C. H. GÉGAUFF.

SKEIN FORMING AND BOXING MACHINE.

APPLICATION FILED MAR. 31, 1921.

1,399,109. Patented Dec. 6, 1921.

3 SHEETS—SHEET 1.

Fig.1.

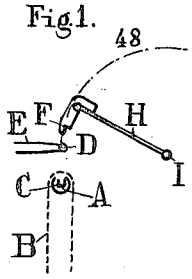


Fig.2.

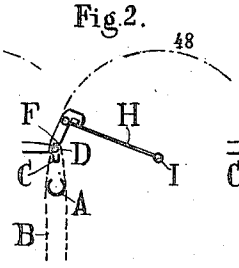


Fig.3.

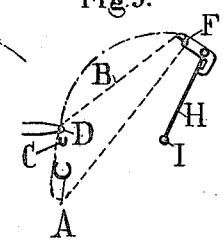


Fig.4.

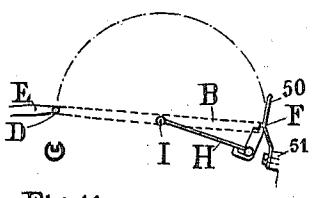


Fig.5.

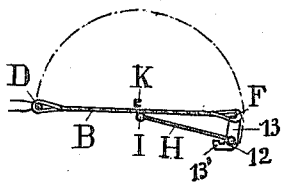


Fig.6.

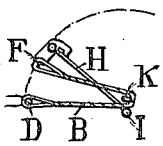


Fig.11.

Fig.7.

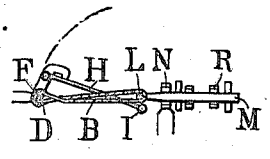


Fig.8.

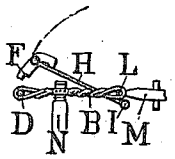


Fig.9.

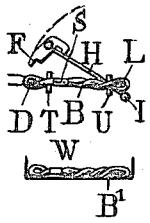
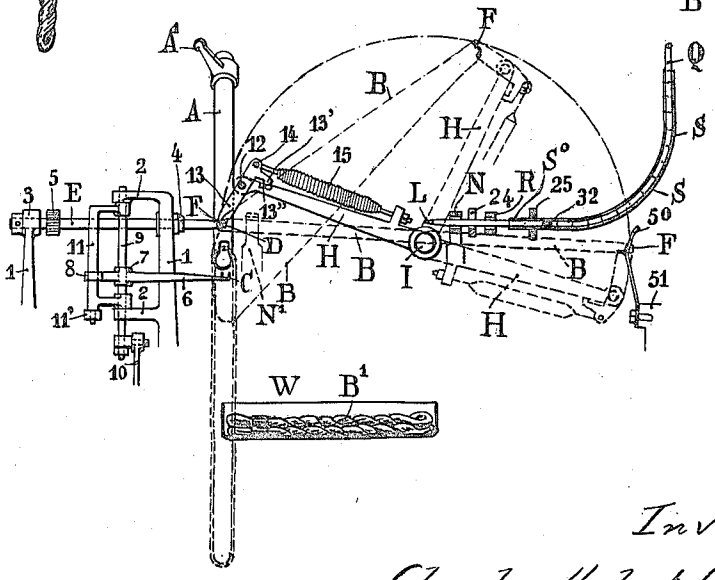


Fig.12.

Fig.10.



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3 SHEETS—SHEET 2.

Fig. 13.

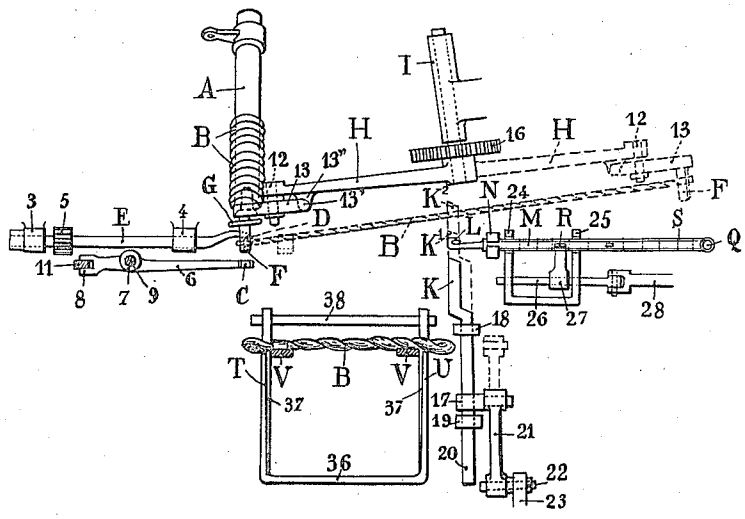
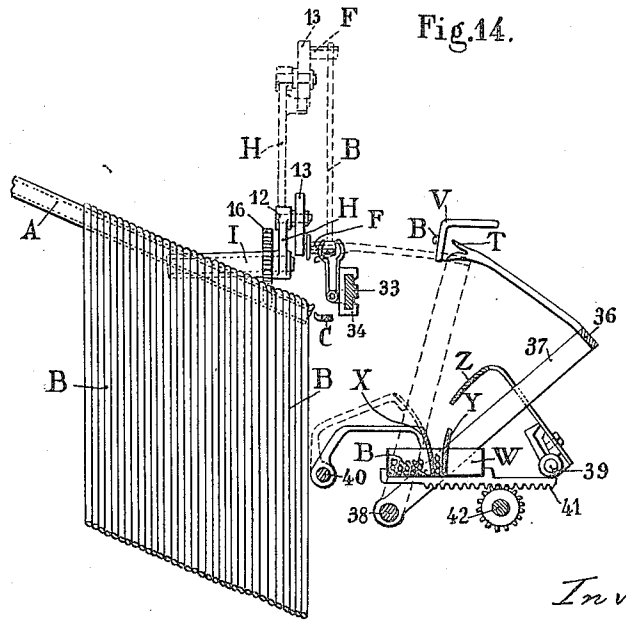


Fig. 14.



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3 SHEETS—SHEET 3.

Fig. 15.

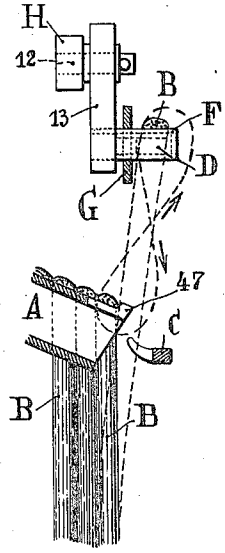


Fig. 16.

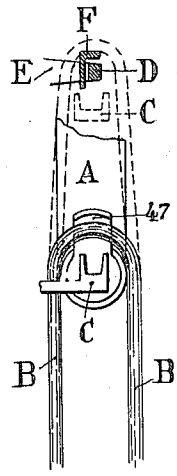


Fig. 17.

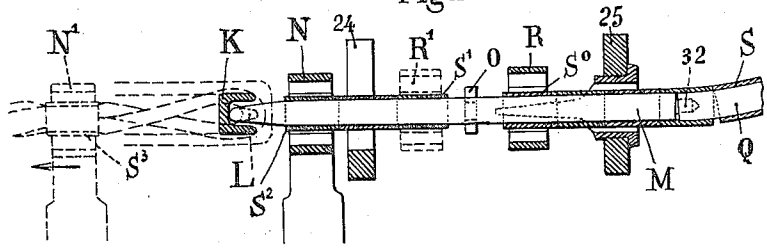
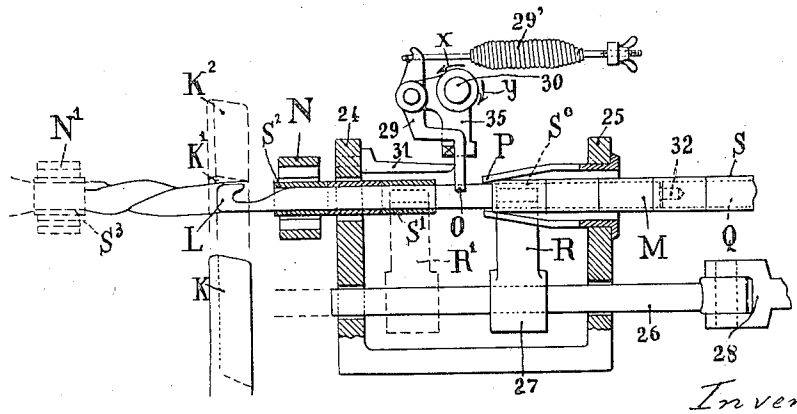


Fig. 18.



Inventor:

Charles Hubert Gégauff

By Laurence Langner

Attorney

UNITED STATES PATENT OFFICE.

CHARLES HUBERT GÉGAUFF, OF MULHOUSE, FRANCE, ASSIGNOR TO LA SOCIETE ANONYME "DOLLFUS-MIEG & CIE", OF MULHOUSE, (DEPARTMENT OF HAUT-RHIN), FRANCE, A CORPORATION OF FRANCE.

SKEIN FORMING AND BOXING MACHINE.

1,399,109. Specification of Letters Patent. Patented Dec. 6, 1921.

Application filed March 31, 1921. Serial No. 457,340.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, CHARLES HUBERT GÉGAUFF, a citizen of the French Republic, and a resident of 78 Rue de Verdun, Mulhouse, Department of Haut-Rhin, France, have invented certain new and useful Improvements in Skein Forming and Boxing Machines, (for which I have filed application in France, April 11, 1919, Patent No. 510,455 of Sept. 6, 1920,) of which the following is a specification.

This invention relates to a machine for carrying out automatically the make-up and finishing of skeins as commonly used for flourishing thread, embroidery cotton and the like.

This operation has hitherto usually been effected by hand, which requires a great deal of work.

The object to be attained by the present machine consists in transforming the long hanks of cotton as received from the reel or winder into a skein of half the length, that is to say folded in half, twisted in a certain manner, and provided with a label consisting of a paper band or tube; finally the skein thus formed is placed in a cardboard box which is designed to contain a large number, neatly alined and stacked, and serves for the retail sale.

The operation to be effected by the machine for this purpose is as follows:

(1) to take the hank and stretch it between two hooks;

(2) to twist it in one direction, for example to the right;

(3) to fold it in half, the two portions being laid one upon the other;

(4) to twist the hank thus folded, in the opposite direction to the first twist, *i. e.* to the left;

(5) to place the label on the skein, making it slide along the latter;

(6) to remove the finished skein and lay it in a cardboard box, which usually is arranged to contain a large number (say thirty to fifty) and serves for retail purposes;

(7) lastly when the box is filled, the machine must stop to allow the operator to remove the full box and replace it by an empty one, and also to place on the machine a fresh supply of hanks and labels. After this the action is allowed to begin again.

The operating devices of the machine, as well as their modes of action, are hereinafter more fully described with reference to the accompanying drawings in which:

Figures 1 to 9 represent diagrammatically the operation of the main working parts, giving nine principal positions of these parts in succession, the whole series forming one complete period or cycle of the machine, corresponding to the complete formation of a finished skein.

Fig. 10 is a front elevation of the working parts of the machine, with parts in section.

Figs. 11 and 12 represent respectively the hank of yarn before treatment and the finished skein.

Figs. 13 and 14 represent, respectively, a plan and a side elevation, parts in section, of the machine.

Figs. 15 and 16, are respectively, a side elevation and a front elevation, parts in section on a larger scale, of the lower end of the tube supporting the hanks and of the fork transferring the hanks successively to one of the hooks.

Figs. 17 and 18 represent respectively, a vertical axial section and a horizontal section, on a larger scale, of the labeling mechanism.

Referring to Figs. 1 to 9, the description of the action in accordance with the nine successive positions shown is as follows:

In the position of Fig. 1, the hanks B (see Fig. 11), coming from the reel, are hooked astride a smooth tube or round bar A, which occupies a position inclined to the horizontal, the hanks being laid one behind another and in sufficiently large number to fill a box of finished skeins.

At the lower end of the tube A there is provided a wide notch 47, intended to allow the passage of the transfer fork C which moves in an upward direction.

The hanks B, by reason of their weight and the inclination of the bar A, tend to

slide along the bar toward its lower end, and therefore always press against one another while sliding downward every time that a hank is taken from the lower end of the bar by the transfer fork C.

In order to facilitate the sliding motion of the hanks along the magazine bar A, the latter receives at regular intervals a slight alternating rotation around its axis, this movement being imparted by means of the crank arm A^1 and an eccentric or cam device.

Fig. 1 represents one of the hanks B suspended from the bar A.

The transfer fork C picks up a hank and places it (see Fig. 2 and also Figs. 10, 13, 14, 15, 16) upon the angle-bar F forming a hook at the end of the oscillating lever H, which moves around the fixed axis I. The movement of the angle-piece F consists in describing in space a half-circumference 48 around the axis I alternately in opposite directions. The preferred form of the oscillating lever H is shown in Figs. 10, 13 and 14.

The transfer fork C, the operation of which is indicated more clearly in Figs. 15 and 16, enters slightly within the tube A at each stroke and then rises through the open notch 47, thereby removing the lowest hank B upon the magazine.

The path of the fork C is shaped like a figure 8 described in space, as indicated in dotted lines in Fig. 15, the direction of travel being shown by the arrows. Consequently the fork C will first raise the hank B and hook it upon the angle-piece of the oscillating lever H. In the position of Fig. 2, this angle-piece F has moved into a position above the hook D at the end of the twisting spindle E, so that the hank will surround the hook D at the same time as the angle bar F. The fork C then falls clear, passing by the angle-piece F, which for this purpose is made narrower than the opening in the fork, and then comes to rest as shown in Figs. 2 and 3. In Fig. 2, the hank B is seen engaged with the angle-piece F, having been laid thereon by the fork C.

In Fig. 3, the oscillating lever H is shown describing a half-revolution about its axis I, in which movement the hank engaged upon the angle-piece F is made to take part, being thus drawn completely off the magazine tube A and sliding upon the hook D of the twisting spindle E.

Fig. 4 shows the oscillating lever H arrived at the end of its movement, after completing a half-revolution. The hank B is thus laid out and stretched between its anchored extremities, the left one upon the hook D at the end of the twisting spindle E, the right upon the angle-piece F at the outer end of the oscillating lever H. A flat spring 50, fixed to a frame 51 and forming an inclined plane in relation to the loop engaged upon the hook F, has come into operation to push back this loop along the angle-piece F so as to bring it into contact with the stripper G placed at the root of the angle-piece.

In Fig. 5 the hank receives its first twist; for this purpose the twisting spindle E and consequently its hook D revolve for a certain number of turns upon their axis, thus twisting the hank. As a result of this twist, the hank becomes slightly shorter, which is allowed for by a yielding movement of the angle-piece F. The latter is supported for this purpose by a latch 13, movable around the pivot 12 and held in normal position by a coiled spring 15 (see Fig. 10). As the skein shortens during the twisting, this spring yields slightly, and the tail 13′ of the latch 13 rests no more on its seat 13″ upon the lever H.

Fig. 6 represents the skein being doubled in half. For this purpose the bar K has been caused to project above and across the middle of the skein, as shown in Figs. 13 and 18, where the advanced position of the bar K is indicated in dotted lines at K_2.

The oscillating lever H, turning back toward its initial starting point, then folds the skein in half, the cross bar K serving as guide for the fold. During this return movement of the lever H, the cross bar K moves slowly from the position K_2 to that shown at K_1 (also in dotted lines in Figs. 13 and 18).

This cross-bar K is of hollow or channel section; the channel is arranged to inclose the hook L forming the extremity of the hooked bar M carrying the bands or labels, as seen in Fig. 17.

In the position represented in Fig. 7, the end of the skein, which has been engaged upon the angle-piece F, leaves the latter and moves onto the hook D, so that both ends of the original hank are now superposed and engaged upon the hook D. This result is obtained by the imposition of the angle-piece F upon the hook D, the latter having made a half-turn of the spindle E, whereby the direction of the hook D becomes reversed, followed by the action of the stripper G which travels along the angle-piece F toward its free end, thus pushing off or stripping the loop which was placed around the angle-piece F and transferring it onto the hook D.

On the other hand, the loop of the hank will be introduced into the hook L at the end of the rod M, by means of the cross bar K acting in coöperation with the said hook L. The hooked rod L M is given a slight longitudinal movement (of some millimeters) toward the right; to that end, the rod M is grasped by a collar O, provided at the end of a pawl 29, carried by a lever 35 secured to a shaft 30, the latter receives

a slight movement of rotation (in the direction of the arrow x, Fig. 18). As a result of said movement of the hook L, the latter enters into the loop of the hank, which has been transferred in front of said hook L by the cross bar K, which has moved to the position K^1.

The doubled skein will now be attached at one end (by the two connected ends of the original hank) to the hook D of the twisting spindle E, and, at the other end, to the hook L of the hooked rod M carrying the labels.

As soon as the attachment at L has been effected, the cross bar K retires completely out of operation back to its extreme position K, represented in full lines in Figs. 13 and 18.

In Fig. 8, the skein is illustrated in the act of receiving its second twist, which is effected in the opposite direction to the first, so that the two superposed halves of the original hank will be twisted together; the inverse twist in question is given by opposite rotation of the twisting spindle E. D.

The label is then placed in position by the hollow annular gripping device N, which is lined internally with rubber or leather; this gripper first grasps the paper tube, forming the label, around its circumference, and then travels along the skein, thus sliding the label over the hook L and skein B until reaching the final position N_1. The gripper is then released and returned empty to its initial position (Fig. 7). This gripping device may be carried by a small slide-block 34, traveling along a stationary slide-bar 33, shown in section in Fig. 14.

After the skein is completed and fitted with its label, there only remains to withdraw it from the two hooks D and L upon which it is attached, and to lay it in the box W, which is designed to hold a fairly large number of skeins, laid neatly in rows; this operation is shown in Fig. 9.

The removal of the skein from its two hooks is obtained by means of two forks T and U coöperating with the cross-bar K. These forks are carried by the frame 36, 37, pivoting around the fixed axis 38, so that the forks advance toward the skein, while the latter is still held by the hooks, and grip the ends of the skein between their divergent prongs (see position in dotted lines on Fig. 14). The cross bar K at the same time returns to its position K_1, which movement releases the skein from the hook L, owing to the obliquity of the front face of the end of the cross bar K, which forms an inclined plane in respect to its direction of travel.

The skein, thus detached from the hooks and gripped by the two forks T and U, which then suffice to effect the release from the hook D alone, is now transported by the forks in their return to the starting position, (shown in full lines in Fig. 14). Two stops V, fixed in space, arrest the skein in its movement and release it from the two forks T and U, the latter continuing their backward motion. The skein B^1, thus freed, falls by its own weight into the box W, placed beneath the stops V.

In its fall, the skein will be to some extent guided by the smooth curved plates X and Y (Fig. 14), resting upon the bottom of the box W. These plates X and Y retain the same position during the formation of three (or four) skeins, which by their successive fall become stacked upon one another, forming a vertical pile of skeins.

After such pile of three (or four) skeins has been made, the plate X rises, turning around its axis 40, and the box W is moved toward the right by means of the pinion 42 engaging with the rack bar 41, carrying the box W; the last pile is thereby pressed against the previous ones filling the left-hand part of the box, and the several piles united together. The box W is then again moved to the left but to a slightly greater extent than in its previous movement to the left, and the plate X falls again into the box as before, remaining there during the formation of the new pile of skeins and so on.

If necessary there may be employed a packing or ramming plate Z, which after the fall of each skein descends upon it, pressing it down in the box and then rising again at once, under the action of a pawl, turning around its axis 39.

When the box is full, that is to say when it has reached its extreme position toward the left, a stop-piece (not shown), traveling with it, will produce the uncoupling and stoppage of the machine; the operator thus notified has only to remove the full box and replace it by an empty one, returning the carriage-mechanism 41—42 to its original position.

In addition to the nine principal operations, described and illustrated diagrammatically in Figs. 1 to 9, there are several secondary actions, not directly affecting the skein but indispensable to the working and serving as preparatory to the principal operations.

Thus, during the first twist of the hank, indicated in Fig. 5, there takes place at the same time the sliding movement of the labels S along the hooked rod L M, for the purpose of bringing a label into the position shown at S^2, in front of the annular gripping device N. This action is produced by means of another gripping member R (see Figs. 17 and 18) traveling along the rod M in a reciprocating motion, from the position shown at R in full lines to that shown in dotted lines at R_1 and vice versa. The forward stroke from R to R_1 takes place with the gripper closed, so that the label is engaged and carried from the position S_0

along the rod as far as the position S_1. The return stroke from R_1 to R takes place with the gripper open, that is to say, empty, leaving the labels in their place. In order to allow the label to pass, the pawl 29, the end collar O of which supports the rod M, is momentarily disengaged from the said rod; to that end, the shaft 30 (Fig. 18) is given a slight rotation, into the direction of the arrow *y*, under the action of the coiled spring 29′, which returns the pawl 29 toward the left; when said pawl approaches the end of its stroke, it abuts against a fixed stop 31, in such a manner that it moves backward from the rod M, which is thus released by the collar O. At this moment, the label S passes from S_0 to S_1, being carried over by the gripper R, which moves into the position R^1; to that end said gripper is carried by a sleeve 27, secured to a shaft 26, connected to a crank 28 and sliding in the frame 24—25.

During the period where the rod M is no more supported by the pawl 29, the latter is replaced by the cross bar K, which acts as a support for the hook L; the reciprocating motion of said cross bar K is imparted by a crank 23 (Fig. 13), connected at 22 to a link 21, which is itself connected to a sleeve 17, secured to a rod 20, which forms an extension of the cross-bar K and which is able to slide in guides 18 and 19.

The labels S S consisting of short paper tubes are placed beside one another, threaded along a smooth rod Q, almost vertical at its upper part (see Fig. 10), and curved horizontally at its lower portion, the extremity of which fits at 32 upon the hooked-rod L M. The labels descend by their own weight as far as S_0, where the rod M rests upon three supporting tongues P (Fig. 18). Beyond this point, they are carried forward one by one by the gripper R, so as to slide along the rod M, firstly as far as S_1 and then to S_2, where the gripper N grasps them one by one and places them upon the skein, as already described.

The operation of the working parts, executing the movements already described, may be effected in various ways and with mechanisms of known type, such as an eccentric or cam of suitable shape acting upon a lever which will control the working part either directly or indirectly. It is, therefore thought unnecessary to describe the details of this mechanical operation, which is of secondary importance. Nevertheless, certain of the less simple movements are hereafter briefly described:

The alternating movement of the oscillating lever H, through about one half revolution in each direction, may be produced with advantage by an oscillating toothed sector, controlled by a cam and meshing with the wheel 16 fixed upon the axis I of the lever H.

The complicated motion of the transfer fork C with path in the shape of a figure **8**, may be obtained by the combination of two perpendicular movements, independent of one another, and each supplying one of the two rectangular components of this motion (Fig. 10). One component will produce the rise and fall of the fork; for example, the sliding rod 9, operated by the crank 10 and adapted to slide vertically in the arms 2 of the frame 1, carries the boss 7 of an arm 6 terminating in the fork C. The other component will produce the horizontal motions of the fork, for example by means of the slide bar 11, serving as a guide to the sliding extremity 8 of the arm 6 opposite to the fork C, said bar 11 being adapted to oscillate around the axis 9 under control of a cam by means of a lever (not shown) acting upon the roller 11′ at the end of the said bar 11.

The twisting spindle E may be operated conveniently by the combined action of a cam and a star-wheel, acting upon a system of wheels forming a differential gear, for the purpose of obtaining the algebraic sum of these two independent motions. The pinion 5, secured upon the twisting spindle (see Fig. 10), will then receive from one of the wheels of the differential gear the resultant of the two movements (cam and star), which will therefore be an alternating motion of unequal amplitude, because the spindle E makes a greater number of turns forward (during the first twist) than backward (during the second twist).

What I claim is:

1. A skein forming machine, comprising a bar adapted to carry a number of hanks to be treated, a lever adapted to oscillate and provided with a hook at its free end, means for lifting the hanks one by one from said bar and successively engaging each of them upon the hook of the said oscillating lever, a twisting spindle adapted to rotate around its axis and provided at its free end with a hook, means for imparting to the oscillating lever a semi-circular movement so as to pull the hank and stretch it between the hook of said lever and the hook of the twisting spindle, means for imparting to said spindle a movement of rotation around its axis so as to twist the hank between both hooks, a bar adapted to move across and above the twisted hank, means for imparting to the oscillating lever a semi-circular movement in the opposite direction, so as to fold the hank in half upon itself upon the cross bar acting as a guide, and to bring the end of the hank, carried by the hook of the lever, in front of the other end of the hank, carried by the hook of the twisting spindle, means for stripping the said first end from the lever hook onto the hook of the twisting spindle, so as to bring together both ends of the hank, and means for rotating the twisting spindle in a direction

opposite to that of the first twisting operation, so as to twist together both halves of the hank folded one upon another.

2. A skein forming machine, comprising a bar adapted to carry a number of hanks to be treated, a lever adapted to oscillate and provided with a hook at its free end, means for lifting the hanks one by one from said bar and successively engaging each of them upon the hook of the said oscillating lever, a twisting spindle adapted to rotate around its axis and provided at its free end with a hook, means for imparting to the oscillating lever a semi-circular movement so as to pull the hank and stretch it between the hook of said lever and the hook of the twisting spindle, means for imparting to said spindle a movement of rotation around its axis so as to twist the hank between both hooks, a bar adapted to move across and above the twisted hank, means for imparting to the oscillating lever a semi-circular movement in the opposite direction, so as to fold the hank in half upon itself upon the cross bar acting as a guide, and to bring the end of the hank, carried by the hook of the lever, in front of the other end of the hank, carried by the hook of the twisting spindle, means for stripping the said first end from the lever hook onto the hook of the twisting spindle, so as to bring together both ends of the hank, and means for rotating the twisting spindle in a direction opposite to that of the first twisting operation, so as to twist together both halves of the hank folded one upon another, together with a fixed rod, provided at one end with a hook, means for hooking the loop of the hank, formed by said folding, to the hook of said rod, a series of labels, consisting of tubes of paper, threaded and guided upon said rod, and gripping means for threading the said labels upon the skein, formed by the halves of the hank folded in half upon itself and twisted together.

3. A skein forming machine, comprising a bar adapted to carry a number of hanks to be treated, a lever adapted to oscillate and provided with a hook at its free end, means for lifting the hanks one by one from said bar and successively engaging each of them upon the hook of the said oscillating lever, a twisting spindle adapted to rotate around its axis and provided at its free end with a hook, means for imparting to the oscillating lever a semi-circular movement so as to pull the hank and stretch it between the hook of said lever and the hook of the twisting spindle, means for imparting to said spindle a movement of rotation around its axis so as to twist the hank between both hooks, a bar adapted to move across and above the twisted hank, means for imparting to the oscillating lever a semi-circular movement in the opposite direction, so as to fold the hank in half upon itself upon the cross bar acting as a guide, and to bring the end of the hank, carried by the hook of the lever, in front of the other end of the hank, carried by the hook of the twisting spindle, means for stripping the said first end from the lever hook onto the hook of the twisting spindle, so as to bring together both ends of the hank, and means for rotating the twisting spindle in a direction opposite to that of the first twisting operation, so as to twist together both halves of the hank folded one upon another, together with a fixed rod, provided at one end with a hook, means for hooking the loop of the hank, formed by said folding, to the hook of said rod, a series of labels, consisting of tubes of paper, threaded and guided upon said rod, and gripping means for threading the said labels upon the skein, formed by the halves of the hank folded in half upon itself and twisted together, in combination with means for releasing the loop of the finished skein from the hook of said rod, after the second twist and the threading of the labels, and means, consisting of a pivoted system of two forks, for grasping the finished skein and transferring it backward, stops for arresting said movement of the forks, a box located under said stops and adapted to receive the said skeins.

4. In a machine as specified in claim 1, an oscillating lever, a latch pivoted on said lever, an angle-piece secured to the end of said latch and adapted to act as a hook for supporting one of the ends of the hank, spring means acting on said latch so as to allow the shortening of the hank during its first twist.

5. In a machine as specified in claim 1, the provision of an inclined bar carrying a number of hanks to be treated, a notch at the lower end of said bar, a fork, and of means for imparting to said fork a path in the shape of an 8 in a vertical plane, so as to pass through said notch and pick up one by one the hanks carried by the inclined bar, to raise said hanks and hook them successively onto the angle-piece supporting hook at the end of the oscillating lever.

6. In a machine as specified in claim 2, the provision of annular gripping devices for engaging and transporting one by one the labels, grasping each of them and carrying the same along the rod as far as the desired point on the skein and then returning empty after release of the label to their starting point, and means for imparting to said grippers the said reciprocating motion.

7. In a machine as specified in claim 3, the provision of a pawl, carrying at its end a collar grasping the hooked rod along which are threaded and guided the labels, a rotatable shaft carrying said pawl, means for rotating said shaft so as to impart to the said

rod a slight longitudinal movement, so as to engage the hook at the end of said rod into the loop of the folded hank, a spring returning said pawl into its initial position, a stop arresting said pawl, so as to oblige the latter to move backward and release the rod by its collar, in order that the label, carried by the gripping means, may pass along the said rod at this point.

8. In a machine as specified in claim 3, the provision of plates, adapted to guide the finished skeins in their fall into the box, one of the guide plates being adapted to rise, after several skeins have been dropped and piled between said plates in the box, a rack bar carrying said box and engaging with a pinion, so as to allow an alternating movement of different amplitude forward and backward of the skein container, in order to allow the skeins, piled between the guide plates, to be joined up with the stack of skeins already in the box, together with a third plate, adapted to drop upon the skeins in the box, so as to ram them together in the bottom of the box.

In testimony whereof I have signed my name to this specification.

CHARLES HUBERT GÉGAUFF.

Witnesses:

ROBERT DE MURALT,

MARTHA CHEINCHRING.