No. 878,091. PATENTED FEB. 4, 1908.

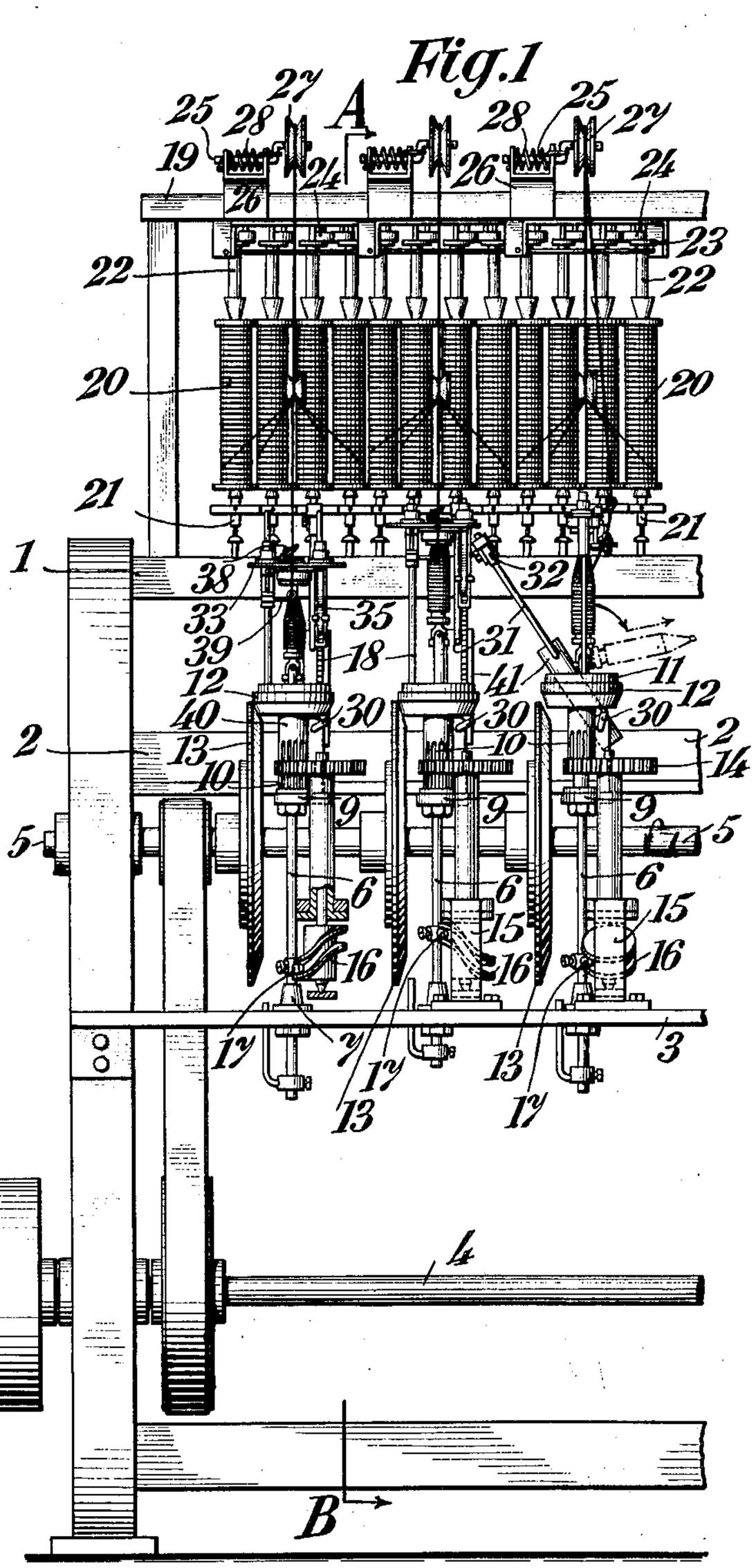
J. SCHÄRER-NUSSBAUMER.

APPARATUS FOR MAKING COPS.

APPLICATION FILED AUG. 1, 1905.

4 SHEETS—SHEET 1.

Fig. 1



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B. Kommers

Inventor:

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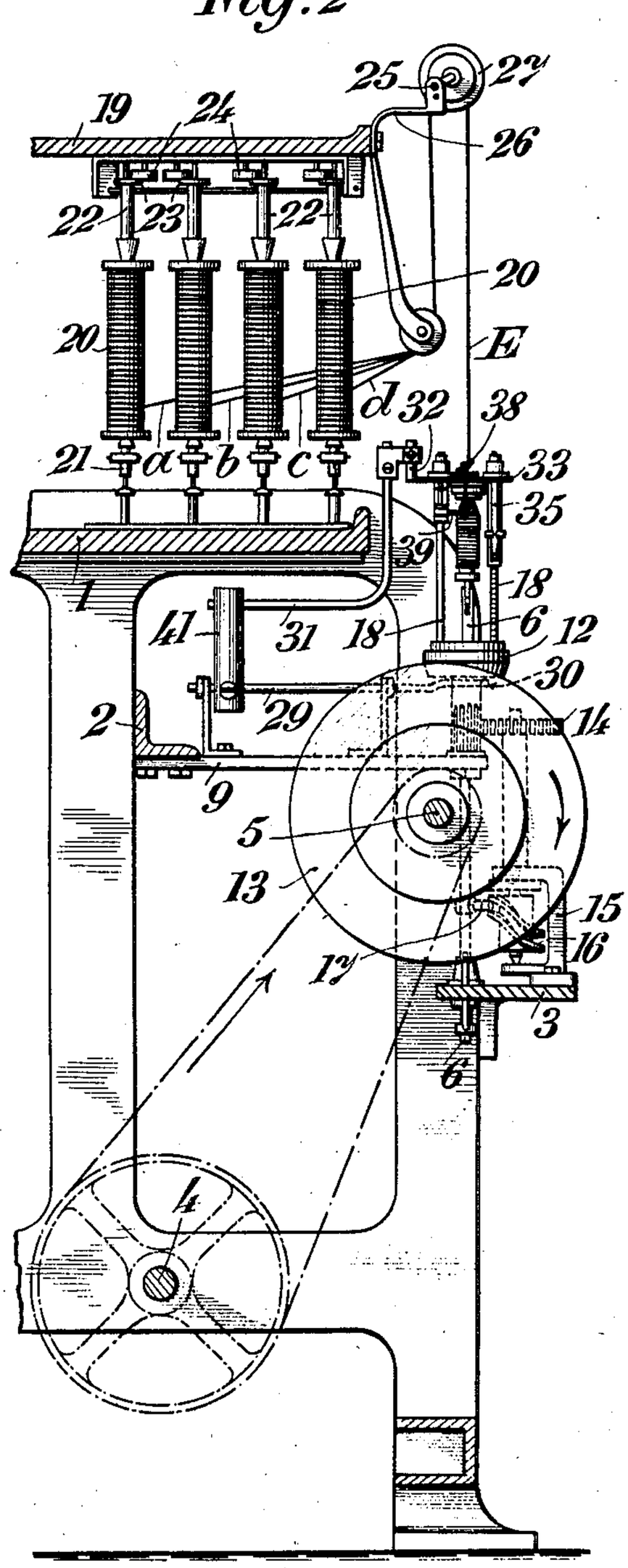
4 SHEETS—SHEET 2.

Fig. 2



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4 SHEETS—SHEET 3.

Fig. 3

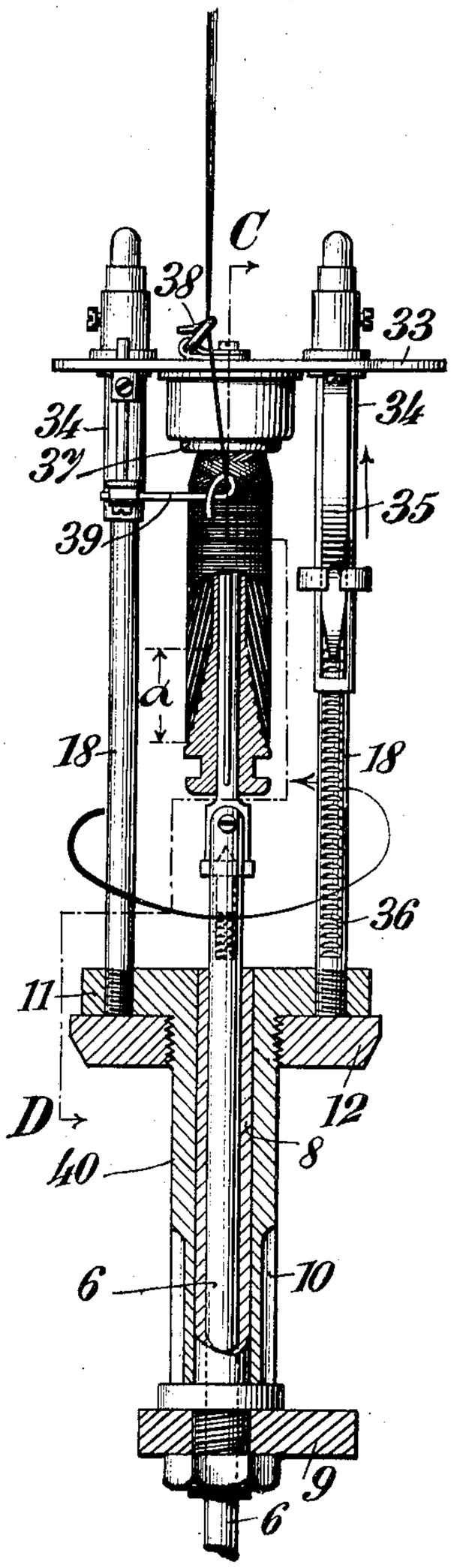
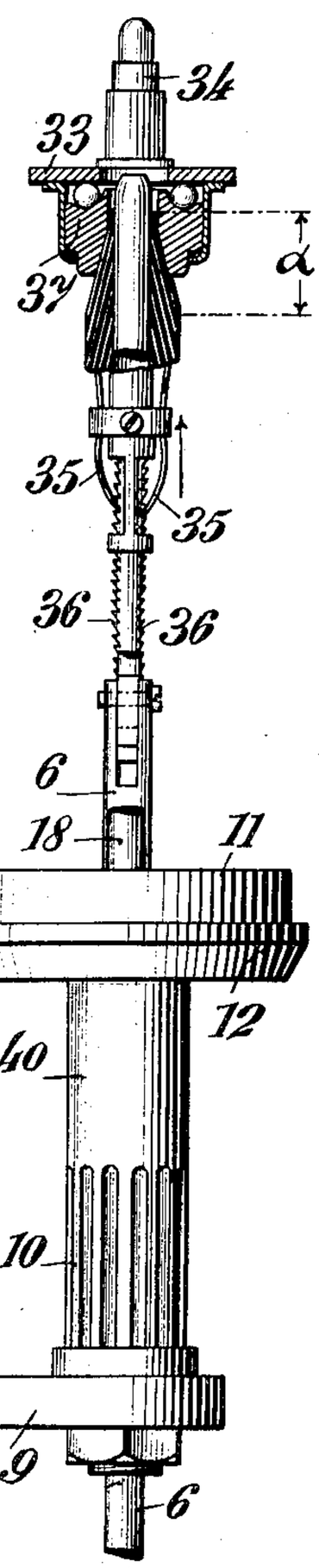


Fig. 4



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4 SHEETS—SHEET 4.

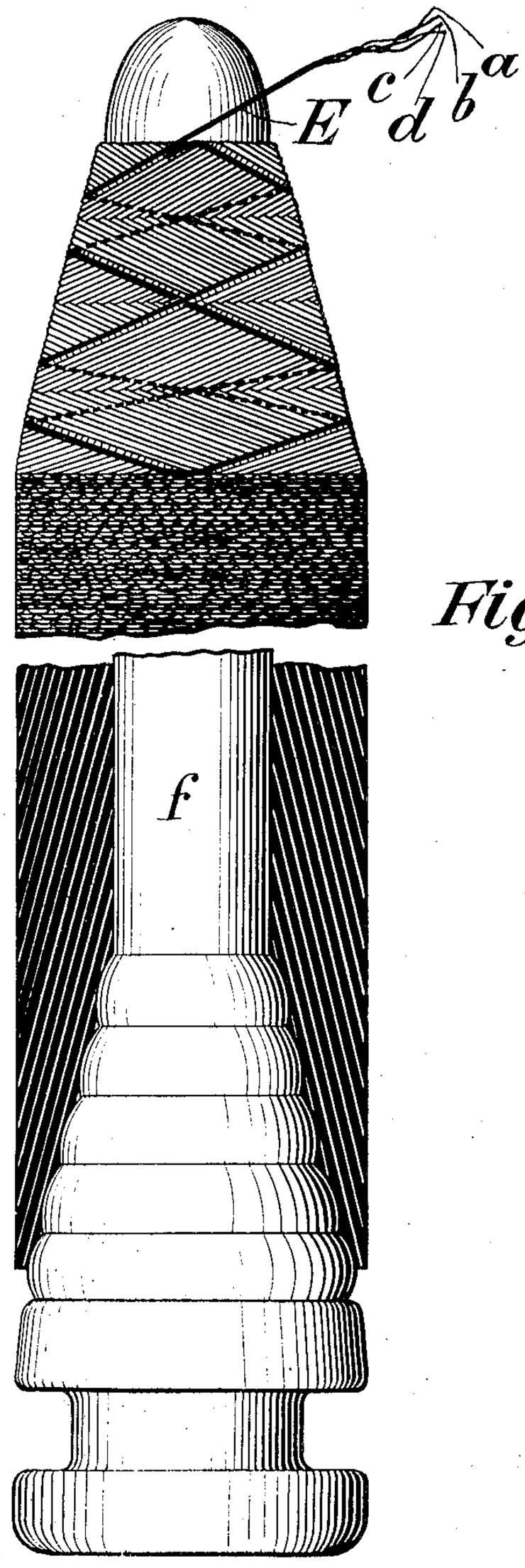

Fig. 5

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UNITED STATES PATENT OFFICE.

JAKOB SCHÄRER-NUSSBAUMER, OF ERLENBACH, SWITZERLAND.

APPARATUS FOR MAKING COPS.

No. 878,091. Specification of Letters Patent. Patented Feb. 4, 1908.

Application filed August 1, 1905. Serial No. 272,199.

To all whom it may concern:

Be it known that I, JAKOB SCHÄRER-NUSSBAUMER, a citizen of the Republic of Switzerland, residing at Erlenbach, District of Meilen, Switzerland, have invented new and useful Improvements in Apparatus for Making Cops, of which the following is a specification.

In weaving textiles, and especially doubled silk fabrics in which not merely a single thread, but several threads, not twisted together, are passed into the shed at each pick, the present practice is to employ cops on which the various threads are twisted together to form a single thread, and this latter is wound on the cop in parallel turns, so that the various turns or coils lie at right angles to the longitudinal axis of the cop spindle.

The use of such cops in shuttles, however, is attended with many disadvantages, as the resultant fabric shows, due to the said method of winding in parallel turns.

The exceedingly rapid speed at which silk looms are worked now-a-days, demands the use of tightly wound cops, otherwise the thread slides on the cop-spindle, causing jamming together of the various coils. With such tightly wound cops with parallel coils however, the silk threads, which despite their being twisted are still very delicate, become stretched in winding. The threads, therefore, shrink together again, which, however, does not occur till after they have been woven. This causes the entire fabric to draw together in the direction of the weft, thus presenting a crinkled appearance. Such a fabric has then to be smoothed again by artificial means, involving considerable expenditure of both time and money.

Loosely wound cops with doubled parallel coils are employed for looms working at a relatively low speed. They have the drawbacks that the fine twisted silk threads wedge themselves into the symmetrically lying grooves presented by adjoining parallel turns. The doubled twisted thread in being drawn off such a cop often unwinds in several turns, or one or more layers, at once, which are then liable to untwist, thus naturally leading to various interruptions in the proper operation of the loom, or to irregularity in the appearance of the fabric. This condition of affairs is also frequently caused by the inertia of the cop on the shuttle entering the lay. Furthermore, with such cops with doubled parallel coils, any lumps or knots or the like in the doubled thread cause interruptions of the work, owing to the thread, on being drawn from the cop, catching in these obstructions and thereby causing several turns or layers of thread to be drawn off simultaneously, or the threads may break.

Another serious defect of cops which are doubled parallel wound, whether tightly or loosely wound, is that the doubled thread lying next the cop stick on being drawn off is exposed, to resistance or friction at the stick. This is due to the thread being so long in contact with the stick during the period of unwinding. This friction increases as the unwinding proceeds, so that doubled parallel wound thread cops of great lengths cannot be wound, small cops having therefore always to be employed. All these defects are entirely overcome by the use of cops made by the machine forming the subject of the present invention. In carrying out the latter several threads are conducted to a cop-stick through a guide turning on a vertical spindle, in such manner that they can be lightly twisted to form a single thread, lying throughout in cross manner on the cop-stick. Such novel cop is shown and described in my application for patent of the United States Serial No. 308,066, filed March 26th, 1906. In this way the composite thread on being unwound from the cop (for instance, on unwinding in the shuttle), is again untwisted into the component threads which are thus brought into the shed lying parallel to each other. In the machine employed for carrying out my invention the cop spindle is given a rapid continuous reciprocatory motion by means of mechanism which rotates the thread-guide round the spindle.

In the accompanying drawings Figure 1 is a front elevation of the end portion of the machine. Fig. 2 is a section on the line A—B of Fig. 1. Fig. 3 is a sectional view showing one of the cop winding devices to an enlarged scale. Fig. 4 is a section of the same taken on the line C—D of Fig. 3. Fig. 5 shows a cop drawn to a still larger scale.

The machine standards support the table 1, a bar 2, below the latter, and a second horizontal bar 3.

4 is the main driving shaft and 5 the shaft for driving the cop winding devices. Both

shafts are mounted horizontally in the frame of the machine. Each cop winding device comprises a vertical, non-rotary spindle 6, said spindles reciprocating in the bearings 7 secured to the bar 3 and in tubular bearings 8 (Fig. 3) carried by arms 9 projecting from the bar 2.

40 is a sleeve which is capable of both turning and sliding on the bearing 8. The bottom of the sleeve 40 has teeth 10, while the top is formed as a disk 11. Below the latter a friction disk 12 is secured to the sleeve 40, which latter disk is driven by a friction wheel 13 mounted on the shaft 5. With the teeth 10 of each sleeve 40 there meshes a pinion 14, the vertical axis of which is mounted in a bearing-bracket 15 secured to the bar 3. On the axis there is also mounted a cam 16, presenting a groove, and in the latter there engages an adjustable stud 17 projecting horizontally from the spindle 6. In this manner the latter is reciprocated vertically on rotation of the cam. The disk 11 carries two vertical rods 18 located diametrically opposite to each other and at an equal distance from the axis of the disk. They serve a purpose to be hereinafter described. Between the table 1 and a second table 19, located above the same, there are arranged for each cop winding device four bobbins 20, located one behind the other in a slanting line. From these bobbins the silk thread twisted on the machine, that is, the thread to be wound as doubled thread on the cop, is taken. The bobbins are held between the points of pins 21, 22 mounted on the tables 1 and 19. The upper pins 22 carry disks 23, on which, below the table 19, there rest weights in the form of small rollers 24. These can move up and down, but not laterally, and by pressing on the disks 23 they exert a braking action on the bobbins 20. On the upper table a tension device is provided for each winding apparatus. The tension device presents a tension pulley 27, mounted on the crank pin of a small crank shaft 25, carried by a bracket 26 secured to the table 19. 28 are spiral springs, one end of which takes below the crank pin, while the other end presses against the bracket 26. Each winding apparatus has its own stop-device. The latter has a crank shaft 29, mounted on the arms 9, the crank 30 of which takes below the disk 12. On the shaft 29 a weight 41 is secured, the center of gravity of which, when the winding device is in operation, lies above the axis of the shaft 29. In the weight 41 a stop-arm 31 having a projecting pin 32 is secured.

The whirls consist of a horizontal bridge or plate 33 (Figs. 3 & 4), having sockets 34 to receive the rods 18 which guide the said plate. One of these sockets is provided with slots at each side to receive springs 35 which engage in notches 36 of the rod 18, which passes through this socket. Below the plate 33 is a box containing a ring 37, relatively to which the plate can rotate. The whirl has in addition to the actual thread guide 39, an auxiliary guide-eye 38. Any suitable number of these cop winding devices may naturally be employed, and all operate in the same manner. The method of operation is as follows:

The threads *a b c d* (Fig. 5) drawn from the bobbins 20 are conducted over the tension disk (Fig. 2) of the tension device and from here as twisted doubled thread E through the eyes 38 and 39. It is then secured in well known manner to the conical part of a cop-stick *f* stuck on the cop spindle. The winding apparatus is then set in motion by the friction disk 12 being brought into contact with the friction wheel 13, whereby the sleeve 40, together with the rods 18 and whirl, is caused to rotate rapidly in the direction of the arrow (Fig. 3) round the non-rotary cop spindle and therefore round the cop-stick. At the same time, the pinion 14 meshes with the teeth 10 whereby the cam 16 is rotated. This causes the cop-stick to be rapidly reciprocated up and down through a distance corresponding to the height of the cone to be produced (designated by "*α*" in Figs. 3 & 4). In this manner the doubled thread E, consisting of the four threads *a b c d*, is wound cross-wise on the cop, and the ratio of transmission between 10 and 14 is so selected that the doubled thread E is wound in closed cross manner. Through the whirl, or rather the thread guide 39 thereof, rotating round the spindle, the thread is twisted during the winding operation, so that it is wound on in twisted condition. The purpose of this twisting will be described below.

During the winding operation the material wound on will, in becoming gradually thicker, slowly push the whirl upward on the rods 18, the cone toward the end of the upward movement pressing against the correspondingly shaped walls of the aperture in the ring 37, whereby the entire whirl, on each ascent of the spindle, shifts always higher up the rods 18. The purpose of the springs 35, engaging in the toothed or notched part 36, is to prevent descent of the whirl on ascent of the spindle. When the thread on the cop has been wound on to a certain definite thickness, the plate 33 presses against the pin 32, whereby the stop arm 31 (which when the apparatus is working occupies a vertical position) comes into an inclined position, the weight 30 also turning to one side. The shaft 29 is thus turned and its crank lifts the sleeve 40 with the friction disk 12, that is to say,—the disk 12 is lifted from the wheel 13, so that the whirl and spindle stop, as is shown in Fig. 1, in the case of the third apparatus from the left-hand side.

It is necessary to stop the spindle to take off the finished cop, because it does not, as in prior machines with parallel-winding mechanism, move slowly, but reciprocates at a high speed. The cop, therefore, cannot be removed from the rotating spindle without risk of damaging the thread. To move the finished cop it is necessary to slightly raise the whirl from the spindle, so that, with the cop, it can be turned into the dotted line position Fig. 1. The weights 24, which on rotation of the bobbins 20 run on the disks 23, act as a brake for the bobbins, so that a certain definite tension is maintained in the thread drawn from the same. By increasing or decreasing these weights the tension of the thread can be regulated at will. The tension device with the spring 28, already described, is for the purpose of compensating for any alteration in the amount of tension of the thread taken from the bobbins 20. For if the tension decreases, the pulley 27 will be moved upward by the spring 28, so that the thread will be drawn tighter. Vice versa, if the tension increases the pulley 27 will be moved downward, the spring 28 yielding, so that the pull on the thread is not unduly great.

The cops wound in this manner are of the following construction. The four threads *a b c d* are twisted together. The thus twisted composite thread E lies in cross turns or coils on the stick *f*.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In a machine for making cops, a vertically slidable, non-rotating spindle, a toothed element rotatable about the spindle, friction means to drive said element, a winding mechanism driven by said element, a second toothed element engaging with the first toothed element, a rotating cam driven from the second toothed element, and means on the spindle engaging the cam whereby said spindle is rapidly raised and lowered by the cam.

2. In a machine for making cops, a vertically movable, non-rotatable spindle, a rotatable sleeve on the spindle having long teeth, means to frictionally drive the sleeve, a winding mechanism driven by said sleeve, a gear wheel meshing with the teeth on said sleeve, a spiral cam rotated by the gear wheel, and a pin on the spindle engaging the cam, whereby the spindle is rapidly reciprocated.

3. In a machine for winding cops, a shaft having a number of friction wheels thereon, a friction disk having a toothed sleeve driven by each friction wheel, a cop carrying spindle vertically reciprocable and non-rotatable in each sleeve, a pin adjustable on each spindle, a gear wheel gearing with each sleeve and a high pitch spiral cam rotated by each wheel and engaged by the pin on the spindle.

4. In a machine for winding cops, the combination with the frictionally driven winding means and a vertically reciprocable cop spindle; of a crank arm and a weight operated by the winding means when in its end position to rotate the weight and arm and lift said means from its driving position, substantially as described.

5. In a machine for winding cops, the combination with frictionally driven winding means and a vertically reciprocable cop spindle, of a crank arm, a weight thereon, a stop connected to said weight and operated by the winding means when in its end position to rotate the weight and arm and lift said means from its driving position, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

JAKOB SCHÄRER-NUSSBAUMER.

Witnesses:
A. LIEBERKNECHT,
MORITZ VEITH.