Dec. 17, 1935. A. CRAWFORD 2,024,911

JACK FOR KNITTING MACHINES

Filed Sept. 4, 1935

Fig. 1.

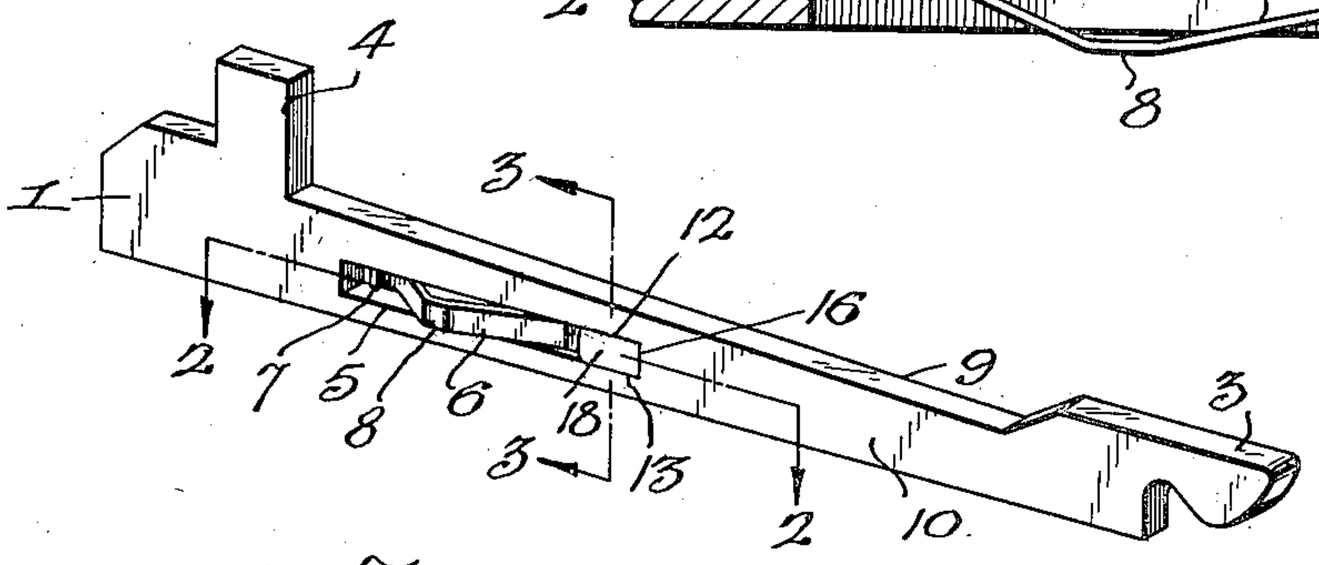


Fig. 2.



Fig. 3.

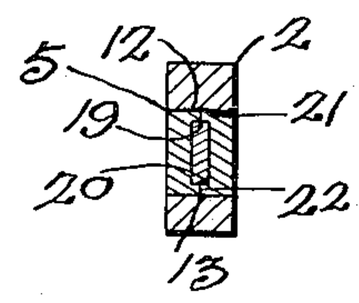


Fig. 7.

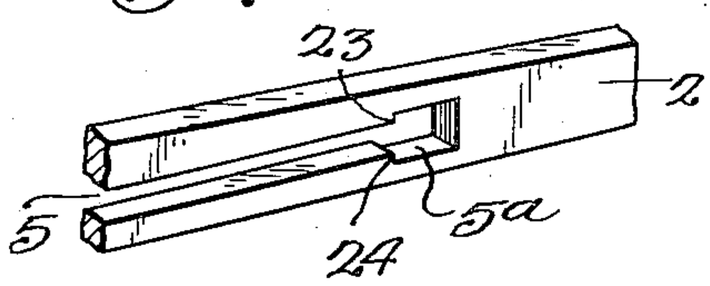


Fig. 5.

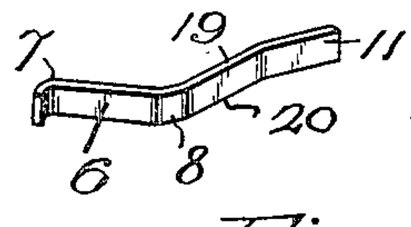


Fig. 6.

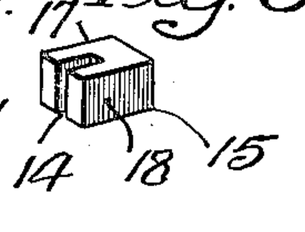


Fig. 4.

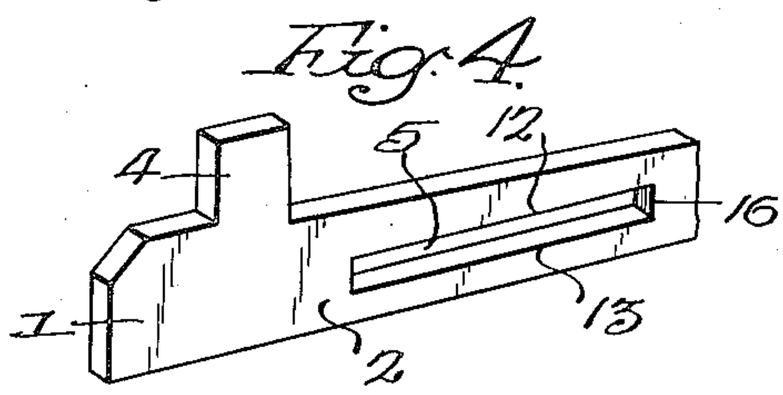


Fig. 9.

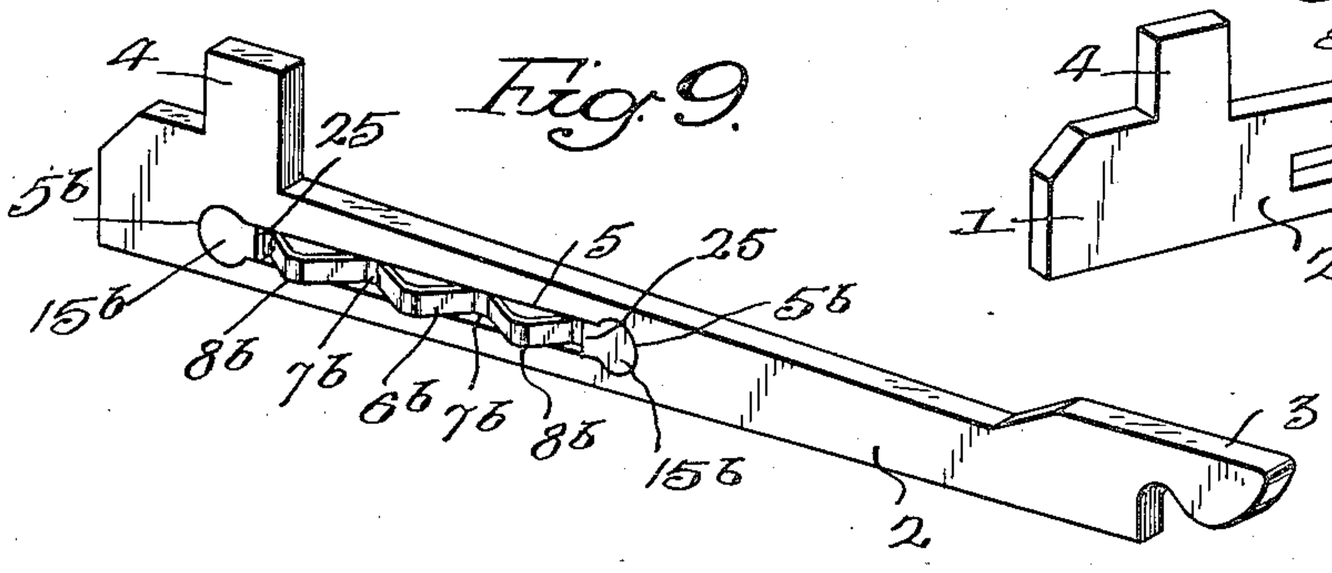
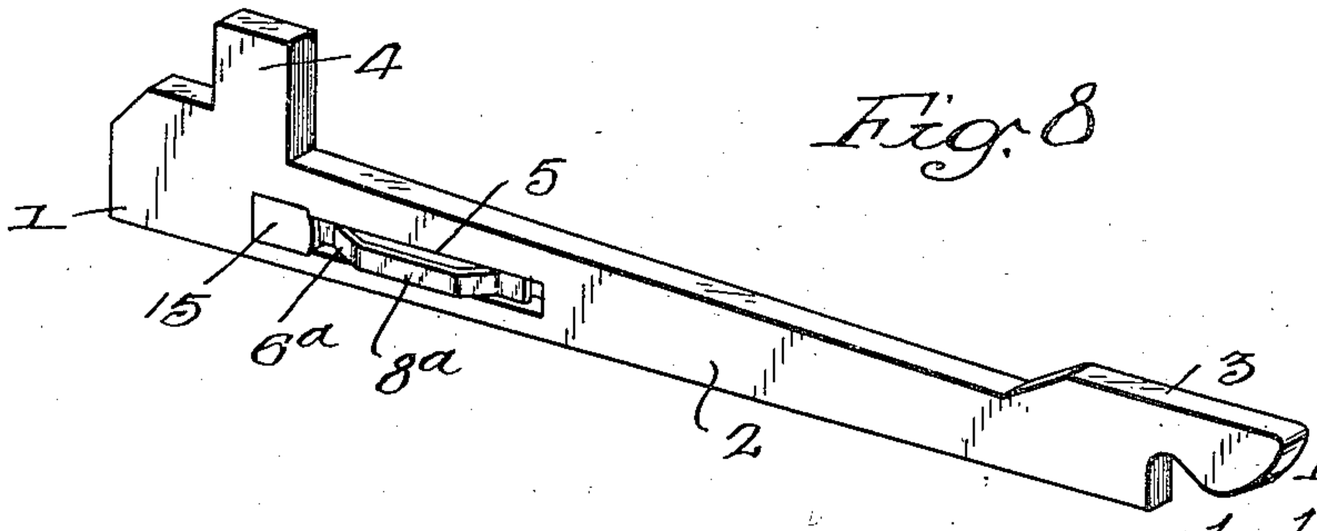


Fig. 8



Inventor:-
Alfred Crawford
by his Attorneys
Howson + Howson

Patented Dec. 17, 1935 2,024,911

UNITED STATES PATENT OFFICE

2,024,911

JACK FOR KNITTING MACHINES

Alfred Crawford, New Brunswick, N. J., assignor to The Crawford Manufacturing Company, New Brunswick, N. J., a corporation of New Jersey

Application September 4, 1935, Serial No. 39,159

9 Claims. (Cl. 66—124)

This invention relates to needle jacks such as are commonly employed in flat knitting machines of the types using independently operable needles wherein the needles and their controlling jacks are mounted for longitudinal sliding movement in individual slots or grooves in a suitable needle bed.

In some instances the jacks are provided with means for frictionally engaging the side walls of the guide grooves in the bed to maintain the jacks and the needles associated therewith in any and all positions to which they may be moved by the knitting cams or locks of the knitting machine during normal operation thereof.

Heretofore the jacks and/or the needles have been in some instances provided with tongues formed of the same metal and as a part of the jack or needle, the tongues being integrally connected at one end to the body of the instrumentality of which they are a part while the opposite end is bent outwardly from and at an angle to the plane of the body to form a spring for engaging a side wall of the groove in which the instrumentality is mounted.

In some instances, the body of the instrumentality has been provided with a shallow recess in one of its sides for the reception of a flat spring having one end secured to the instrumentality by swaging the walls of the recess over the spring.

In other instances, the instrumentality has had a transverse recess cut in one longitudinal edge thereof for the reception of a spring and one or more sub-recesses at one or both ends of the main recess for receiving lateral extensions of the spring.

Each and all of the above noted devices have inherent faults which are well known to the art, some of which arise from a construction of the device while others relate to the cost of its manufacture.

The object of the present invention is to provide a needle jack or knitting instrumentality with a friction device of such a type and construction as will permit of its being manufactured inexpensively and which will be highly efficient in operation without requiring any special attention.

The construction of the instrumentality forming the subject matter of the present invention will be fully disclosed hereinafter, reference being had to the accompanying drawing; of which:

Fig. 1 is a perspective view of the preferred form of the invention;

Fig. 2 is a longitudinal section taken on the line 2—2, Fig. 1;

Fig. 3 is a transverse section taken on the line 3—3, Fig. 1;

Figs. 4, 5 and 6 constitute a detached perspective view of the elements of the instrumentality shown in Fig. 1; and

Figs. 7, 8 and 9 respectively are perspective views of modified forms of the invention.

As shown in Figs. 1 to 6 inclusive, the instrumentality chosen to illustrate the principles of the present invention is in the form of a needle jack 1. The needle jack 1 is of ordinary and usual contour and is adapted to perform all of the usual and well known functions of devices of its kind.

The jack 1 comprises a main body portion 2, at one end of which is a needle-engaging head 3, of ordinary construction, while the opposite end is provided with the usual butt 4 adapted to be engaged by the knitting cams of the machine in which the jack is installed.

In the present instance, the body 2 of the jack is provided with a longitudinally extending elongated slot or recess 5 which passes transversely and completely through the body 2 of the jack.

Mounted in the recess 5 is a flat spring 6 which is bent or formed to provide one or more frictional bearing surfaces 7 and 8 on one or both sides of the jack and which project to some extent beyond the planes 9 and 10 respectively of the opposite sides of the body 2 of the jack, for the purpose of engaging one or both of the opposite side walls of the needle bed groove in which the jack is adapted to be mounted.

It will be understood that the jacks are adapted for longitudinal movement in the needle bed grooves and that in the course of time the side walls of the grooves wear to an extent that the jacks are relatively loose in the guide grooves and consequently will not maintain the positions to which they are moved by the knitting cams or locks of the knitting machine.

By providing the shaped spring 6 in the recess 5 and by securing at least one end of the spring rigidly to the jack 1 the bearing surfaces 7 and 8 of the spring will engage the opposite side walls respectively of the grooves and exert sufficient pressure thereon to maintain the jack in any position to which it may be moved longitudinally of the guide groove.

It will be understood that in placing the jack 1 in the groove the spring 6 is flexed and straightened out longitudinally to some extent,

at least until the bearing surfaces 7 and 8 are substantially flush and coincide with the planes of the sides 9 and 10 of the jack and as the jack is pressed down into the groove and the spring 6 is released in the recess 5 these bearing surfaces automatically adjust themselves to the difference in measurement between the width of the jack and the width of the groove.

In order to secure the one end of the spring 6 in the recess 5, a plug, block, or strip of metal relatively softer than the steel of which the jack 1 is composed and of which the spring 6 is composed, preferably copper, is placed around the one end 11 of the spring 6 prior to the placing of the spring in the recess of the jack. This plug or block may take the form as shown at 15, particularly in Fig. 6, wherein the plug is provided with a cut or recess 14 for receiving the end 11 of the spring 6. After placing the plug of softer metal on the one end of the spring the assembly is then inserted in the recess 5 of the jack and sufficient pressure is brought to bear on the opposite sides of the plug 15 to cause the metal of which the plug is composed to flow in the slot 5 into contact with the upper and lower edges or walls 12 and 13 thereof and in some instances into contact with the one end wall 16 of said recess, until the sides 17 and 18 of the plug 15 are substantially flush or coincident with the sides 9 and 10 respectively of the jack. Such pressure-flowing of the metal plug 15 causes the metal to grip the end 11 of the spring 6 rigidly and also to grip the walls 12, 13 and 16 of the recess 5 so firmly as to prevent relative movement between the anchored end of the spring and the body of the jack.

During the flowing of the metal of the block 15 around the end 11 of the spring 6, the metal of said block flows between the upper and lower edges 19 and 20 of the end 11 of the spring and the upper and lower edges 12 and 13 of the recess 5, adjacent the one end 16 of the recess, as clearly illustrated at 21 and 22 in Fig. 3, whereby the said upper and lower edges of the spring 6 are held in spaced relation to the top and bottom walls of the recess 5 to permit free movement of the spring within the recess, insofar as lateral movement of the free end of the spring is concerned.

In some instances, as shown in Fig. 7, the end of the recess 5 in which the spring is anchored may be in the form of a rectangular enlargement illustrated at 5*a* and into which the plug 15 fits prior to the application of the lateral pressure on the opposite sides of the block or plug which effects the flowing of the metal thereof. The shoulders 23 and 24 formed by the enlargement 5*a* at the one end of the recess 5 preclude all possibility of any relative longitudinal movement between the plug, the spring and the jack body.

In that form of the invention shown in Fig. 8, the spring 6*a* is provided with a relatively long flat frictional surface 8*a* for engaging but one of the walls of the grooves in which the jack is mounted.

In that form of the invention shown in Fig. 9, the spring 6*b* is provided with a plurality of undulations forming a series of frictional-bearing surfaces 7*b* and 8*b*, for engaging the opposite side walls respectively of the groove. In this form of the invention, the spring may be anchored at both ends in plugs 15*b* which are arranged in substantially circular recesses 5*b*, 5*b* formed at the opposite ends of the recess 5 in which the spring 6*b* is mounted. The circular formation of the plugs 15*b* with extensions 25 fitting the ends of the recess 5 adjacent the enlargements 5*b* thereof prevents any possible longitudinal movement between the plugs and the body of the jack.

If desired one end of the spring 6*b* may be rigidly anchored in and by one of the plugs 15*b*, in the device shown in Fig. 9, while the opposite end of the spring 6*b* may be slidably confined in the slot of the second plug whereby the spring may be elongated longitudinally by lateral compression without exerting too great a frictional bearing against the walls of the slot in which the instrumentality is used. The same condition may be applied to the device shown in Fig. 8 by slidably encasing the free end of the spring 6*a* in a plug mounted in that end of the recess 5 opposite to that in which the anchoring plug 15 is mounted.

The several springs 6, 6*a* and 6*b* may be shaped to the forms desired, either prior to the inserting of said springs in the recesses 5 or during the time when the lateral pressure is applied to the plugs 15 to cause the metal thereof to flow into contact with the walls of said recesses and in the preferred method of assembling the springs 6 are formed to shape after being inserted in the recesses 5, by employing suitable dies which will bind or shape the spring at the same time as the dies are applying the metal-flowing pressure to the plugs.

While the plugs 15, etc. have been described as being composed preferably of copper, other metals or other suitable compressible materials or materials which will take and hold rigid form under pressure may be used to secure the springs in the recesses without departing from the spirit of the present invention.

In making a jack in accordance with the above disclosure, high grade spring metal may be used in making the springs 6 while a relatively inexpensive grade of metal may be used for the bodies of jacks 1, and by using the soft metal or other suitable plug to anchor the spring in the jack the cost of assembly is reduced to a minimum.

In that form of prior art devices which have the shallow recess for the friction spring it is impossible to prevent the accumulation of dirt, oil and lint behind the spring, i. e. between the back face of the spring and the base of the recess, and after such accumulation has taken place it is impossible to remove it. In the present device, by having the recess pass completely through the body of instrumentality no such accumulation of dirt, oil and lint, etc. can take place, thus the useful life of the device is greatly prolonged without having to exercise any particular precautions.

I claim:

1. A knitting instrumentality comprising a body portion provided with a recess, a spring in said recess, and a plug in rigid contact with the spring and the walls of the recess securing the spring in the instrumentality.

2. A knitting instrumentality comprising a body portion with a recess passing transversely and completely through said body, a flat spring in said recess, and a plug in the recess in rigid contact with the walls thereof and with the spring and securing the spring in said instrumentality.

3. A knitting instrumentality comprising a body portion provided with an elongated recess

extending longitudinally of and passing transversely through said body, a flat spring in and extending longitudinally of said recess, and a plug in the recess in rigid contact with the walls thereof and said spring securing the spring in the instrumentality.

4. A knitting instrumentality comprising a body portion provided with an elongated recess extending longitudinally of and passing transversely through said body, a flat spring in and extending longitudinally of said recess, and a plug in one end of the recess in rigid contact with the walls thereof and with one end of said spring securing the spring in the instrumentality.

5. A knitting instrumentality comprising a body portion provided with an elongated recess extending longitudinally of and passing transversely through said body, a flat spring in and extending longitudinally of said recess, and a plug in one end of the recess in rigid contact with the walls thereof and encircling one end of said spring in rigid contact therewith for securing the spring in the instrumentality.

6. A knitting instrumentality comprising a body portion provided with an elongated recess extending longitudinally of and passing transversely through said body, a flat spring in and extending longitudinally of said recess and formed to provide at least one friction-bearing surface at at least one side of said body and normally disposed in a plane outside the plane of said body side, and a plug in the recess in rigid contact with the walls thereof and said spring securing the spring in the instrumentality.

7. A knitting instrumentality comprising a body portion provided with an elongated recess extending longitudinally of and passing transversely through said body, a flat formed spring in and extending longitudinally of said recess and provided with friction-bearing surfaces at opposite sides respectively of said body and normally disposed in planes outside the planes of said body sides, and a plug in the recess in rigid contact with the walls thereof and said spring securing the spring in the instrumentality.

8. A knitting instrumentality comprising a body portion provided with an elongated recess extending longitudinally of and passing transversely through said body, a flat formed spring in and extending longitudinally of said recess and provided with friction-bearing surfaces at opposite sides respectively of said body and normally disposed in planes outside the planes of said body sides, and a plug in each end of the recess in rigid contact with the walls thereof and the opposite ends respectively of said spring with at least one of said plugs rigidly gripping and securing the spring in the instrumentality.

9. A knitting instrumentality comprising a body portion provided with an elongated recess extending longitudinally of said body and having an enlargement at at least one end thereof, said recess and enlargement passing transversely through said body, a spring in the recess with its end extending into said enlargement, and a plug in said enlargement in rigid contact with the walls thereof and said spring end securing said spring in said instrumentality.

ALFRED CRAWFORD.