to turn with the screw, and an enlarged collar screwed onto the end of the stud to secure the cam against the end of the screw, said collar adapted to be received within a bore in the bearing-member to adapt the screw to turn therein.

In testimony whereof I affix my signature.

WILLIE HOLDSWORTH.