

No. 633,957.

Patented Sept. 26, 1899.

F. J. F. GRAF.
CORDAGE MACHINE.

(Application filed Jan. 7, 1899.)

(No Model.)

FIG. 1.

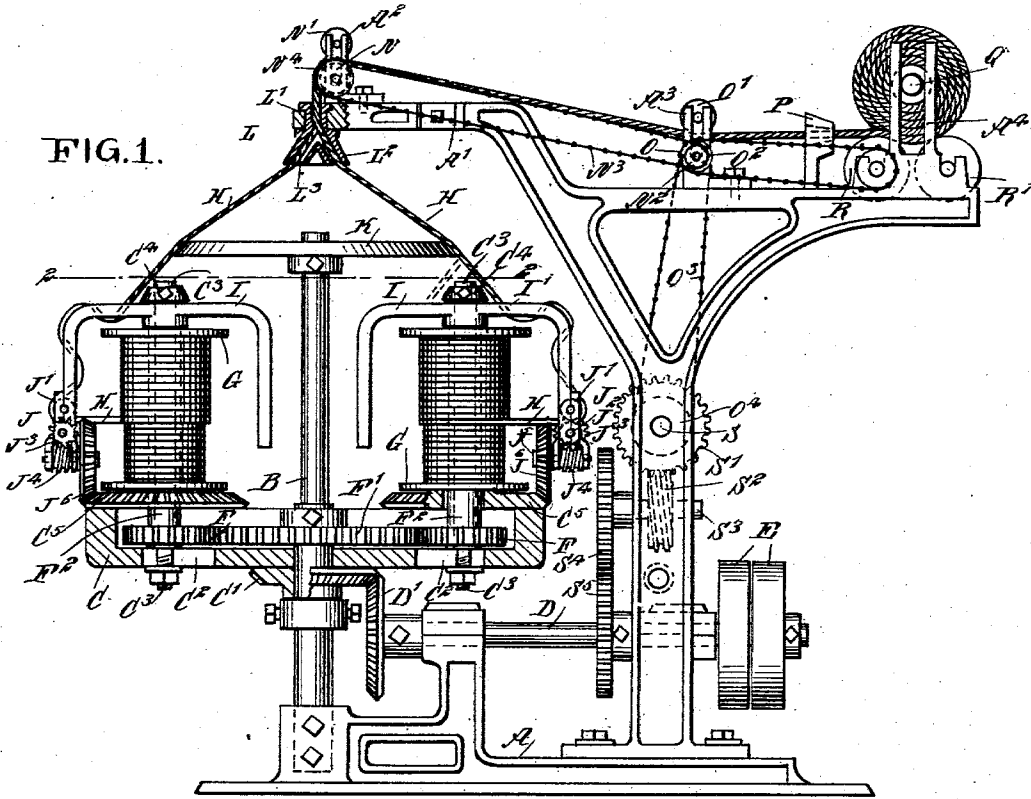
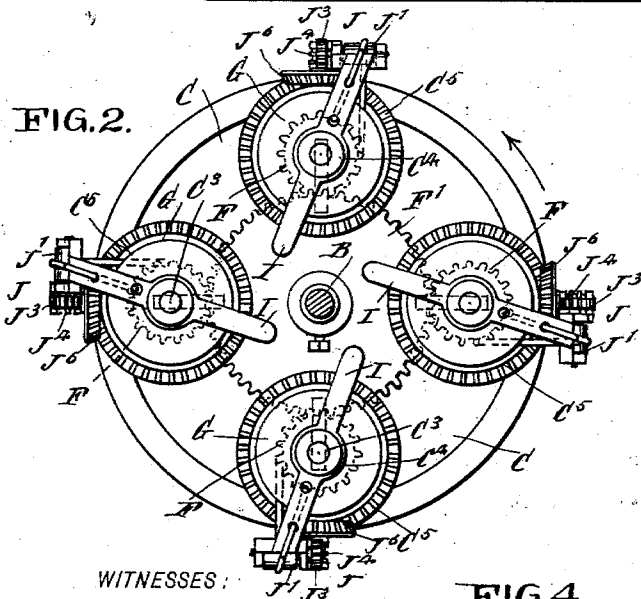


FIG. 2.



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FIG. 4.

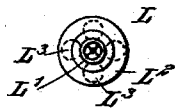
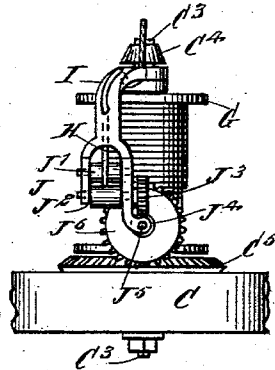


FIG. 3.



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FRANZ J. F. GRAF, OF PASSAIC, NEW JERSEY.

CORDAGE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 633,957, dated September 26, 1899.

Application filed January 7, 1899. Serial No. 701,511. (No model.)

To all whom it may concern:

Be it known that I, FRANZ J. F. GRAF, of Passaic, in the county of Passaic and State of New Jersey, have invented a new and Improved Cordage-Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved cordage-machine for manufacturing ropes, cords, cables, and like articles in a very simple and economical manner without requiring long rope walks and skilled mechanics, the machine being capable of turning out a large quantity of rope of a high quality in a comparatively short time.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement with parts in section. Fig. 2 is a sectional plan view of the same on the line 2 2 of Fig. 1. Fig. 3 is an end view of one of the drawing devices and adjacent parts, and Fig. 4 is a plan view of the twisting-thimble.

The improved cordage-machine is mounted on a suitably-constructed frame A, supporting a post B, on which is mounted to turn the frame C, preferably in the shape of a disk, and driven from the main driving-shaft D by gear-wheels D' and C', secured on the shaft D and the frame C, respectively. The main driving-shaft D carries fast and loose pulleys E, connected by a belt with other machinery for imparting a rotary motion to the shaft D and by the gear-wheels D' and C' to the frame C to rotate the latter horizontally on the post B.

In the frame C are arranged a number of radial slots C², in each of which is held a rod C³, on which is mounted to turn loosely a gear-wheel F in mesh with a gear-wheel F', fastened to the post B by a set-screw or other suitable means, so that when the frame C is rotated the several gear-wheels F roll off on the fixed gear-wheel F'. The rods C³, carrying the gear-wheels F, are made adjustable to permit of using different-sized gear-wheels

F on the fixed gear-wheel F'. The hub F² of each gear-wheel F extends in an upward direction to form a bearing for the bobbin G, carrying the strands H of a suitable material, according to the article to be manufactured by the machine.

On the upper end of each hub F² is secured a flier I, held against upward movement by a beveled collar C⁴, secured to the extreme upper end of the rod C³. On one arm of each flier I is arranged a drawing device J, consisting principally of two rollers J¹ and J², between which passes the strand H, unwinding from the corresponding bobbin G for the particular flier I. The lower drawing-roller J² carries on its shaft a worm-wheel J³ in mesh with a worm J⁴, secured on a shaft J⁵, journaled in suitable bearings carried by the flier I, and on this shaft J⁵ is secured a bevel gear-wheel J⁶ in mesh with a fixed bevel gear-wheel C⁵, rigidly attached to an upwardly-extending flange of the frame C. It is evident that when the gear-wheel F is rotated on the turning of the frame C, as previously explained, a rotary motion is given to the flier I, so that the drawing device J moves around the bobbin, and at the same time the bevel gear-wheel J⁶ rolls off on the bevel gear-wheel C⁵, so that a turning motion is given to the shaft J⁵ and the worm J⁴, which latter rotates the worm-wheel J³ and the lower drawing-roller J². Now as the strand H passes between the two drawing-rollers it is evident that the strand is unwound from its bobbin, the strand being then passed several times around the arm of the flier carrying the drawing device or through apertures in the same to finally pass from an opening I' in the flier over the beveled collar C⁴ to and upon a fixed disk K, secured to the upper end of the post B, the peripheral surface of said disk being beveled, as is plainly indicated in Fig. 1. Now as the flier revolves and is carried around by the frame C it is evident that a twisting of the strands takes place between the flier and the fixed disk K, the twisted strand then passing from the disk K to the twisting device L in the form of a thimble, the upper portion L' of which is mounted to turn in a suitable bearing carried by a bracket A' of the main frame A.

The lower portion L² of the thimble L is

bell-shaped and is provided with a number of apertures L^3 , corresponding in number to the number of bobbins carried by the frame C. For instance, as shown in the drawings, 5 four apertures L^3 are formed in the thimble to correspond with the four bobbins supported on the frame C. The apertures L^3 stand at angles to each other and terminate in a common opening in the upper part L' of the 10 thimble, in which the twisting takes place as the thimble is carried around in its bearings by the action of the strands H moving with the fliers I. The twisted strands then pass between pairs of rollers NN' and O and O' and 15 through an eye P to wind up on a reel Q the roll of rope, cord, or cable resting on two rollers R and R' . The rollers N' and O' are made heavy and are mounted loosely in bearings A^2 and A^3 , carried by the bracket A' , 20 while the lower rollers N and O are journaled in fixed bearings and are driven from the main shaft D by the gearing presently to be described.

On the shaft for the lower roller O is secured a sprocket-wheel O^2 , connected by a sprocket-chain O^3 with a sprocket-wheel O^4 , secured on a transversely-extending shaft S, journaled on the bracket A' , the said shaft carrying a worm-wheel S' in mesh with a worm S^2 , secured on a shaft S^3 , connected by gear-wheels S^4 and S^5 with the main driving-shaft D, so that when the latter is rotated a rotary motion is transmitted by the gear-wheels S^5 S^4 to the shaft S^3 , and the latter by 35 the worm S^2 and worm-wheel S' rotates the shaft S and the sprocket-wheel O^4 , which by the sprocket-chain O^3 and the sprocket-wheel O^2 rotates the roller O. On the shaft of this roller O is further secured a sprocket-wheel 40 N^2 , connected by a sprocket-chain N^3 with a sprocket-wheel N^4 on the lower roller N, the connection being such that the roller N is rotated somewhat more slowly than the roller O to cause a stretching of the cord, rope, or 45 cable between the pairs of rollers NN' and OO' . The roller R is also rotated by sprocket wheels and chain from the lower roller O, as indicated in Fig. 1, to give the desired tension to the article between the rollers OO' and 50 the eye P to prevent curling up of the finished article previous to its being wound in a roll on the reel Q.

The operation is as follows: When the several parts are in position, as indicated in the drawings, and the filled bobbins G are mounted to turn on the hubs F^2 between the gear-wheels C^5 and the horizontal members of the fliers I and the several strands H are passed through the drawing devices and the fliers 60 up over the fixed disk K and passed through the twisting device L to form a twisted cord, rope, or cable, then the rotation of the frame C causes a drawing of the several strands by the drawing devices J to unwind the strands 65 from the bobbins, as before explained. The several strands are each independently twisted between the fliers and the fixed disk K,

and then the several strands are twisted together in the thimble, and the twisted article is passed between the rollers NN' to and between the rollers O and O' to hold the twisted 70 article firmly stretched, especially as the rollers O O' rotate at a higher rate of speed than the rollers NN' . The finished article then passes through the eye P to wind up on 75 the roll Q, driven by the roller R.

It is understood that by the arrangement described any desired number of strands can be independently twisted and then twisted 80 together to form a rope, cord, or cable of as many strands as there are bobbins carried by the frame C.

It will further be seen that the entire machine takes up a comparatively small space, and it can be run at a high rate of speed, so that it takes but a short time to finish the article and without the help of a skilled 85 mechanic.

Having thus described my invention, I claim as new and desire to secure by Letters 90 Patent—

1. A cordage-machine comprising a revolvable frame arranged for carrying a plurality of bobbins, a drawing device for each bobbin to draw the strands therefrom, a flier carrying 95 the said drawing device to rotate the latter around the bobbin, means for rotating the said flier and a twisting device receiving the strands from the several drawing devices, substantially as described. 100

2. A cordage-machine comprising a revolvable frame arranged for carrying a plurality of bobbins, a drawing device for each bobbin to draw the strand therefrom, a flier carrying 105 the drawing device, to rotate the latter around the bobbin, and means, substantially as described for rotating the said flier moving with the frame, as set forth.

3. A cordage-machine comprising a revolvable frame arranged for carrying a plurality of bobbins, a drawing device for each bobbin, to draw the strand therefrom, a flier carrying 110 the drawing device, to rotate the latter around the bobbin, means, substantially as described, for rotating the said flier moving with the 115 frame, and a fixed disk for the passage of the several strands from the flier, to permit of twisting the strands independently of each other, as set forth.

4. A cordage-machine comprising a revolvable frame arranged for carrying a plurality of bobbins, a drawing device for each bobbin to draw the strand therefrom, a flier carrying 120 the drawing device, to rotate the latter around the bobbin, means, substantially as described, 125 for rotating the said flier moving with the frame, a fixed disk for the passage of the several strands from the flier, to permit of twisting the strands independently of each other, and a twisting device for twisting the sev- 130 eral strands together to form a cord, rope or cable, as set forth.

5. A cordage-machine comprising a revolvable frame arranged for carrying a plurality of

bobbins, a drawing device for each bobbin to draw the strand therefrom, a flier carrying the drawing device, to rotate the latter around the bobbin, means, substantially as described, for rotating the said flier moving with the frame, a fixed disk for the passage of the several strands from the flier, to permit of twisting the strands independently of each other, a twisting device for twisting the several strands together to form a cord, rope or cable, and a stretching device for stretching the cord, rope or cable, after leaving the twisting device, as set forth.

6. A cordage-machine comprising a revoluble frame, a series of rods carried by the said frame, gear-wheels having upwardly-extending hubs and mounted to turn on the said rods, a fixed gear-wheel engaged by the said series of gear-wheels, a flier on the hub of each gear-wheel in the said series and rotating therewith, a bobbin mounted to rotate loosely on the hub of each gear-wheel in the series, a drawing device carried by the flier and rotated around the bobbin for drawing off the strand therefrom, the said drawing device being actuated from the said revoluble frame and means for rotating the said frame, substantially as shown and described.

7. A cordage-machine comprising a revoluble frame, a series of rods carried by the said frame, gear-wheels mounted to turn on the said rods, a fixed gear-wheel on which the said series of gear-wheels rolls off, a flier on the hub of each gear-wheel in the said series, a bobbin mounted to rotate loosely on the hub of each gear-wheel in the series, a drawing device carried by the flier for drawing off the strand from the bobbin, the said drawing device being actuated from the said frame by a gearing comprising a fixed bevel gear-wheel on the frame, a bevel gear-wheel in mesh with the fixed gear-wheel, a worm on the shaft of the said bevel gear-wheel, a worm-wheel in mesh with the said worm, and a pair of drawing-rollers of which one carries the said worm-wheel, substantially as shown and described.

8. A cordage-machine provided with a revoluble frame carrying a plurality of bobbins, a drawing device for each bobbin to draw the strands therefrom, the said drawing device being arranged to rotate around the bobbin, means for rotating the drawing device, means for actuating the drawing device and a fixed disk to which pass the strands from the drawing device to twist each strand independently of the other between the drawing devices and the fixed disk, substantially as shown and described.

9. A cordage-machine comprising a revol-

ble frame arranged for carrying a plurality of bobbins, a drawing device for each bobbin and carried by and moving with the frame, the said drawing device being mounted to rotate around the bobbin, means for rotating the drawing device around the bobbin, means for actuating the same and a twisting device receiving the strands from the several drawing devices, substantially as shown and described.

10. A cordage-machine comprising a revoluble frame, a series of rods carried by the said frame, gear-wheels mounted to turn on the said rods and having upwardly-extending hubs, a fixed gear-wheel around which the said series of gear-wheels revolve when the frame is turned, a flier on the upper end of the hub of each gear-wheel, a bobbin mounted to rotate loosely on the hub of each gear-wheel in the series, a drawing device carried by a depending arm of each flier and rotated around the bobbin, and means for actuating the said drawing device, substantially as described.

11. A cordage-machine provided with a revoluble frame, a series of rods carried by the frame and adjustable therein, gear-wheels mounted to turn loosely on the said rods and having upwardly-extending hubs, a fixed gear-wheel in mesh with the series of gear-wheels, a flier on the hub of each gear-wheel, a bobbin mounted to rotate loosely on the hub of each gear-wheel in the series, a drawing device carried on an arm of the flier and rotated around the bobbin, a beveled collar secured on the upper end of each of the series of rods above the flier; a fixed disk having its peripheral surface beveled, the strands passing over the beveled collar and upon the fixed disk and a twisting device for twisting the several strands together, substantially as set forth.

12. In a cordage-machine, a revoluble frame provided with means for supporting a plurality of bobbins, a beveled gear-wheel fixed to the frame below each bobbin, and a drawing device mounted to rotate around each bobbin for drawing off the strand therefrom, the said drawing device comprising a bevel gear-wheel in mesh with the fixed bevel gear-wheel on the frame, a worm on the shaft of the said bevel gear-wheel, a worm-wheel in mesh with the said worm and a pair of drawing-rollers, one of which carries the said worm-wheel, substantially as shown and described.

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Witnesses:

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