Sept. 9, 1952 R. CASAS-ROBERT 2,609,772

SEWING MACHINE

Filed March 31, 1949 2 SHEETS—SHEET 1

Fig.1

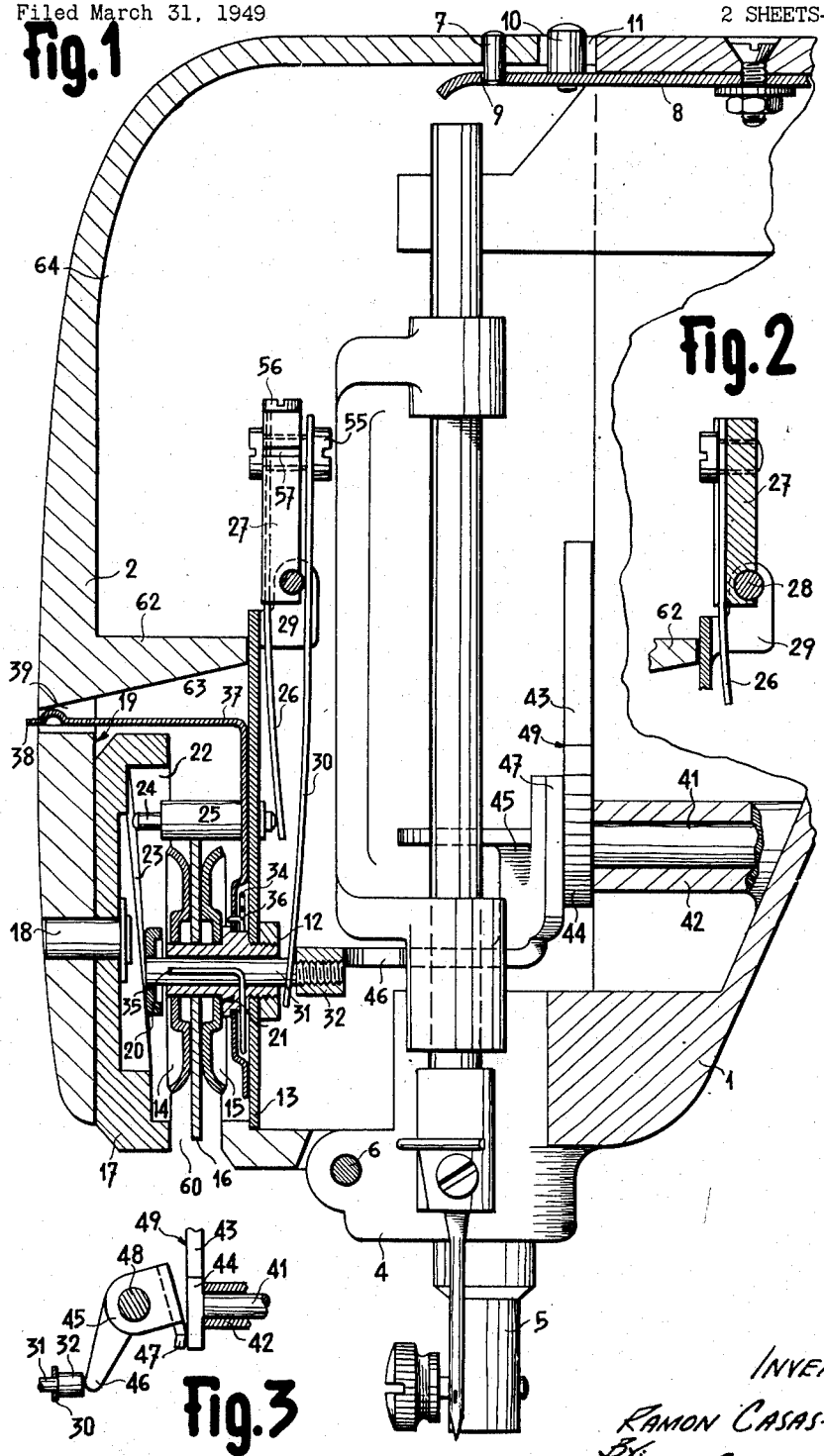

Fig.2

Fig.3

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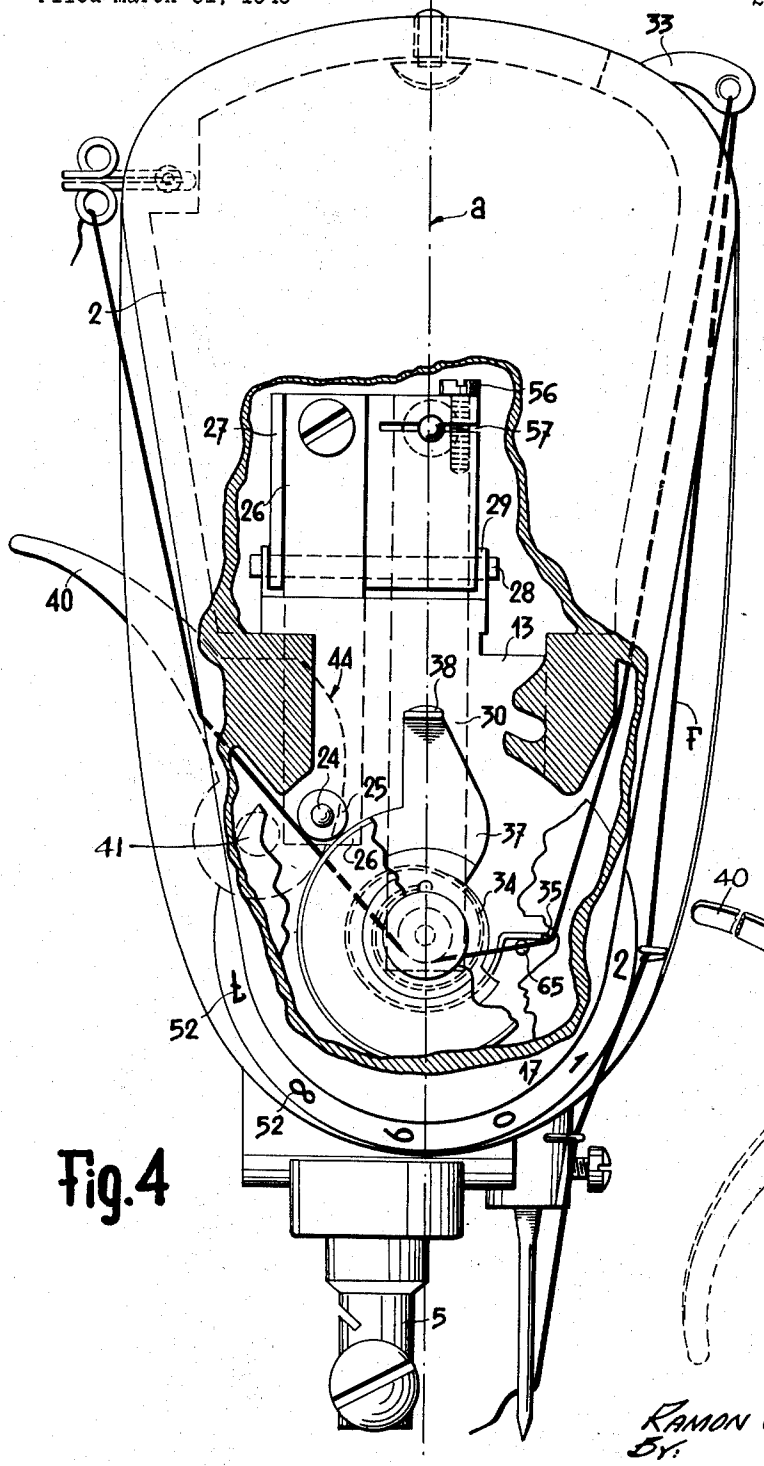
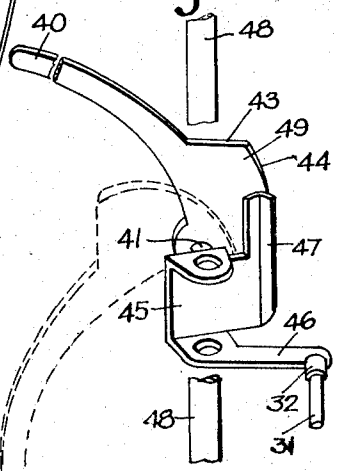


Fig.4

Fig.5.



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2,609,772

SEWING MACHINE

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17 Claims. (Cl. 112—254)

1

All sewing machines in use at the present time include a thread tension device arranged on the thread path between a reserve reel and a thread-puller and protruding in relation to the surface of the casing forming the needle-carrying arm of the sewing machine. Now, such an arrangement of the thread tension device is always rather inelegant, on the one hand, and said thread tension device is very exposed to shocks on the other hand. In addition, the sewing done on the machine or the clothes worn by the operator are easily caught by this thread tension device with risk of damage either to said device itself or to said work or clothes. Finally, in many cases, and especially when this thread tension device is mounted on the side front face of the needle-carrying arm, it happens to be on the straight line between the needle and one or the other eye of the operator, and therefore considerably hinders the operator during his work. Moreover, it provokes eye strain quickly and induces squinting.

The present invention relates to a sewing machine including a needle-carrying arm, constituting a casing and safeguarding the driving mechanism of said machine as well as that of the thread-puller. An object of this machine is to eliminate the mentioned drawbacks by the provision of a thread tension device located inside said casing in front of a slot made in one of the walls of said casing and intended for placing the thread in the thread tension device and for the passage of the thread through the thread tension device during the running of the machine.

The attached drawing shows diagrammatically and by way of example a form of construction of the machine in accordance with the invention.

Fig. 1 is a part longitudinal cross-section view of the needle-carrying arm.

Figs. 2 and 3 are detail views.

Fig. 4 is a view of the front face of the arm, certain parts of the casing being torn off.

Figure 5 is a detailed view showing the cam and associated structure.

On the attached drawing, only the parts of the sewing machine necessary for the good understanding of the thread tension device are shown.

In the machine shown on the drawing, the fore front face of the arm 1 consists of a cover 2 pivoting on the arm 1. This cover has the general form of a triangle with rounded angles, symmetrically arranged in relation to a medial,

2

vertical, longitudinal plane a of the arm (Fig. 4). It is hinged to the lower part 4 of the guide of the support 5 of the presser foot by means of a pivot pin 6, and is kept in closed position by a spring lock. The latter includes a pin 7 rigidly fastened to the upper wall of the cover and positioned to be engaged in an opening 9 of a spring blade 8, rigidly fixed by one of its ends to the arm 1. This blade 8 further carries a controlling part 10, emerging from the arm 1 through a hole 11 made in its upper wall.

The thread tension device and its driving device are located in the lower part of the cover and fixed to the internal part of the latter, means being provided to shelter it from oil splashes.

The thread tension device consists of a hollow axle 12, rigidly fastened to a plate base 13, fastened to the cover 2, and two flanges 14 and 15 revolving freely on this axle 12. A washer 16 revolving freely on this axle 12 is inserted between the two flanges.

The thread tension driving device includes a revolving driving member 17, mounted on a pivot 18, rigidly fixed to the internal wall 19 of the cover and mechanically connected to a mobile stop 20, subjected to an elastic action tending to apply it against the flange 14 and to press the two flanges and the washer 16 against a shoulder 21 of the axle 12.

The driving member 17 consists of a disc having a hollow 22, of which the bottom constitutes a cam 23 acting in conjunction with a pusher 24 sliding into a guide 25 and acting on the end of a spring blade 26 rigidly fastened to a rocking support 27. The latter carries an axle 28, revolving in bearings formed in ears 29 of the base plate 13. On this support is mounted a second blade spring 30, resting on the axle 28, and of which one of the ends is engaged under the head of a screw 55, while its other end is engaged on a rod 31, sliding inside the axle 12 and carrying a mobile stop 20. This rod 31 has a head 32 on which is seated the blade 30.

The tension device is further provided, like other tension devices of known types, with a device compensating thread tension, absorbing shocks and catching-up the slack of the thread portion situated between the thread tension device and the thread-puller 33 and caused by the periodical movement of the latter. This device includes a spiral spring 34, of which one of the ends is curved in the shape of a finger parallel to the axle 12, while its other end has a beak 35, engaged in a housing made in an adjusting

member 37, which revolves with friction on the axle 12. This adjusting member includes an adjusting finger 38 emerging from the cover through a slot 39 in form of an arc of circle concentric to the axle 12.

Finally, the sewing machine shown is fitted with an automatic releasing device for the thread tension device when the presser foot is lifted. This device includes a controlling lever 40, fastened to an axle 41 revolving in a bearing 42, fastened to the arm 1 and carrying at its end a cam 43, of which the ramp 44 acts in conjunction with an actuating member (which is not shown) of the support 5 of the presser foot in order to effect the lifting of the latter against the action of a spring (which is not shown).

A U-shaped part 45, of which one of the wings has an extension in form of a finger 46, and of which the middle part includes an extension in the form of a heel 47 pivots on an axle 48 fastened to the arm 1. The heel 47 is intended to act in conjunction with the side face 49 of the cam 44, while the finger 46 actuates the rod 31 against the action of the blade spring 30, in order to push away the mobile stop 20 and to release the flanges 14 and 15 and the washer 16 of the thread tension device.

The described sewing machine works as follows:

When the presser foot is in lifted position (position shown on the drawing), the heel 47 of the part 45 resting on the side face 49 of the cam 44, the finger 46 keeps the rod 31 in a position for which the mobile stop 20 is distant from the flange 14. For this position, the flanges of the thread tension device are completely free, so that the thread or threads F passing between them and the washer 16 undergoes no braking at all and can therefore be pulled without trouble in order to enable the removing of the work from under the presser foot. An opening 60, made in the wall of the cover in front of the thread tension device enables the placing of the thread in the thread tension device and the passage of the thread through the thread tension device during the running of the machine.

On the contrary, when the operator actuates the controlling member 40 in order to effect the lowering of the support of the presser foot under the action of its pressing spring, the heel 47 escapes from the side face 49 of the cam 44, so that the finger 46 no longer opposes the action of the spring 30. In consequence, the rod 31 moves towards the right side of Fig. 1 and the mobile stop comes into contact with the flange 14. Thus, this spring 30 effects the tightening of the two flanges on the washer 16, the axial position of the flange 15 being defined by the shoulder 21 of the axle 12, and therefore the braking of the thread or threads passing between these flanges and the washer 16. By acting on the controlling member 17, the operator has the possibility of modifying and fixing at will the value of the elastic action exerted by the spring 30 and therefore of choosing and fixing the value of the braking action of the thread tension device on the thread or threads going through it. Indeed, by displacing angularly the disc 17, the angular displacement of the cam 23 is effected which defines the axial position of the pusher 24 in its guide and therefore the tension of the springs 26 and 30.

The controlling member 17 includes marks 52 made on a conical surface and moving in front of a fixed mark (which is not shown) made on the rim of the cover 2. Thus the user has every possible facility for marking the angular position of the controlling member 17 and choosing and fixing at will the value of the desired braking. Indeed, a part of the disc 17 emerges from the cover 2 through a slot 60, made in its lower wall. In order to achieve an elegant aggregate while permitting an easy reading of the marks made on the disc 17, the lower rim of the cover is rounded in the form of an arc of a circle concentric with the pivot 18 and having a diameter equal to that of the small base of the frustum of the disc 17. On the contrary, in order to enable a complete safeguarding of the driving device of the thread-puller, the upper part of this cover has a width equal to that of the arm. The upper part of the cover 2 is convex in order to permit the housing of the whole of the needle-carrier within it and thus to avoid the need of providing a plug forming a protuberance in relation to the upper wall of the arm and into which would slide the end of the needle-carrier.

The various springs of a same series of springs cannot be exactly identical, particularly as regards the slope of the straight line representing, in rectangular co-ordinates, the strength of the spring as a function of its compression. It follows that, in order to obtain identical sewing machines, it is necessary to gauge the thread tension device, so that for a same position of the controlling member 17, a same value of the braking action on the thread is obtained on all machines.

The above described sewing machine makes it possible to carry out very easily such a gauging at the factory. Indeed, it is sufficient for this purpose to place the mark 0 of the disc 17 in front of the mark made on the rim of the cover 2, then to open the latter by disengaging one from the other the two parts of the spring lock, then to tighten or to loosen the screw 55 holding the blade 30 on the support 27 until the mobile stop 20 comes into contact with the flange 14 without exerting a push on it. Indeed, by tightening or loosening the screw 55, there is the possibility of modifying the elastic action exerted by the blade 30 on the rod 31 independently from the position of the cam 23, and therefore to correct the manufacturing differences which may exist from one spring to the other. This gauging done, one can block the screw 55 in position by tightening a screw 56, the end of the support being rendered flexible thanks to a slot 57, made radially in relation to the threaded drilling made in the support 27 and intended for receiving the screw 55.

Finally the efficiency of the device compensating the thread tension, absorbing shocks and catching up the slack of the thread section between the thread tension device and the thread-puller can be modified, chosen and fixed by acting on the adjusting member 37. A stop 65 fastened to the plate 13 limits in one direction the displacements of the finger 35.

From above explanations and by examining the drawing, it is easy to see that the described sewing machine has great advantages over all known sewing machines, which are due to the fact that its thread tension device is entirely housed inside the casing. Indeed, the latter is no longer exposed to damage or misadjustment and is moreover efficiently safeguarded against oil splashes and dust, the base plate and a wall 62 separating completely the space 63 in which is housed the thread tension device from the inside space 64 of the casing, in which are housed

the driving mechanisms for the needle and the thread-puller. The mechanical connection between the cam 23 and the spring 26 constituted by a pusher sliding into a guide efficiently prevents oil oozing inside the space 63, if one provides between the pusher and the guide a small enough slack and a long enough guide. This obviously applies also to the rod 31 sliding inside the hollow shaft 12. In addition, owing to the fact that the thread tension device is situated in front of a slot made in the lower side wall of the cover, the placing of the thread is extremely easy and convenient.

In the form of construction shown, a washer 16 is inserted between the two flanges of the thread tension device, in order to enable sewing with two threads, but it is obvious that in an alternative construction, this washer could be suppressed.

A form of construction has been herewith described by way of example and in reference to the attached diagrammatical drawing, but it is obvious that all described members and elements could be replaced by their equivalents. However, the described form of construction enables to achieve a thread tension device having a small height, easy to house inside the cover. In addition, the described arrangement enables to achieve a sewing machine of which the fore front face of the needle-carrying arm consists entirely of a cover with a simple and elegant form giving a large access to the driving mechanism of the needle-carrier and of the thread puller.

The details of the thread tensioning device have been disclosed in my application Serial No. 84,604 filed March 31, 1949, now abandoned.

I claim:

1. A sewing machine including a needle-carrying arm constituting a casing safeguarding the driving mechanism of the machine and comprising a cover constituting the fore front face of the needle-carrying arm and having an opening therein for the passage of thread, a thread tension device fastened to the inside wall of said cover, an auxiliary wall forming with said cover a space including said thread tension device and separating said latter from the inside space of the casing safeguarding the said driving mechanisms of the sewing machine.

2. A sewing machine as claimed in claim 1 and including a control device of the value of the braking action of said thread tension device on the thread comprising a control member of which a part emerges through said opening made in said cover of said casing for the passage of the thread.

3. A sewing machine as claimed in claim 1, and including a control device of the value of the braking action of said thread tension device on the thread comprising a control member of which a part emerges through said opening made in said cover of said casing for the passage of the thread, a mobile stop subjected to an elastic action tending to press the two flanges of the said thread tension device one against the other.

4. A sewing machine as claimed in claim 1, and including a control device of the value of the braking action of said thread tension device on the thread comprising a control member of which a part emerges through said opening made in said cover of said casing for the passage of the thread, a mobile stop, an elastic member acting on said mobile stop, a gauging device of the elastic action of said elastic member, a mechanical connection connecting said control member to said mobile stop, said gauging device being interposed in said mechanical connection.

5. A sewing machine as claimed in claim 1, a hinge for said cover fastened to said needle-carrying arm, a lock to keep said cover in closed position.

6. A sewing machine as claimed in claim 1, and including a control device of the value of the braking action of said thread tension device on the thread comprising a control member of which a part emerges through said opening made in said cover of said casing for the passage of the thread, a mobile stop, an elastic member acting on said mobile stop, a gauging device of the elastic action of said elastic member, a mechanical connection connecting said control member to said mobile stop, said gauging device being interposed in said mechanical connection, said control member comprising a disc revolving on a pivot rigidly fastened on the bottom of said cover.

7. A sewing machine as claimed in claim 1, and including a control device of the value of the braking action of said thread tension device on the thread comprising a control member of which a part emerges through said opening made in said cover of said casing for the passage of the thread, a mobile stop, an elastic member acting on said mobile stop, a gauging device of the elastic action of said elastic member, a mechanical connection connecting said control member to said mobile stop, said gauging device being interposed in said mechanical connection, said control member comprising a disc bearing a cam and revolving on a pivot rigidly fastened on the bottom of said cover, a pusher, a guide for said pusher, said guide being fastened to said auxiliary wall, one end of said pusher cooperating with said cam and the other emerging in said space in which are housed the driving mechanisms of the sewing machine.

8. A sewing machine including a needle-carrying arm constituting a casing safeguarding the driving mechanism of the machine and comprising a cover constituting the fore front face of the needle-carrying arm and having an opening therein for the passage of thread, a thread tension device fastened to the inside wall of said cover, an auxiliary wall forming with said cover a space including said thread tension device and separating said latter from the inside space of the casing safeguarding the said driving mechanisms of the sewing machine and including a control device of the value of the braking action of said thread tension device on the thread comprising a control member of which a part emerges through said opening made in said cover of said casing for the passage of the thread, a mobile stop, an elastic member acting on said mobile stop, a gauging device of the elastic action of said elastic member, a mechanical connection connecting said control member to said mobile stop, said gauging device being interposed in said mechanical connection, said control member comprising a disc bearing a cam and revolving on a pivot rigidly fastened on the bottom of said cover, a pusher, a guide for said pusher, said guide being fastened to said auxiliary wall, one end of said pusher cooperating with said cam and the other emerging in said space in which are housed the driving mechanisms of the sewing machine, a rocking member fastened to said auxiliary wall, said rocking member bearing said elastic member, said second end of said pusher acting on said elastic member.

9. A sewing machine as claimed in claim 8, in which said gauging device comprises a blade spring seating on an intermediate point, a screw screwed in said rocking member, one end of said blade spring being engaged under the head of said screw, and the other end of said blade spring being engaged on a rod carrying said mobile stop.

10. A sewing machine as claimed in claim 8 of which the thread tension device is fitted with a device compensating the tension of the thread, absorbing shocks and catching the slack of the portion of thread situated between the thread tension device and the thread-puller, of which the efficiency can be modified and fixed at will by acting on an adjusting member of which a part emerges from said cover through a slot in the form of an arc of circle concentric with said pivot of said disc.

11. A sewing machine as claimed in claim 1, comprising a presser foot lifting device, said thread tension device including two flanges, a spring pressed member urging the flanges together, and means cooperating with the presser foot lifting device for shifting the spring pressed member against the action of its spring to release pressure between the flanges.

12. A sewing machine as claimed in claim 1, in which said cover has the general shape of a triangle symmetrically arranged in relation to a middle, vertical, longitudinal plane of the needle-carrying arm.

13. A sewing machine as claimed in claim 1 in which said cover has the general shape of a triangle symmetrically arranged in relation to a middle, vertical, longitudinal plane of the needle-carrying arm, a control device of the value of the braking action of said thread tension device on the thread comprising a control member located inside said cover and mounted in the lower part of said cover, a part of said control member emerging through a slot made in the lower wall of said cover in the plane of rotation of said thread tension device.

14. A sewing machine as claimed in claim 1 in which said cover has the general shape of a triangle symmetrically arranged in relation to a middle, vertical, longitudinal plane of the needle-carrying arm, a control device of the value of the braking action of said thread tension device on the thread comprising a control organ located inside said cover and mounted in the lower part of said cover, a part of said control organ emerging through a slot made in the lower wall of said cover in the plane of rotation of said thread tension device, the lower angle of the said triangle being rounded according to an arc of circle concentric with a pivot for said control organ.

15. A sewing machine as claimed in claim 8, in which said thread tension device comprises a pair of flanges, a hollow axle on which the flanges are revolvably mounted, and a rod traversing said hollow axle, said rod having the mobile stop fixed to one end thereof and the other end engaged by said elastic member.

16. A sewing machine including a needle-carrying arm constituting a casing safeguarding the driving mechanism of the machine and comprising a cover constituting the fore front face of the needle-carrying arm and having an opening therein for the passage of thread, a thread tension device fastened to the inside wall of said cover, an auxiliary wall forming with said cover a space including said thread tension device and separating said latter from the inside space of the casing safeguarding the said driving mechanisms of the sewing machine and including a control device of the value of the braking action of said thread tension device on the thread comprising a control member of which a part emerges through said opening made in said cover of said casing for the passage of the thread, a mobile stop, an elastic member acting on said mobile stop, a gauging device of the elastic action of said elastic member, a mechanical connection connecting said control organ to said mobile stop, said gauging device being interposed in said mechanical connection, said control organ comprising a disc bearing a cam and revolving on a pivot rigidly fastened on the bottom of said cover, a pusher, a guide for said pusher, said guide being fastened to said auxiliary wall, one end of said pusher cooperating with said cam and the other emerging in said space in which are housed the driving mechanisms of the sewing machine, an elastic member supported by said auxiliary wall, said second end of said pusher acting on said elastic member.

17. A sewing machine as claimed in claim 8, in which said gauging device comprises a blade spring, a support carried by the cover, a screw securing one end of said blade spring to said support, and the other end of said blade spring is engaged on a rod carrying said mobile stop.

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