PUBLISHED
APRIL 27, 1943.
BY A. P. C.

A. TASSO

AUTOMATIC SILK-TITRE REGULATING DEVICE

Filed June 10, 1941

Serial No.
397,475

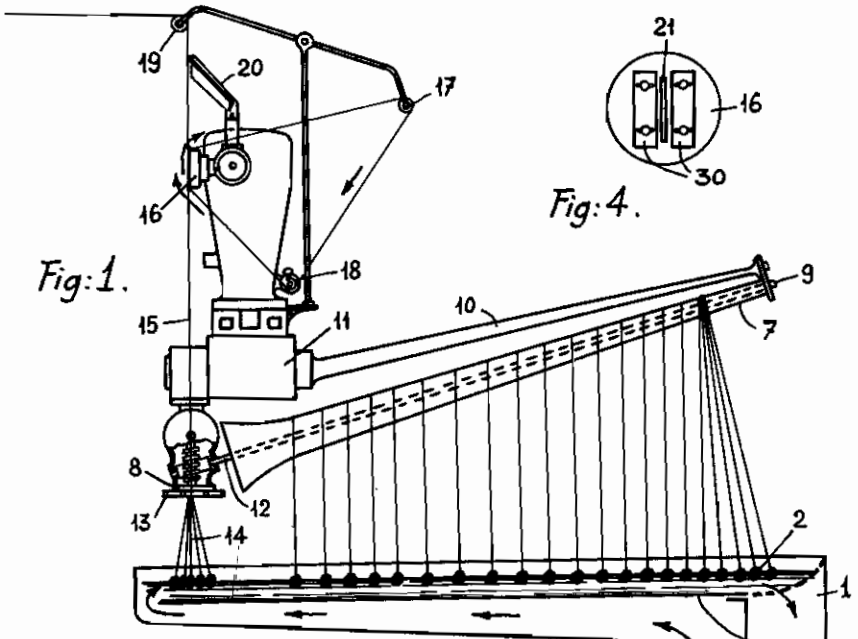

Fig:1.

Fig:4.

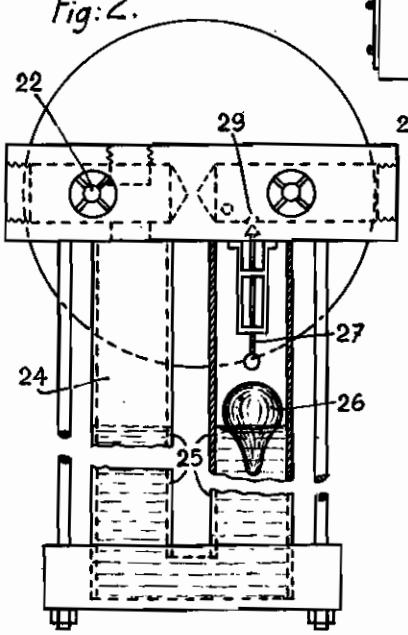

Fig:2.

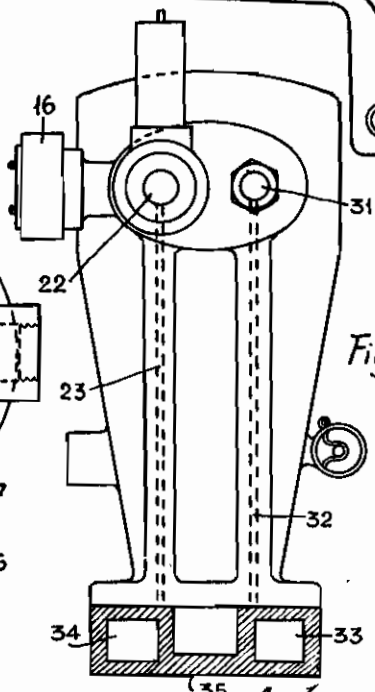

Fig:3.

Inventor
Antonio Tasso
By
Attorney

Published Apr. 27, 1943 Serial No. 397,475

ALIEN PROPERTY CUSTODIAN

AUTOMATIC SILK-TITRE REGULATING DEVICE

Antonio Tasso, Genoa, Italy; vested in the Alien Property Custodian

Application filed June 10, 1941

This invention relates to the silk reeling end aims to provide a method and a device for regulating the thickness or titre of the thread during the reeling.

A further object of the invention is to provide control means permitting to reel any desired titre of silk by keeping the thread at the desired thickness with very small differences of titre.

A further object of the invention is to provide a control means steered by very slight differences of pressure of air, promoted by the slightest differences of titre of the thread, for starting feed means for piecing a fresh cocoon filament when the thread becomes too thin.

Other objects and advantages are the provision of an improved automatic feed means for the cocoons, including also an improved reeler's trough.

Still other objects and advantages will be apparent from the following specification with reference to the attached drawing, in which:

Figure 1 is a section of an improved device according to the invention, showing in side elevation one of the improved units of the device;

Fig. 2 is an enlarged side view of the control means steered by the slight difference of air pressure;

Fig. 3 is an enlarged side elevation, partly in section, of the control block, including a slotted head, and

Fig. 4 is a front view of the said slotted head.

The improved cocoon reeling device according to the invention comprises a trough 1 having a substantial width and in which the cocoons 2 to be reeled off are soaked with warm water. In order to avoid that the sticky matters dispersed into the water of trough 1 come again into contact with the cocoons, and further in order to permit of keeping the water at the proper temperature according to the invention, the trough is divided by a partition 3 into a shallow upper part in which the cocoons are fed, as will be seen hereinafter, and in a lower part comprising a pit in which by one i. e. the reeling side of the device, a heater unit 5 is inserted, which is practically constituted by a steam pipe or a sleeved electric heater. The partition 3 constituting the bottom of the upper part of the trough is provided with a substantially vertical diaphragm 6 projecting into the pit 4 at a certain distance of the bottom thereof. The partition 2 is solid but at the ends, where either it does not touch the trough walls (see left-hand side) or is perforated, slotted or otherwise apertured (see right-hand side). Due to this arrangement, the water heated by 5 is circulated by thermosyphon action first towards the reeling end of the trough and then returns back into the pit through the apertured portion at the opposite end of said trough, as clearly shown by the arrows. In this manner the most part of the suspended matters are deposited at the bottom of pit 4 and do not soil the cocoons.

According to the invention, the cocoons are suspended by the worker to a rotatable inclined conical feed arm 7 which projects through the whole width of the trough 1 and is automatically operated by the regulator of the thread thickness each time the thread does not reach the required titre and until a fresh cocoon filament is pieced. In the example as shown the feed arm 7 is driven by shaft 12, which is driven in its turn by a worm gear in mesh with a worm 8 integral of the driving shaft 8 of piecer 13. Shaft 12 is journalled at its free end 8 in a supporting bearing provided at the end of a bracket 10. Piecer shaft 8, together with adjacent parts, is axially bored, as usual and is driven at intervals by motor 11.

The several cocoons filaments 14 to be united to one thread 15 pass through the said perforation of piecer 13 and adjoining parts and the thread just formed slides against a slotted head 16 from which it is drawn at an angle to grooved pulleys 17 and 18 and from this latter it is led again opposite the slot of head 16 where it crosses in known manner a preceding section of the same therad and then is led to grooved pulley 19 and to the winding reel (not shown). The thread, between head 16 and pulley 19 slides against a feeler arm 20 adapted to stop the unit, including the winding reel, each time a thread breaks. This device, however, which may be of a known type, needs not to be described.

The automatic control and regulation of the titre of the thread is effected pneumatically by utilising the very slight difference of free section of slit 21 (Fig. 4) of head 16, whenever the threads sliding at their crossing point possess a titre that lies under the lower permitted limit.

Slit 21 is in communication through the hollow interior of chamber 16, and ducts 22, 23 and 34 with a source of air kept at a constant pressure, that is generally slightly above the atmospheric one. In practice this source of low pressure air is a substantially large reservoir connected through suitable reduction valves to an air compressor and fitted with an air pressure regulator. As however these latter devices may be of any suitable known type, they have been not de-

scribed. The pressure air thus continually flows through slit 21 to the exterior, and the pressure within the duct 22 remains unaltered all the time the threads crossing against the slit 21 are of the required thickness. Now the crossing point has just been chosen in order to better allow to feel the slight differences of partial obstruction of slit 21 by doubling the sensibility of the device.

In order to automatically start the feeding of the piecer 13 and feed arm 7, whenever the thickness of the thread goes under a predetermined limit, duct 22 opens directly in a chamber 24 containing a relay that is sensible to, and displaced by slight differences of pressure. In the embodiment as shown this relay comprises a U tube 25 filled with liquid (generally water or a light liquid) up to a certain height and containing in one of the U branches a float 26 adapted to operate a movable member 27 which, according to whether it is pushed up by the float 26 or not, opens or closes a higher-pressure fluid valve, or also an electric filament feed system and the filament piecer 13. In the embodiment as shown, as soon a very slight decrease of pressure is detected, due to the fact that the thread has become thinner and therefore more air escapes through slit 21, the water level in 24 rises and float 26 sinks, thus leaving member 27 with attached needle valve 28 free to slide down and uncover a port leading to a chamber containing air at a sufficient pressure to close an electric switch (not shown) inserted in the circuit of motor 11.

It has been found in practice that the above device permits of keeping the thickness of the silk threads within the desired very narrow limits as no skilled worker would be able to keep.

In order to keep slit 21 clean, i. e. free from the sticky substances adhering to the wet cocoon thread, this latter is given an oscillating movement transversely of the slit so as to constantly sweep off any solid particles sticking near it. This movement is obtained by making pulley 18 or/and pulley 17 oscillatable to and fro in axial direction. By this means the section of the slit remains unaltered even after very much work.

The device permits of automatically regulating the thickness or titre of the threads at will be acting either on the sensibility of the relay, or by varying the width of slit 21 e. g. by means of a pair of parallel plates which may be drawn together or apart, or also by varying the pressure of the air passing through slit 21. However, in the embodiment as shown, the regulation of the titre is effected preferably by varying the height of the liquid column within U-tube 25, the thickness of the thread being inversely proportional to this height.

In practice a number of units like that shown in figure 1 are arranged side by side, so that the air duct 34 for the low pressure air, as well as the duct 33, (in case a source of higher pressure air is provided, controlled by the low-pressure operated relay), may be cast in a single block 35 and be connected each to a single air source, thus acting as distributing mains for a number of conduits 23—22 on the low pressure side and 32—31, on the high pressure side.

Of course, the constructional features of the device according to the invention may vary within very wide limits. Thus the arrangement of the thread-guilding pulleys and of the slotted head may vary and in some particular cases this slotted head may be arranged in some other position; the relay may be of any other type, provide it be sufficiently sensible to very slight changes of low pressure air; instead of a positive pressure inside of the slotted head chamber and duct 22, a negative pressure, i. e. a slight vacuum, may be employed; the motor 11 may be also a turbine, the float 26 may act on electric contacts, instead of pushing a movable member 27 and a number of other variations, without however departing from the basic principle of the invention.

ANTONIO TASSO.