

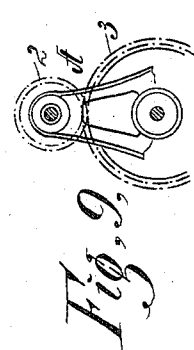
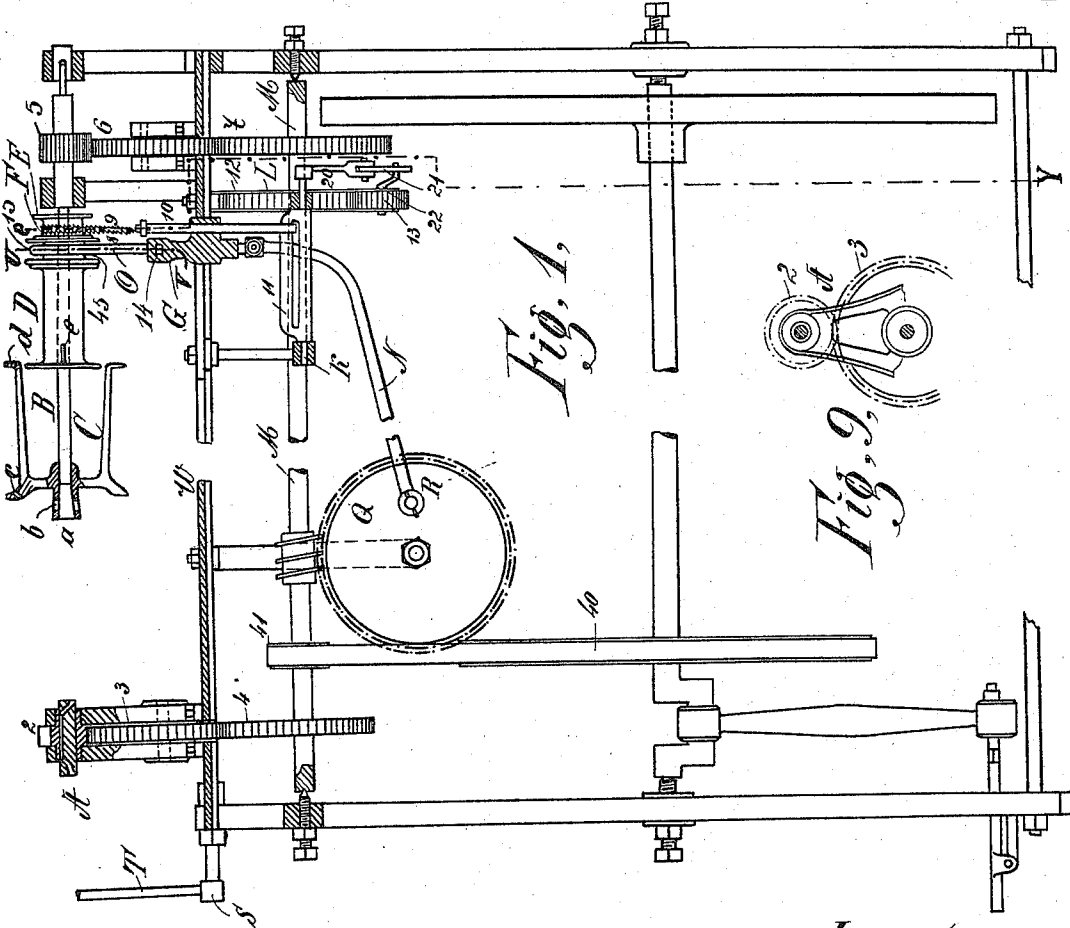
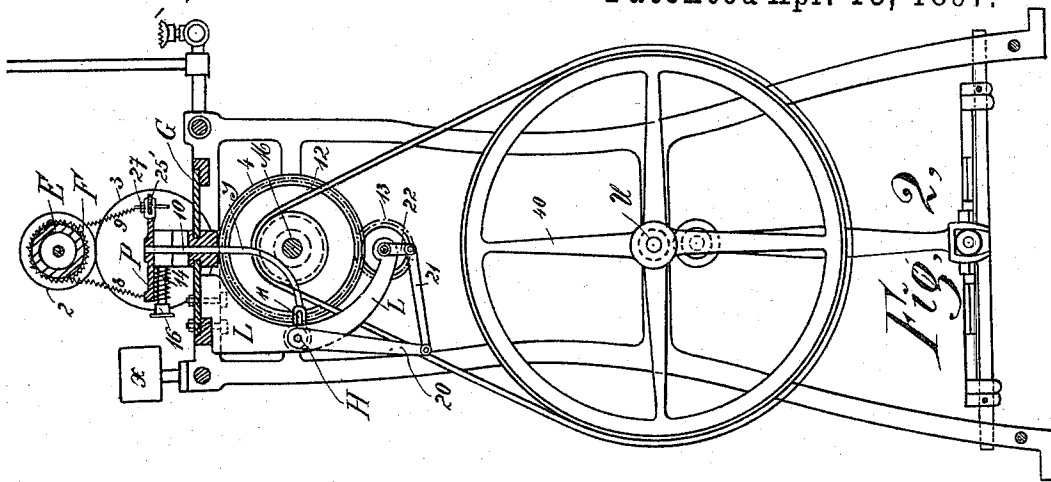
(No Model.)

2 Sheets—Sheet 1.

K. ENGEL.
SPINNING MACHINE.

No. 580,452.

Patented Apr. 13, 1897.



Witnesses:
H. L. Edwards Jr.
Fred. J. Dole.

Inventor:
Koloman Engel.
By his Attorney,
F. A. Richard.

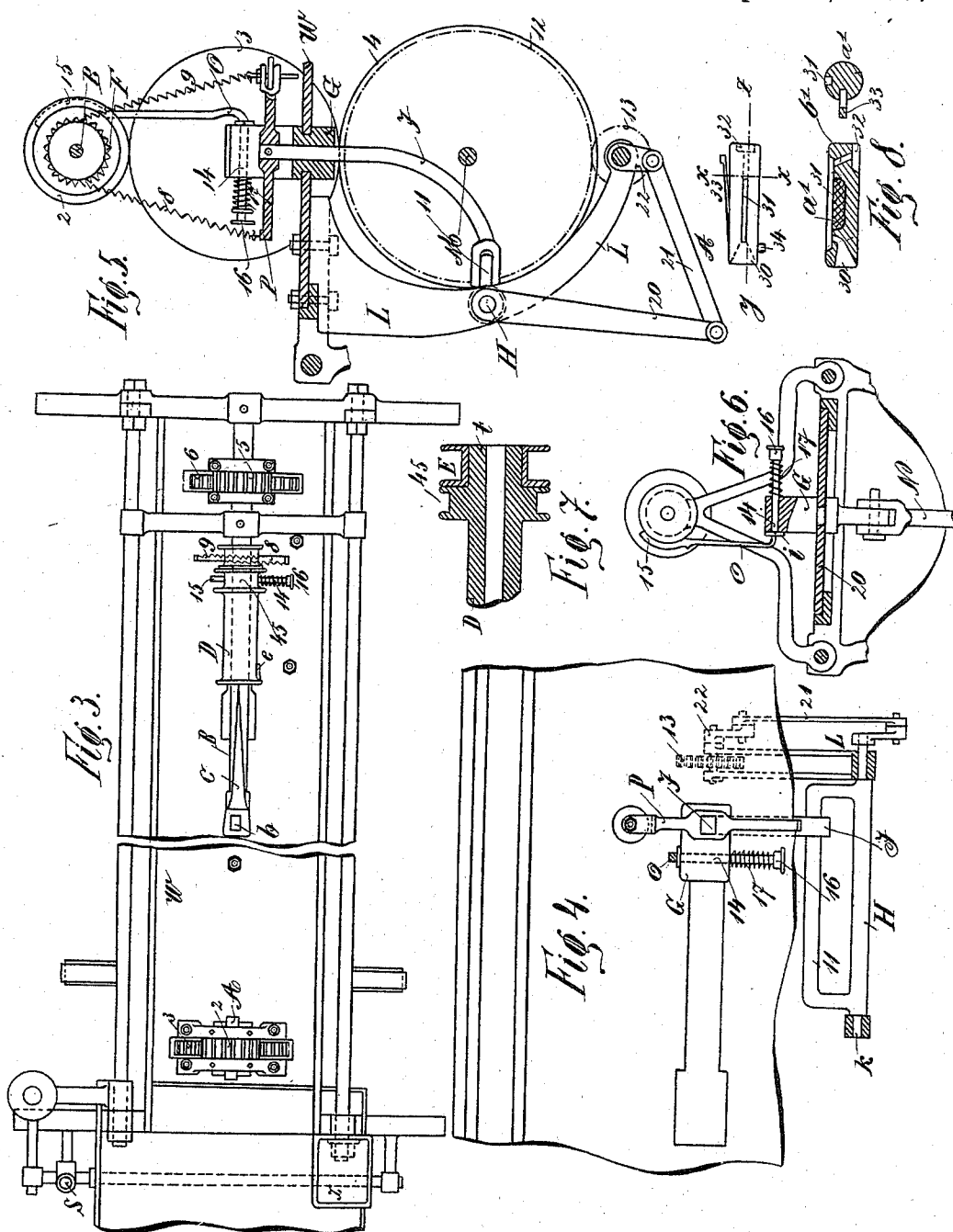
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UNITED STATES PATENT OFFICE.

KOLOMAN ENGEL, OF BARANYA-SZENT-LÖRINCZ, AUSTRIA-HUNGARY.

SPINNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 580,452, dated April 13, 1897.

Application filed January 2, 1897. Serial No. 617,756. (No model.)

To all whom it may concern:

Be it known that I, KOLOMAN ENGEL, a subject of the Emperor of Austria-Hungary, and a resident of Baranya-Szent-Lörincz, Comitat Baranya, Empire of Austria-Hungary, have invented certain new and useful Improvements in Spinning-Machines, of which the following is a full, clear, and exact description.

The present invention consists of a spinning-machine by means of which the roving, stretching, and fine spinning are accomplished in one operation; and in order to render the present specification more easily intelligible reference is had to the accompanying drawings, in which similar letters and figures of reference denote similar parts throughout the several views.

Figure 1 is a vertical longitudinal section through the machine; Fig. 2, a section on line E Y of Fig. 1; Fig. 3, a plan. Fig. 4 is a detail plan view, drawn to a larger scale, of the brake-actuating mechanism. Fig. 5 is a vertical section drawn to a larger scale and taken through the machine-table to the left of the brake mechanism in Fig. 3 and showing said spool brake mechanism partly in section. Fig. 6 is a section on line U V of Fig. 1. Fig. 7 is a detail part-horizontal section through the spool, drawn to a larger scale. Fig. 8 shows a plan and longitudinal and cross sections of a shuttle for twisting the roving, the two latter sections being taken along the lines *y z* and *x x*, respectively, of the plan view of the said figure. Fig. 9 is an end elevation of the shuttle-bearing.

The machine comprises the table W, which carries the various mechanisms, which are driven by suitable driving-gear located underneath the said table. The material to be spun receives the first twist from a shuttle A, which is driven by a train of wheels 2, 3, and 4 from the shaft M. This shuttle should rotate at a speed of about two thousand revolutions per minute. The construction of the shuttle which imparts to the roving the first or rough twist will be clearly seen from Fig. 8. The roving passes from the arm T and is threaded into the conical opening 30 at the end of the shuttle A, which is cylindrical in form. From the opening 30 the thread passes along a longitudinal groove 31, then into a transverse eye *b'* and out of the shuttle at the opposite side

at 32, thus performing a Γ -shaped path through the shuttle. The shuttle is fixed in the boss of the gear 2 by means of the spring-catch 33, which engages in the interior of said boss and is prevented from longitudinal movement in the same by means of a projection 34. If it is required to thread the roving through the shuttle, the catch 33 is depressed and the shuttle taken out of the gear 2. The shuttle is further provided with a recess *a'*, in which a sponge having a cambric covering is arranged, which sponge serves to moisten the thread during the work. The object of this arrangement is to render the thread moist and soft while it is being stretched. By means of this shuttle and the rough twist imparted to the roving by the same the feed of material to the machine is greatly accelerated and the working effect of the machine enhanced.

The speed at which the shuttle revolves must be determined by trial and must be such as to enable the spinner to alter the thickness of the thread at will. As soon as the thread issues from the shuttle it will have a certain amount of strength, which greatly facilitates the subsequent fine spinning.

The fine twist is imparted to the thread between the shuttle A and the spindle B, which latter should revolve at about four thousand revolutions per minute, to correspond with the capability of the machine. This speed is absolutely necessary in order to impart to the thread the finest possible twist during the short period in which the thread passes from the shuttle to the spool D. If the shuttle A were omitted, the fine twist imparted by the machine when running at four thousand revolutions would reach to the hand of the spinner, and it would be impossible for him to feed the material quickly enough to the machine in order to vary the thickness of the thread at will. The arrangement of the shuttle enables in a great measure fine spinning at such a high speed without breaking the thread, since the tension of the thread between its entrance and exit at the shuttle, while it is in the groove 31, is employed to stretch the roughly-twisted roving. The rotation of the shaft B which imparts the fine twist to the roving is effected from the shaft M by the train of wheels 5 6 7, which are advantageously arranged in the proportion

of fifteen to eight to four. The proportion of the shuttle-driving gear is advantageously as twelve to nine to five. The difference between these speeds of rotation will therefore be such that the tension caused will not be quite compensated by the stretching of the roving in the shuttle, so that a breaking of the thread would not be entirely avoided. In order, therefore, to entirely obviate any risk whatever of breakage of the thread, I employ an automatic intermittently-operated brake.

As is well known, the thread is wound on the spool D by the latter rotating in the same direction as its spindle, but at a different speed. In practice this is generally attained by decreasing the speed of the spool in that the motion of the same is either stopped entirely or slowed by an uninterrupted brake.

The spooling of the thread in the present case is effected by passing the same through the guide-holes *a b c d* of the flier C, and then attaching the end to the spool D by means of the spring *e* on the latter. The spool D is loosely mounted on the spindle B and will rotate with the flier C.

By the aid of my improved intermittently-operating brake the finest cambric threads may be produced without the slightest danger of breaking the thread, since the latter is not subjected to any strain.

The construction and arrangement of the brake F is shown in Figs. 2 and 5. The spool D is provided with a rearwardly-extending boss *t*, on which is mounted to rotate with the said spool a grooved ring E. A fine spiral spring F is wound round the groove of the ring E once, and its ends are fastened to the ends of a transverse bar P, one of the said ends 8 being fast to the corresponding bar end, while the opposite end 9 is adjustably fixed to the opposite end of the bar P. To this end the end 24, Figs. 2 and 5, of the bar is bifurcated and carries a screw-spindle 27, to which the end of the spiral is attached. Between the arms of the fork a screw-nut 25 is arranged on the spindle, and a locking-nut 26 is also provided, so that by operating the two nuts the position of the screw-spindle and the tension of the spring F may be adjusted.

The bar P is mounted on an arm J, which passes downward through the sliding block G and is bifurcated at its lower end to engage a slot 11 of the bar H, which is pivoted in bearings L and K, Fig. 4, underneath the table. The shaft M carries a gear 12, which engages a pinion 13, mounted in the lower end of the arm L, said gear 13 having attached thereto a crank-arm 22, which is connected to an arm 20, fast on the shaft H, by means of a connecting-rod 21. Thus the rotation of the pinion 13 will communicate a rocking motion to the lever 11. As will thus be seen, the operation of the brake will be intermittent, since the same will be applied to the spool D when the arm 11 is depressed, taking with it

the arm J and bar P and tightening the spiral round the groove of the spool D.

An intermittently-operating brake is advantageous for other reasons. It enables the spinner to keep back the thread in case sufficient twist should not have been imparted to the same. It further renders possible an increase or decrease in the fineness of the twist imparted to the thread without straining the same in any way.

The device for moving the spool consists of the spool-holder O, Figs. 1, 3, and 5, being a lever having its upper end rounded out to lie in the groove 45 of the spool D. The lower end of this lever is bent round to lie horizontally, as at 14, said end having a square section and being passed through the sliding block G and retained in position on the same by means of a spring 17, arranged between the block G and a nut 16 on the end of the bar 14. The spring 17 will act to keep the upper end of the rod O in the groove of the spool, and when it is required to take the spool out it will only be necessary to press the arm 14, through the block, against the action of its spring, and the spool will be free of the said arm.

The stand G, in which the spool and the brake device are mounted, is connected underneath the table to a connecting-rod N, which is operated from the gear Q by means of the crank-pin R. The block G is suitably guided in a slot in the table W. In order to moisten the material being spun, a reservoir or receptacle *x* is provided, which may contain cold or lukewarm water, in which the spinner can moisten his fingers. Motion is imparted to the shaft M by means of the gears 40 and 41, the former of which is fast on the crank-shaft U and engages the latter, which is keyed to the shaft M. The crank-shaft U may be worked by a treadle or by means of sheave-pulleys (not shown) from any suitable power source.

I claim as my invention—

1. In a spinning-machine in combination with a flier, a spool and means for rotating and reciprocating the same, means for intermittently imparting to the spool a speed differing from that of the flier, a rotary shuttle through which the roving passes previous to its passage through the flier, said shuttle comprising a conical end orifice, a longitudinal peripheral groove, a transverse canal *b'* and exit 32, and means for rotating said shuttle in the manner and for the purpose substantially as described.

2. In a spinning-machine in combination with a flier, a spool and means for rotating and reciprocating the same, a shuttle as specified arranged in front of the said flier, a tooth-gear and means for rotating the same, a hollow boss to said tooth-gear a spring-catch on said shuttle to engage the interior of said boss, a stop on said shuttle to limit the movement of said shuttle in said gear means in connection with said shuttle for moistening

the roving and means for imparting to the spool and to the flier intermittently-varying speeds substantially as described.

3. In a spinning-machine in combination
5 with a flier, a spool and means for rotating and reciprocating the same, a shuttle as specified, an intermittently-operated brake to said
10 spool consisting of a spiral spring wound round the boss of said spool, a bar to which the ends of said spring are attached and
means for reciprocating said bar vertically
15 in the manner and for the purpose substantially as described.

4. In a spinning-machine the combination
15 of a flier, a spool, and means for rotating the same, a groove arranged in the end of said

spool, a spiral spring wound around said
groove, a horizontal bar P supported at the
upper end of a lever J and having the spiral-
spring ends attached thereto, means for ver- 20
tically guiding said lever, a fork on the lower
end of said lever to engage the slot 11 of the
lever-bar H and means for rocking said lever-
bar H in the manner and for the purpose sub-
stantially as described. 25

In witness whereof I have hereunto set my
hand in presence of two witnesses.

KOLOMAN ENGEL.

Witnesses:

RICHARD KANT,
OTTO BECKER.