No. 777,915. PATENTED DEC. 20, 1904.

H. A. OWEN.

SPINNING MACHINE.

APPLICATION FILED DEC. 21, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

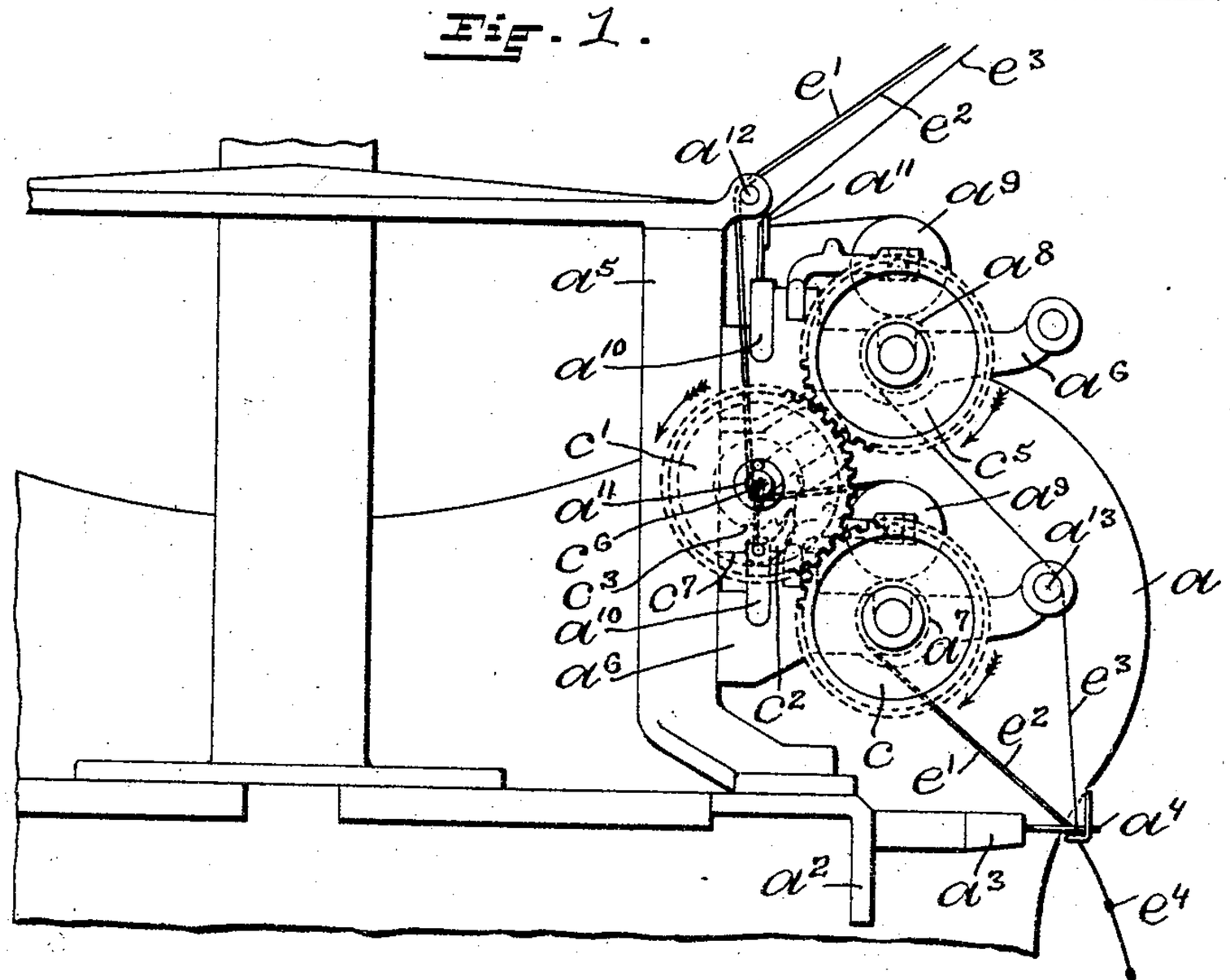


Fig. 2.

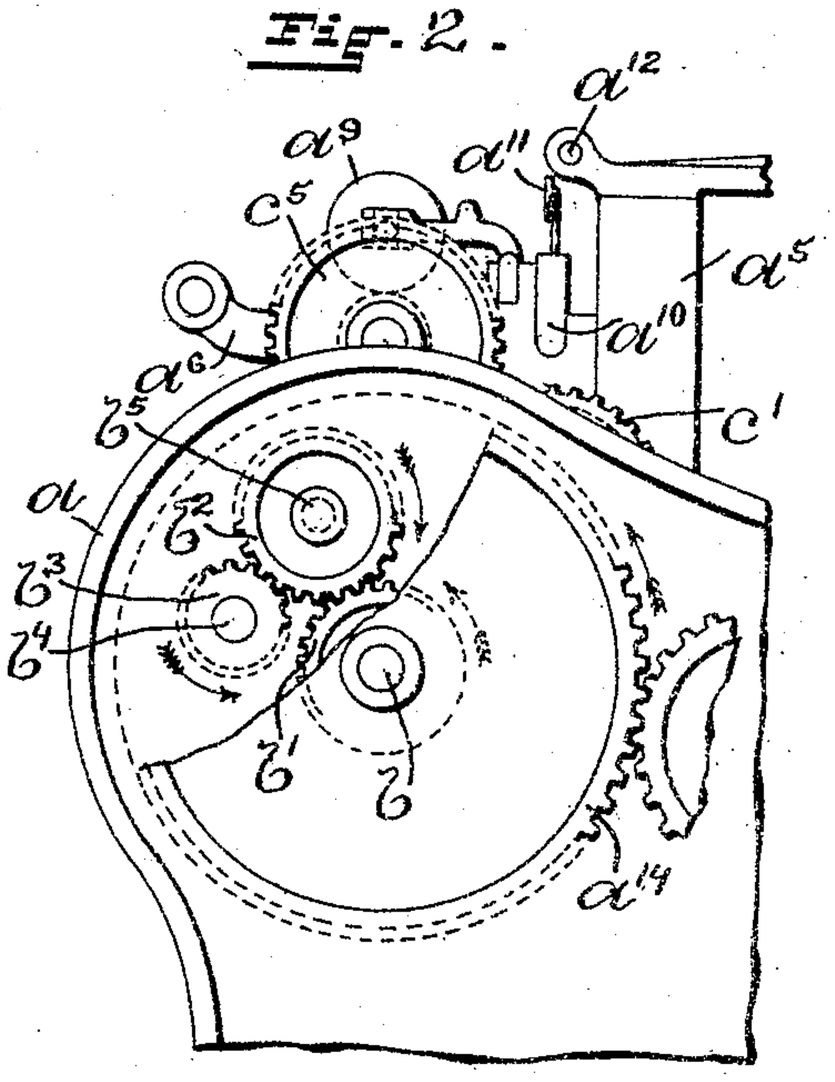
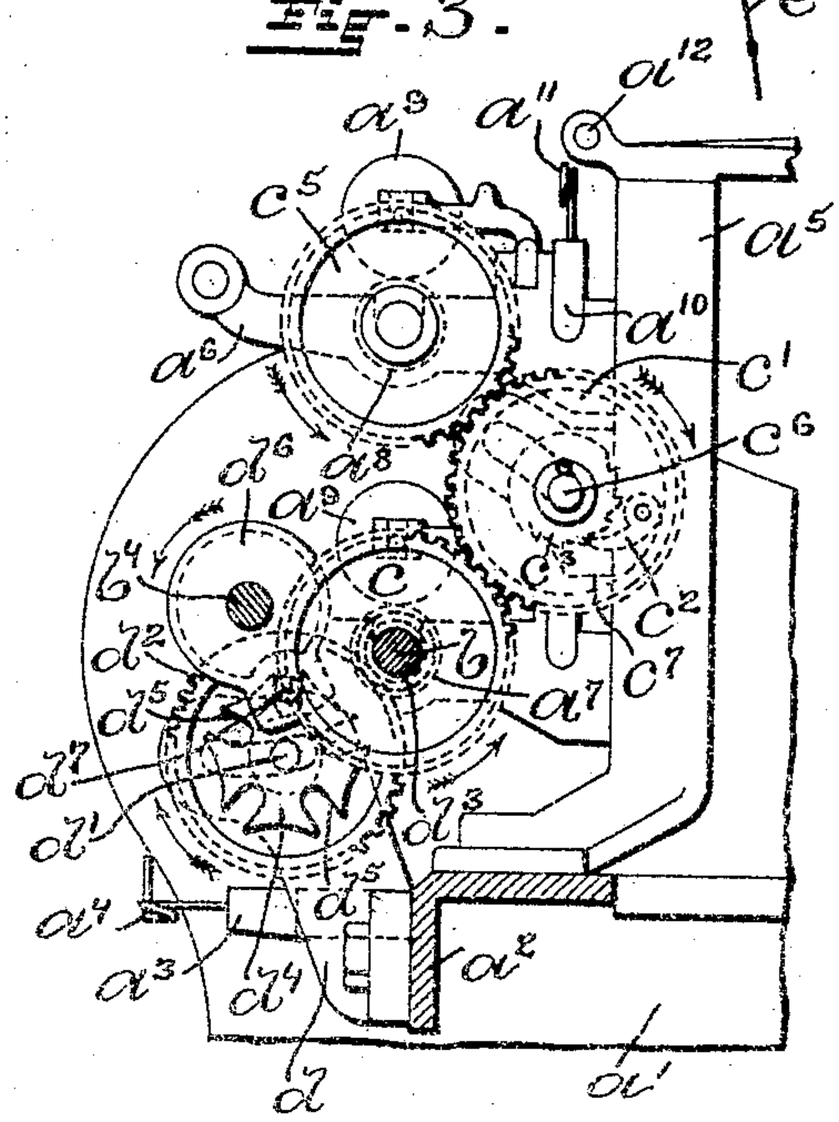


Fig. 3.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

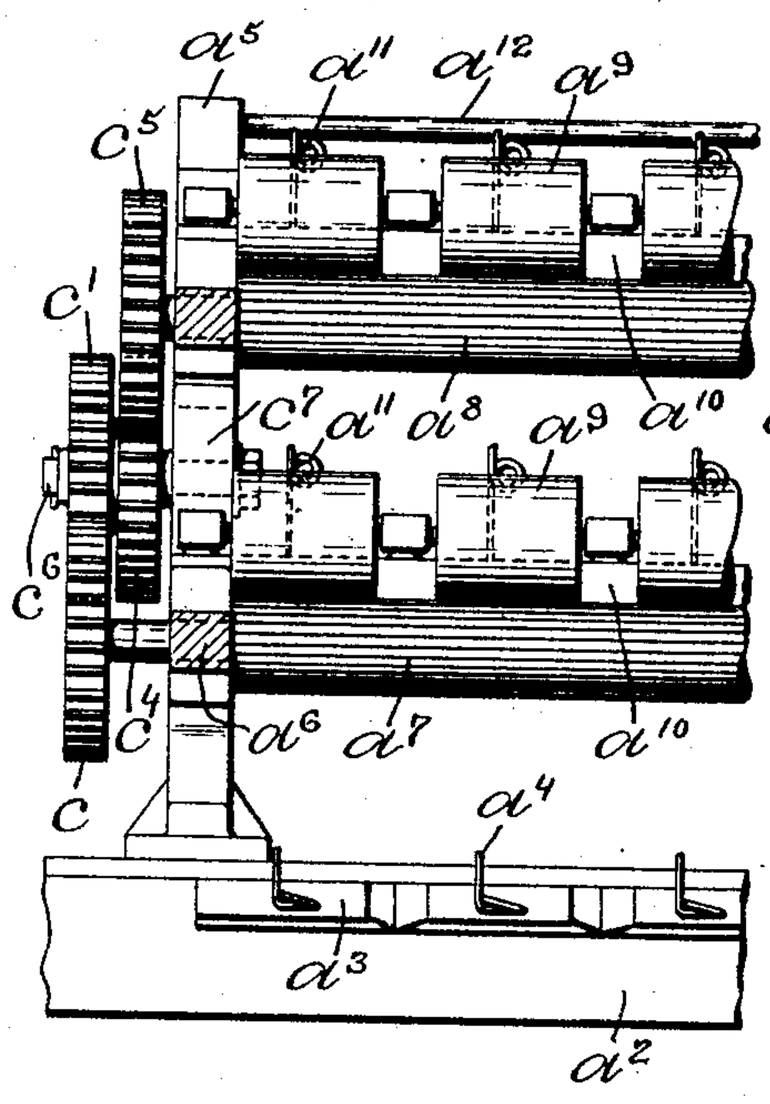

Fig. 5.

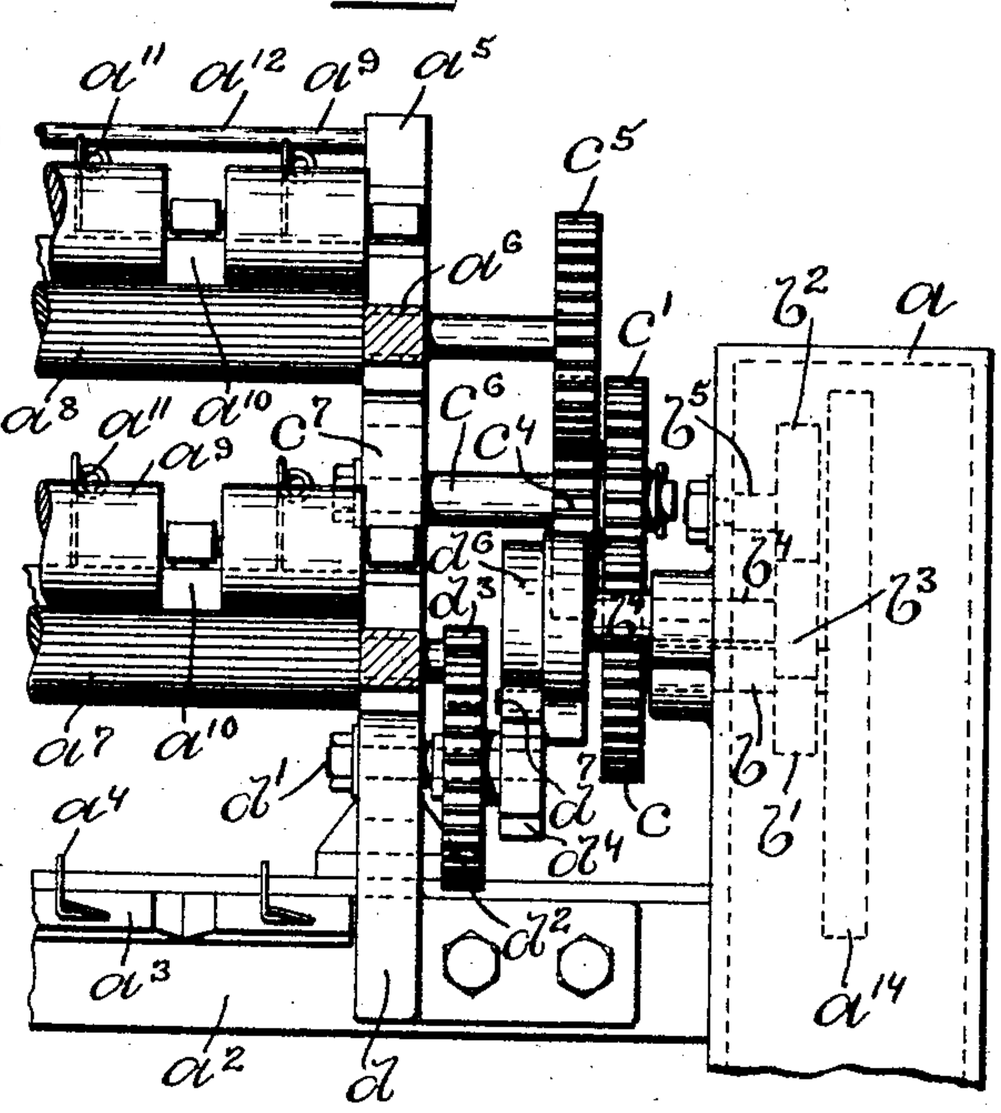

Fig. 6.

Fig. 7.

Fig. 8.

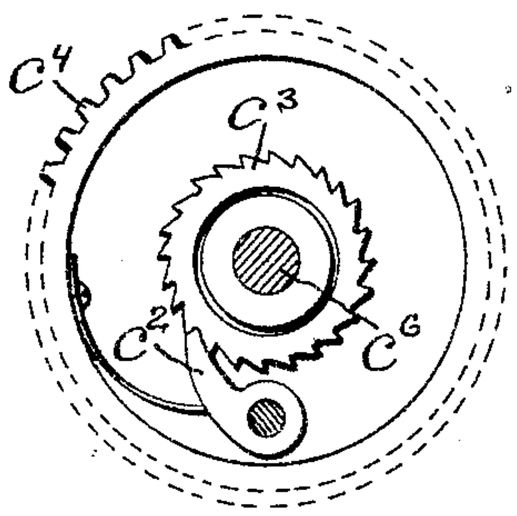

Fig. 9.

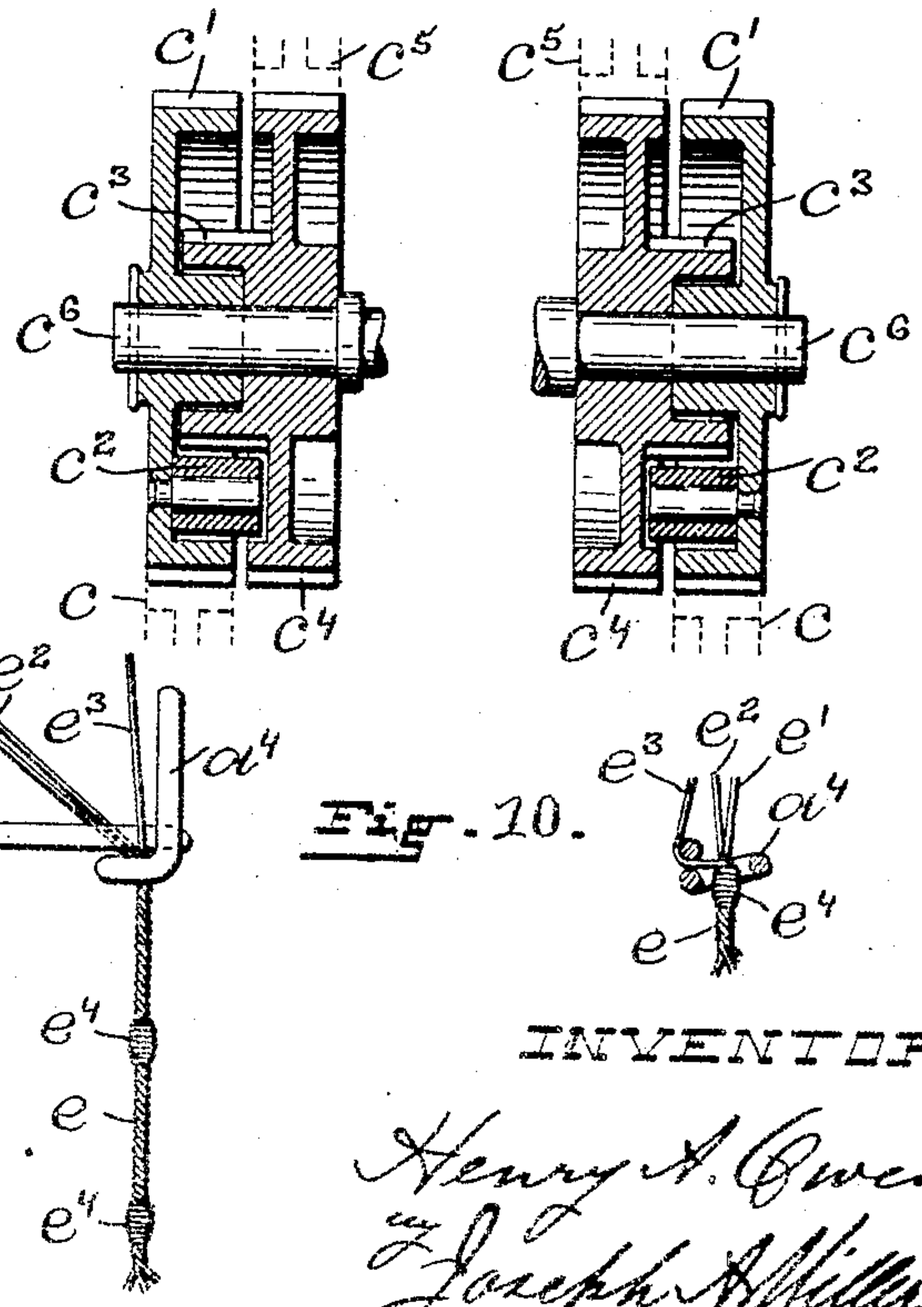

Fig. 10.

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No. 777,915. Patented December 20, 1904.

UNITED STATES PATENT OFFICE.

HENRY A. OWEN, OF WHITINSVILLE, MASSACHUSETTS, ASSIGNOR TO THE WHITIN MACHINE WORKS, INCORPORATED, OF WHITINSVILLE, MASSACHUSETTS.

SPINNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 777,915, dated December 20, 1904.

Application filed December 21, 1903. Serial No. 185,950.

To all whom it may concern:

Be it known that I, HENRY A. OWEN, a citizen of the United States, residing at Whitinsville, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Spinning-Machines, of which the following is a specification.

This invention has reference to an improvement in spinning-machines, and more particularly to an improvement in that form of spinning-machines known in the art as "twisters."

In certain fancy weaves of cloth it is required to use a thread having bunches formed at intervals on the thread to give the required result in the weave of the cloth.

The object of my invention is to form a thread having bunches a predetermined distance apart, and I accomplish this object by mechanism in a spinning or similar machine adapted to intermittently revolve the feed-rolls and by the way in which the strands forming the thread are run through the feed-rolls and guide-eyes on the finger-boards.

In twisting-machines to which my improvement is particularly adapted two sets of feed-rolls are used, one above the other. With my improved mechanism for forming bunches on the thread at intervals any number of strands may be used. Where three strands are used to form the thread, two of the strands are fed downward through the lower set of feed-rolls and guide-eye on the finger-board in the usual way. The third strand is fed downward through the upper set of feed-rolls to the outside of the guide-eye on the finger-board, where it enters the guide-eye between the coil forming the eye. It is now twisted with the two strands for a predetermined distance and then wound on the two strands to form a bunch, these operations being repeated indefinitely.

My invention consists in the peculiar and novel construction of mechanism in a spinning-machine adapted to form bunches on the threads at intervals and to give a uniform twist to the thread between the bunches, said mechanism consisting of gearing, clutches, and an intermittent motion, the whole adapted to automatically stop the lower feed-rolls, while the upper feed-rolls are revolved to feed the strand that forms the bunch and then to revolve both the lower and upper feed-rolls at the same ratio and feed all the strands simultaneously to form a uniform twist between the bunches, as will be more fully set forth hereinafter.

In the drawings enough of a twisting-machine is shown to clearly show the adaptation of my invention.

Figure 1 is a vertical view looking at the left-hand end of a twisting-machine, showing the improved gearing and clutch mechanism connected with the left-hand end of the feed-rolls and the method of carrying the strands downward through the feed-rolls and the guide-eyes on the finger-boards. Fig. 2 is a vertical view looking at the right-hand box end of the twister with the cover of the end removed, showing the gearing connecting with the intermittent-motion mechanism. Fig. 3 is a vertical sectional view looking from the right-hand end of the machine, showing the intermittent-motion mechanism connected with the right-hand end of the lower set of feed-rolls and the gearing and clutch mechanism connected with the right-hand end of the upper set of feed-rolls. Fig. 4 is a front vertical view of the left-hand end of the machine, showing the gear on the lower feed-roll connected to the gear on the upper feed-roll through double intermediate gears having a clutch mechanism. Fig. 5 is a front vertical view of the right-hand end of the machine, showing the gearing in the box end in broken lines connecting with the upper feed-roll through double intermediate gears having a clutch mechanism and to the intermittent motion connecting with the lower feed-roll. Fig. 6 is an enlarged view of the inner right-hand intermediate gear, showing the pawl and ratchet forming the clutch of the gears. Figs. 7 and 8 are transverse sectional views of the left and right hand double intermediate gears, showing them in their relative positions. Fig. 9 is an enlarged detail view of a finger-board guide-eye, showing the method of run-

ning the strands through the eye of the guide-eye; and Fig. 10 is a transverse sectional view through the coil forming the eye of the guide-eye, showing the single strand passing between the coil and winding on the two strands to form a bunch on the thread.

In the drawings, a indicates the right-hand box-end frame, and a' the left-hand end frame supporting the front rail a^2, which in turn supports the finger-boards a^3 a^3 with the guide-eyes a^4 a^4. The roller-stands a^5 a^5 are supported on the front rail a^2 and have the usual brackets a^6 a^6, constructed to form bearings for the lower bottom roll a^7, the upper bottom roll a^8, and the top rolls a^9 a^9 and to support the bars a^{10} a^{10}, having the guide-eyes a^{11} a^{11}. On the top of the roller-stands a^5 a^5 is secured the guide-rod a^{12} and on the outer ends of the lower brackets a^6 a^6 the guide-rod a^{13}, both of which extend the length of the machine.

The shaft b extends through a bearing in the box-end frame a and has on its outer end in the frame the usual front-roll gear a^{14}, operated through a train of gears in the frame. The shaft b is in alinement with the shaft of the lower bottom roll a^7, but has no connection with it. On the shaft b in the frame a is the gear b', meshing with the intermediate gear b^2, which in turn meshes with the gear b^3 on the shaft b^4, extending through a bearing in the frame a. The intermediate gear b^2 is supported on the stud b^5, secured to the end frame a.

On the inner end of the shaft b is secured the gear c, and in the same relative position is secured a corresponding gear c on the left-hand end of the lower bottom roll shaft. These gears c c mesh with the outer intermediate clutch-gears c' c', having the spring-pressed pawls c^2 c^2, engaging with the ratchets c^3 c^3 on the inner intermediate clutch-gears c^4 c^4, which mesh with the gears c^5 c^5, secured on the outer ends of the upper bottom roll shaft, as shown in Figs. 4 and 5. The intermediate clutch-gears c' c' and c^4 c^4 are loosely mounted on the studs c^6 c^6, supported on the brackets c^7 c^7, secured to the roller-stands a^5 a^5 at each end of the machine.

The upwardly-extending bracket d is secured to the front rail a^2 at the right-hand end of the machine and supports the stud d', on which is loosely mounted the gear d^2, meshing with the gear d^3, secured on the right-hand end of the lower bottom roll shaft. On the gear d^2 and forming a part of it is the wheel d^4, having a plurality of notches d^5 d^5, extending inward from its periphery, which is concaved between the notches. On the inner end of the shaft b^4 is secured the disk d^6, having the pin d^7 in a position to engage with one of the notches d^5 in the wheel d^4 at each revolution of the disk d^6. The periphery of the disk d^6 fits into the concave portions of the periphery of the wheel d^4 when the pin leaves the notches, holding the lower bottom roll a^7 from revolving through the gears d^2 and d^3 until the pin has traveled approximately a revolution and entered the next notch in the wheel. As shown in Fig. 3, the wheel d^4 has five notches and is given one-fifth of a revolution to one revolution of the disk d^6.

The thread e may be composed of any number of strands desired. In the preferred form I use three strands e', e^2, and e^3 and form the bunches e^4 e^4 on the thread by twisting the strand e^3 around the strands e' and e^2, as shown in Figs. 9 and 10. The strands e' and e^2 are carried downward over the guide-rod a^{12}, through the guide-eye a^{11} on the lower bar a^{10}, then through the lower feed-rolls a^7 and a^9 and the guide-eye a^4 on the finger-board in the usual way. The strand e^3 is carried downward through the guide-eye a^{11} on the upper bar a^{10}, then through the upper feed-rolls a^8 and a^9, over the guide-rod a^{13} to the outside of the guide-eye a^4, which it enters through the coil forming the eye of the guide-eye. It is now twisted on the strands e' and e^2 to form the bunch e^4 and then twisted with the strands e' and e^2 to form a uniform twist between the bunches.

In the operation of my improved mechanism adapted to spinning or similar machines for forming bunches on threads at intervals the lower feed-rolls a^7 and a^9 are held from revolving by the periphery of the disk d^6 engaging with the concave portions of the periphery of the wheel d^4 for approximately one revolution of the disk d^6. This holds the strands e' and e^2, while the strand e^3 is fed to form the bunch, the upper feed-rolls being revolved from the shaft b, through the gear c, meshing with the outer clutch-gear c', the pawl c^2, and the ratchet c^3 on the inner clutch-gear c^4, meshing with the gear c^5 on the right-hand end of the upper feed-roll shaft. The gears c, c', c^4, and c^5 all have the same pitch and revolve the upper feed-rolls at the same ratio as the shaft b. When the lower feed-roll is held from revolving, the ratchet c^3 on the inner intermediate clutch-gear c^4 at the left-hand end of the machine revolves in the direction of the arrow, as shown in Fig. 1, the ratchet slipping under the pawl c^2 on the outer intermediate clutch-gear c'. When the disk d^6 has approximately completed its revolution, the pin d^7 on the disk enters one of the notches in the wheel d^4 and revolves it one-fifth of a revolution. The lower and upper set of feed-rolls are now revolved at the same ratio through the gear d^2, meshing with the gear d^3 on the shaft of the lower bottom feed-roll a^7 at the right-hand end of the machine, then through the gear c on the shaft of the bottom feed-roll a^7 at the left-hand end, meshing with the outer intermediate clutch-gear c', having the pawl c^2, engaging with the ratchet c^3 on the inner clutch-gear c^4, which meshes with the gear c^5, secured on the left-hand end of the upper

feed-roll shaft. This feeds all the strands of the thread at the same ratio for a predetermined distance and gives a uniform twist to the thread between the bunches. When both the lower and upper feed-rolls are revolved at the same ratio, the ratchet c^3 on the inner intermediate gear c^4 at the right-hand end of the machine revolves in the direction of the arrow, as shown in Fig. 3, the ratchet slipping under the pawl c^2 on the outer intermediate clutch-gear c'.

As shown in the drawings, the mechanism is adjusted to give two-thirds of a revolution to the upper feed-rolls to feed the strand e^3 to form the bunch and one-third of a revolution to both lower and upper feed-rolls to feed all the strands to form the twist between the bunches. This ratio may be varied when required by changing the pitch of the gearing. In twisting threads of this nature it is desirable to give a slow motion to the upper feed-rolls in forming the bunch and a quick motion to both sets of feed-rolls in forming the twist between the bunches. This is accomplished by making the pitch of the gear b' on the shaft b greater than the pitch of the gear b^3 on the shaft b^4 and the pitch of the gear d^2 on the stud d' greater than the pitch of the gear d^3 on the shaft of the lower feed-roll, as shown in Figs. 2, 3, and 5.

It is evident that any form of a clutch may be used between the intermediate clutch-gears c' and c^4 and that any combination of strands may be used to form the bunches and the uniform twist between the bunches on the thread without materially affecting the spirit of my invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a spinning-machine, the combination of two sets of feed-rolls and finger-boards with guide-eyes, of means for running two strands through one set of feed-rolls and a guide-eye, means for running a third strand through the other set of feed-rolls to the outside of the guide-eye, then between the coil forming the eye of the guide-eye to merge with the two strands in the guide-eye, and mechanism adapted to give an automatic and continuous intermittent motion to the feed-rolls to hold the two strands while the third strand is fed to form a bunch on the two strands, and then to feed all the strands simultaneously to form a uniform twist between the bunches, as described.

2. In a spinning-machine, means consisting of two sets of feed-rolls to feed the strands of a thread, and mechanism controlling the feed-rolls to alternately hold one set of feed-rolls and revolve the other set at a slow speed to form a bunch on the thread and then revolve both sets of feed-rolls simultaneously at the same ratio and at a high speed to form a uniform twist between the bunches, as described.

3. In a spinning-machine having two sets of feed-rolls, mechanism for revolving the upper set of feed-rolls at a comparatively slow speed, consisting of gears connecting the feed-rolls with the front-roll gear-shaft acting through double intermediate clutch-gears on the right-hand end of the machine, mechanism for connecting the lower and upper set of feed-rolls at the left-hand end of the machine, consisting of gears on the feed-rolls meshing with double intermediate clutch-gears, means for alternately holding the lower set of feed-rolls and for revolving the lower and upper set of feed-rolls simultaneously at a high speed, consisting of a disk deriving its power from the front-roll gear-shaft through gearing, a pin on the disk adapted to engage with notches in a wheel, the periphery of which between the notches is concave to coincide with the periphery of the disk, and a gear formed integral with the notched wheel and meshing with a gear on the lower bottom roll shaft at the right-hand end of the machine, for the purpose as described.

4. The combination with a spinning-machine of the gears b', b^2 and b^3, the shaft b^4, the gears c c, the intermediate clutch-gears c' c', the pawls c^2 c^2, the ratchets c^3 c^3, the intermediate clutch-gears c^4 c^4, the gears c^5 c^5, the bracket d, the stud d', the gears d^2 and d^3, the wheel d^4 having the notches d^5 d^5, and the concave portions on its periphery between the notches, and the disk d^6 having the pin d^7, all for the purpose as herein shown and described.

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

HENRY A. OWEN.

Witnesses:
ADA E. HAGERTY,
J. A. MILLER, Jr.