F. WHELAN.
Braiding-Machine.

No. 198,230. Patented Dec. 18, 1877.

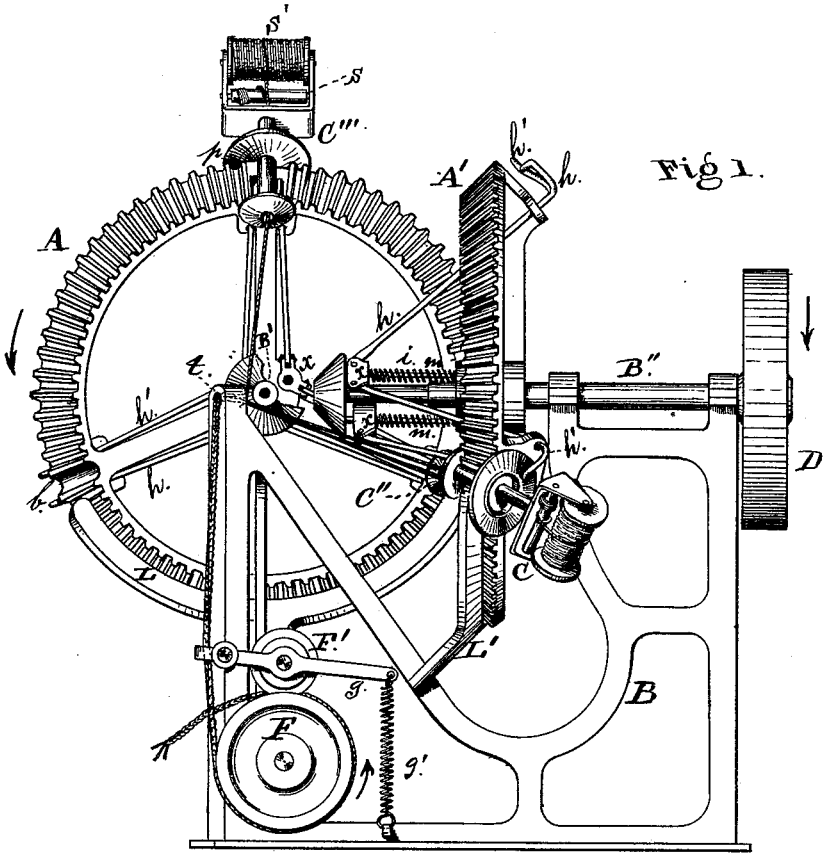

Fig 1.

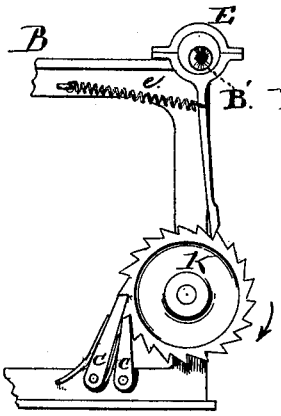

Fig 2.

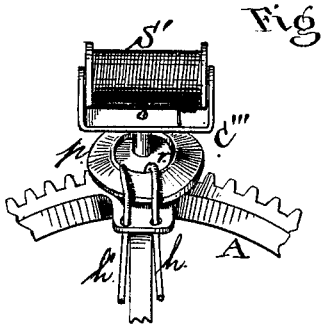

Fig 3.

Witnesses.
S. K. Firth
H. B. Hughes.

Inventor.
Frank Whelan.
per his attorney
H. Montevercle.

UNITED STATES PATENT OFFICE.

FRANK WHELAN, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN BRAIDING-MACHINES.

Specification forming part of Letters Patent No. **198,230**, dated December 18, 1877; application filed July 6, 1876.

To all whom it may concern:

Be it known that I, FRANK WHELAN, of the city and county of San Francisco, and State of California, have invented certain Improvements in Braiding-Machines, of which the following is a specification:

My invention relates to that class of machines or apparatus termed "braiding or platting machines," and is one in which a braid or plat can be made from three or more threads.

The braid or plat produced by my machine can be put to any and all the uses that similar braids are put to, as produced either by hand or other machines heretofore used. It can, when made of suitable material and of the required number of threads, be used for candle-wicks, or, when made of sufficient size, and of, say cocoa fiber, be used for door-mats.

To more fully describe my invention, reference is had to the accompanying drawing, forming part of this specification in which—

Figure 1 represents a front elevation of my machine, a small piece broken off to show the head *x*. Fig. 2 represents the back elevation of my self-feeding movement, the rest broken off. Fig. 3 represents an enlarged view, facing the back of the wheel A (here broken off) of my spool-frame and clutching-arms.

My machine consists of two toothed wheels, A A′, mounted upon a suitable frame, B. The wheel-shafts B′ B″ point to one center in common, being placed at right angles to each other, which causes the toothed wheels A A′ to be also at right angles to each other.

The shafts B′ B″, I prefer to make hollow, as, by this means, I can introduce an extra thread into the braid, which is intermixed with the spool-threads, thus making a thicker braid with the same number of spools. I either use one thread or two—that is to say, passing a thread through each of the shafts B′ B″, when using two of these core-threads, it will produce an even and smooth flat braid. It will be seen by the way which these shafts point that the threads running through them will come out at the same central point where they pass through the opening *t* after being braided over by the spool-threads, as before described.

Upon the faces of these wheels there are cut semicircular grooves or recesses *b*, into which fit the flanged conical heads of the spool-frames, the number of these recesses being equal, on each wheel, to the number of spools used in the machine. In this case there are three spools. Therefore, each wheel has three recesses cut upon its face for the alternate reception of each of the three spool-frames, as hereinafter described. (Spool-frames are marked C C″ C‴.) As the angle at which the spool-frames rest when in these recesses is one of forty-five degrees with the central shafts, and the two wheels A A′ being also at right angles with each other, it follows that the threads running out from the stems of the spool-frames will point to the same center or focus, where they pass out after being interwoven together through a suitable guiding-outlet, as hereinafter described.

These spool-frames are held in position upon the recesses before named by means of a set of arms, of which there are two to each spool-frame. *h h′* are the arms. These arms serve, one to clutch the spool-frame, and the other to unclutch the same, as hereinafter described. These arms are set into a sliding head, *x*, sliding upon bars *i i* running horizontally to the axles of the wheels A A′, and are kept in position by a spiral spring, *m*, behind the head *x*.

At the extremity of the shaft B″ is shown a pulley, D, to which, either by hand or machinery, is applied the motive power. At the extremity of the other shaft B′ is an eccentric, E, having its arm terminating in a pawl which engages into the ratchet-toothed wheel K. The eccentric arm is kept upon the wheel by means of the spring *e*.

c c are pawls, engaging upon the same wheel K, which keep it from being brought back when once pushed ahead by the eccentric arm. The shaft bearing the ratchet-wheel runs across the frame of the machine to the front, where it has attached to it the feed-wheel F, the periphery of which is slightly grooved and roughened, which allows the soft-rubber-covered wheel F′ to press the braid, which is thus carried along as fast as made. This rubber-covered wheel is mounted upon the arm *g*, which has its bearing back of the wheel F′, and is provided with a spring at *g′*, thus insuring a constant pressure upon the face of the friction-wheel F.

Underneath the wheels A A′ are semicircular guides L L′, which serve to keep the spool-

frames C from dropping off after being disengaged from their retaining clutch-arms *h*.

To operate my machine, the motive power is applied at the wheel or crank D, turning the same as indicated by the arrows—that is to say, so that the wheels A A′ will revolve with their faces toward each other on their lower side. Now, as per drawing, the spool-frame C, on its recess on wheel A′, is just on the point of entering the semicircular guide L′, and the spool-frame C″ on wheel A is upon the point of leaving the other guide L under said wheel A. Now, on the further revolution of the wheels, the spool-frame C″, being only kept in place by the guide L, will, upon getting to the inner extremity of said guide, be received and clutched by the clutching-arm in the empty recess on the opposite wheel to which the spool-frame is set, and which recess will, as hereinbefore said, come opposite, as the number of slots or recesses are equal in number on each wheel, and are equally divided thereon. Now, as seen, the spool-frame C″, which was upon the recess on wheel A, has left said wheel, and been clutched into the recess on wheel A′, but in being clutched into its recess it also, by means of the conical flange-head *p*, forces or pushes upward the adjoining arm, which, as before said, is attached to the head *x*, and which arm is but the extension of the clutch-arm or the next recess to the one in which the spool-frame now finds itself, and which, also, is the one which will immediately succeed it into the guide L. By thus pushing this arm upward it disengages the spool-frame, as just said, which, traveling onward through the guide L, will, in turn, be clutched, upon the point of leaving said guide, by the clutching-arm on the recess of the opposite wheel; and at the same time it will unclutch the next succeeding spool-frame upon the wheel in which it finds itself clutched—the spool-frame being in this case transferred from wheel A to A′. This motion being continuous and always alternating as long as the wheels A A′ are in revolution—that is to say, the spool-frame on wheel A will, as it leaves the semicircular guide under said wheel, go into the wheel A′, and here, disengaging the next succeeding spool-frame, which in turn enters the semicircular guide under wheel A′, which will, upon leaving said guide, be clutched into wheel A, there producing the same effect as the preceding spool-frame, thus imitating the braiding, as if by hand, by passing the threads one over the other, and so on, according to the number of spool-frames and threads used.

In my spool-frame I use a reacting tensional spring-bar, having a spiral spring coiled around one end of it, and also provided with a hole, through which the thread is passed once around. By this means, the pull of the self-feed, as before described, does not come directly upon the thread-spool S′, but upon the spring-bar S, which, by means of the coil-spring, reacts after being pulled, thus taking up any slack of the thread that may occur. The thread, after passing through the tension-bar *s* runs through a hole in the shank of the frame; thence meeting the other threads, passes through the focus-opening *t* on the frame B; thence downward through a guiding-opening in the friction-wheel arm *g*, thence over the wheel F, and upward and around between this and the wheel F′, whence it is gradually pushed out at every revolution of the machine by the pawl-arm of the before-described eccentric E.

Having described my invention, I desire to secure by Letters Patent—

1. The wheels A A′, with their shafts arranged at right angles to each other, in combination with the spool-frames C C″ C‴, clutching and unclutching arms *h h′*, and guides L L′, as hereinbefore described.

2. The spool-frames C C″ C‴, having a hollow spindle with conical flange *p* and circular groove *r* and tension-bar *s*, in combination with arms *h h′*, sliding cross-head *x*, and the toothed wheels A A′ of a braiding or platting machine, as and for the purposes as specified.

FRANK WHELAN.

Witnesses:
F. E. MONTEVERDE,
HOLLAND SMITH.