

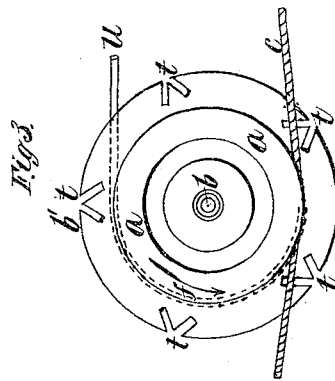
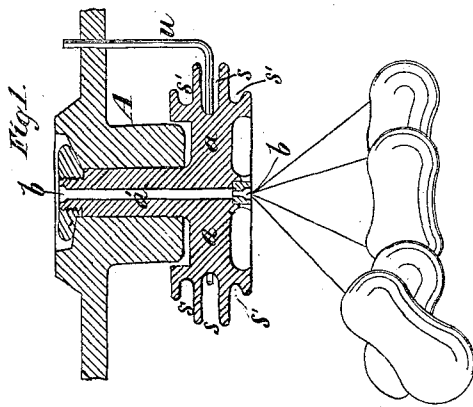
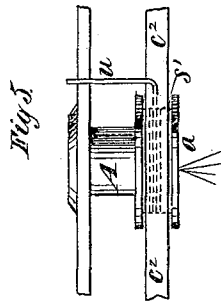
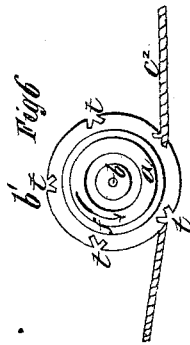
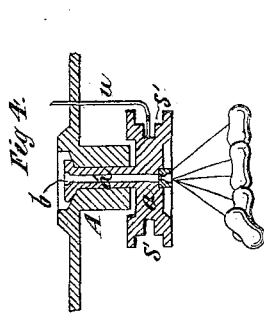
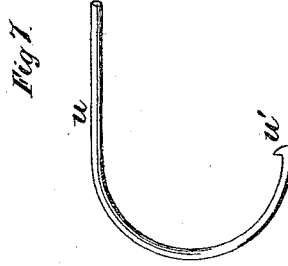
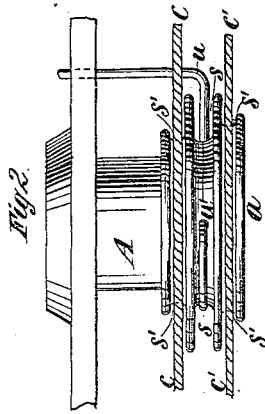
(No Model.)

F. DAINA.

DEVICE FOR TWISTING SILK FROM COCOONS AND OTHER MATERIALS.

No. 248,408.

Patented Oct. 18, 1881.



WITNESSES
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DEVICE FOR TWISTING SILK FROM COCOONS AND OTHER MATERIALS.

SPECIFICATION forming part of Letters Patent No. 248,408, dated October 18, 1881.

Application filed July 7, 1881. (No model.) Patented in Italy October 18, 1878.

To all whom it may concern:

Be it known that I, FRANCESCO DAINA, of Bergamo, in the Kingdom of Italy, have invented certain new and useful Improvements in Devices for Twisting Silk from Cocoons and other Materials, of which the following is a specification, and for which were granted Letters Patent of the Kingdom of Italy, numbered 10,359, and dated October 18, 1878.

Although my improvements are intended chiefly for use in reeling or winding silk from cocoons they may also be embodied in machines for "doubling" and "twisting."

In reeling silk from cocoons great loss of time occurs when a filament from one of them happens to break and a fresh one has to be substituted, and if the operative is not successful in at once replacing the broken filament the thread produced will be irregular and uneven from the fact that the number of filaments composing it vary at different portions of its lengths. The same remarks apply when the operations of twisting or doubling are being performed.

The results of this invention are the certainty of being able to replace any number of broken filaments immediately, and the ability to cut away the loose end of the replaced filament above its union with the main thread, and that consequently a more regular and even thread is produced than by any of the processes at present in vogue, the thread being free from "nibs."

The apparatus consists of a wheel or flier having a hollow spindle working in a fixed frame. The wheel or flier preferably has three grooves in its periphery, and the sides of the central groove project beyond the outer sides of the exterior grooves. In each of the exterior grooves runs a cord or band, each of which is connected with the motive power, and thus motion is imparted to the wheel. A knife or cutter having a curved or semicircular stock or arm is fixed by one end in the frame, and is arranged so that its blade is in the center groove. There are notches, hooks, or catches in the edges or sides of the central groove.

The apparatus is used as follows: Underneath the rotating wheel are placed the cocoons of silk or other material required to be used. A thread, containing as many separate

filaments as may be desired, is passed through the hollow spindle or shaft of the wheel and reeled in the usual way. When a filament breaks, or from any cause it is desired to add a fresh one to the thread, a cocoon is placed in the bath underneath the flier, and the part of the new filament near the free end is placed in contact with the edges of the central groove, and is instantly caught by the notches, hooks, or catches and carried round thereby. The parts of the filament on each side of the central groove pass under the bands running in the exterior grooves, and are thus held tightly. The cocoons being stationary the rotary motion of the wheel warps the fresh filaments round the unbroken filaments, and the portion of the new filament between the edges of the central groove coming into contact with the knife or cutter is divided. The fresh filament then passes with the others up the hollow spindle in exactly the same way as if it had been "thrown" in the usual manner. Thus the operations of warping a new filament and cutting off the superfluous end of the same filament are performed immediately after each other. An end of the replaced filament equal to the radius of the flier remains to the thread. A collar is placed loosely round the spindle of the flier, round which entwine the detached ends of the added filaments. This prevents them from clogging up the apparatus.

Instead of the bands as above described, springs or pads may be used to hold the ends of the filaments about to be added. A wheel with a single groove instead of three may be used. In this case there is a subsidiary groove at the bottom of the principal groove. As before, there are notches, hooks, or catches on the sides or projecting rims of the principal groove. A driving-band lies in the principal groove, and is wide enough to cover the groove. The knife or cutters in the subsidiary groove and the operation is similar to that described when the wheel has three grooves, the only variation being that, whereas in the latter case the end of the filament is secured by two bands, in the present case one wide band only is requisite.

In the accompanying drawings, Figure 1 represents a central vertical section of a wheel or flier embodying my invention, a portion of the

frame supporting, the same and a number of cocoons. Fig. 2 represents a side view of said wheel or flier and frame. Fig. 3 represents a plan of the wheel or flier. Fig. 4 represents a central vertical section of a wheel or flier of slightly modified form, and also a portion of the frame and cocoons. Fig. 5 represents a side view of the wheel or flier and frame shown in Fig. 4. Fig. 6 represents a plan thereof, and Fig. 7 represents a view of the knife detached.

Similar letters of reference designate corresponding parts in all the figures.

Each of these twisting devices, which may also be termed "thread-joiners," is composed of a little wheel, *a*, turning upon a pivot, of which the center is perforated by a hole, *b*, through which the thread of silk to which the silk filaments are to be joined passes.

The pivot *a* may either be fixed to the support *A* or may form part of the little revolving wheel *a* and pass through a bearing in the support, as here represented.

The form of the pivot as well as that of the little wheel may be varied indefinitely.

The wheel or flier *a* represented in Figs. 1, 2, and 3 comprises in its periphery a central groove, *s*, and a groove, *s'*, upon each side thereof, and the flanges which form the sides of the central groove are of considerable width, and have in them notches *t*, as seen in Fig. 3. The groove *s'* receive bands *c c'*, whereby the wheel or flier is rotated, and in the central groove, *s*, is arranged a knife, *u u'*, which is secured in the frame of the machine.

The wheel or flier represented in Figs. 4, 5, and 6 has only a single groove, *s'*, which receives a driving-band, *e²*, and in the bottom of said groove is a smaller groove, receiving the knife *u u'*. The knife *u u'* has a worm or stock, *u*, made in the form of a half-circle, and which embraces the wheel or flier. This knife is clearly shown in Fig. 7.

In the thread-joiners of the accompanying drawings the wheels turn in the direction of the arrows *f*, moved by the cords *c' c* or by the band *e'*. The following is their mode of working:

If the wheel *a* is in motion and it be desired to add one or more filaments to the thread, the reeler brings one or more cocoon filaments in contact with it. These filaments are caught by one of the notches *t t* cut in the most prominent flanges of the wheel in question and carried round.

It must be remembered that at the moment of its contact with the filaments the notch which catches them is at the point *b'*, Figs. 3 and 6, and it will be understood that, in turning, this notch carries them the first revolution outside the broken-thread cutter, and, having returned to the point *b'*, it carries them another half-turn within the stock *u* of the cutter *u'*, until they arrive at its extremity *u'*, corresponding to the point where the cords *c' c'* or the band *e''*, which move the wheels *a*, hold and retain under their pressure the filaments to be joined.

The part of the filaments placed between the two cords *c c'* or the sides of the band *e''* strike against the end *u'* of the hook *u u''*, and, being unable either to pass over or to yield, the filaments being held as aforesaid, they must necessarily break. Thus broken and suitably shortened, these filaments are thrown by the revolving wheel *a* upon those of the other cocoons which are being reeled, and joined thereto.

The thread-joiners in use up to the present time, wanting an arrangement similar to that here indicated, did not always break the filament, and therefore the junction is accomplished in a defective manner, and the end of the filament to be joined, being insufficiently shortened, sometimes remained attached to the joining-wheel and finished by breaking the thread composed of the various filaments of all the other cocoons in process of being reeled, a very grave obstruction to the regularity of the reeling.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the wheel or flier for twisting, containing peripheral grooves and having projecting flanges provided with notches, of a knife or cutter, having a stock or arm of semicircular shape fitting in one of said grooves, and a driving band or bands fitting the other groove or grooves, substantially as and for the purpose specified.

2. The combination of the flier or wheel containing the central groove, *S*, the grooves *S'* upon each side thereof, and flanges provided with notches *t*, the knife *u u'*, and the driving-bands *c c'*, substantially as specified.

FRANCESCO DAINA.

Witnesses:

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CARLO GATTI.