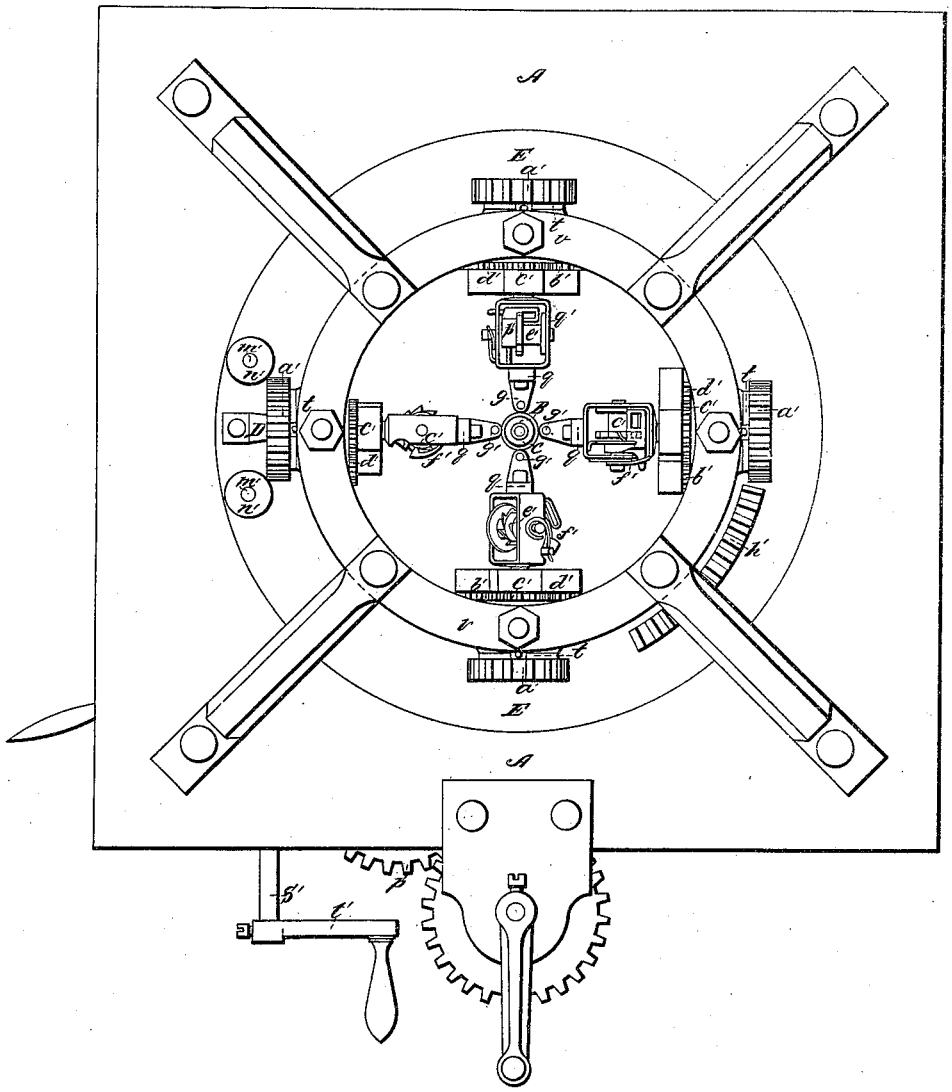
Sheet 1-4 Sheets.

L. Hull.

Circular Weaving.

No. 52,718. Patented Feb. 20, 1866.

Fig. 1.



Witnesses:

D. P. Hall Jr.

G. H. Washburn.

Inventor:

Lucius Hull

by his attorney

R. H. Eddy

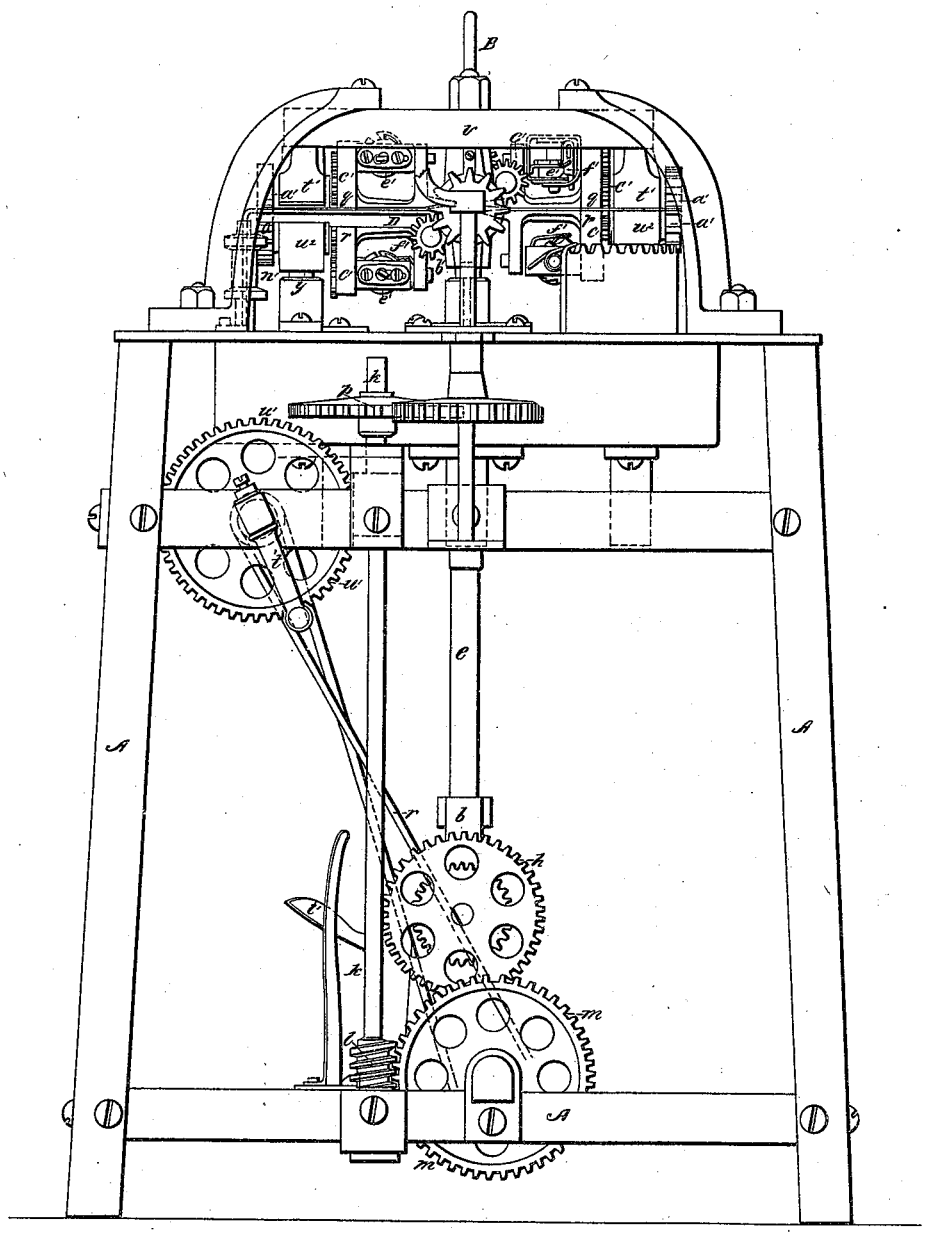
Sheet 2 - 4 Sheets.

I. Hull.

Circular Weaving.

No. 52,718. Patented Feb. 20, 1866.

Fig. 2.



Witnesses:
P. Hale Jr
G. H. Washburn.

Inventor
Iverus Hull
by his attorney
R. H. Eddy

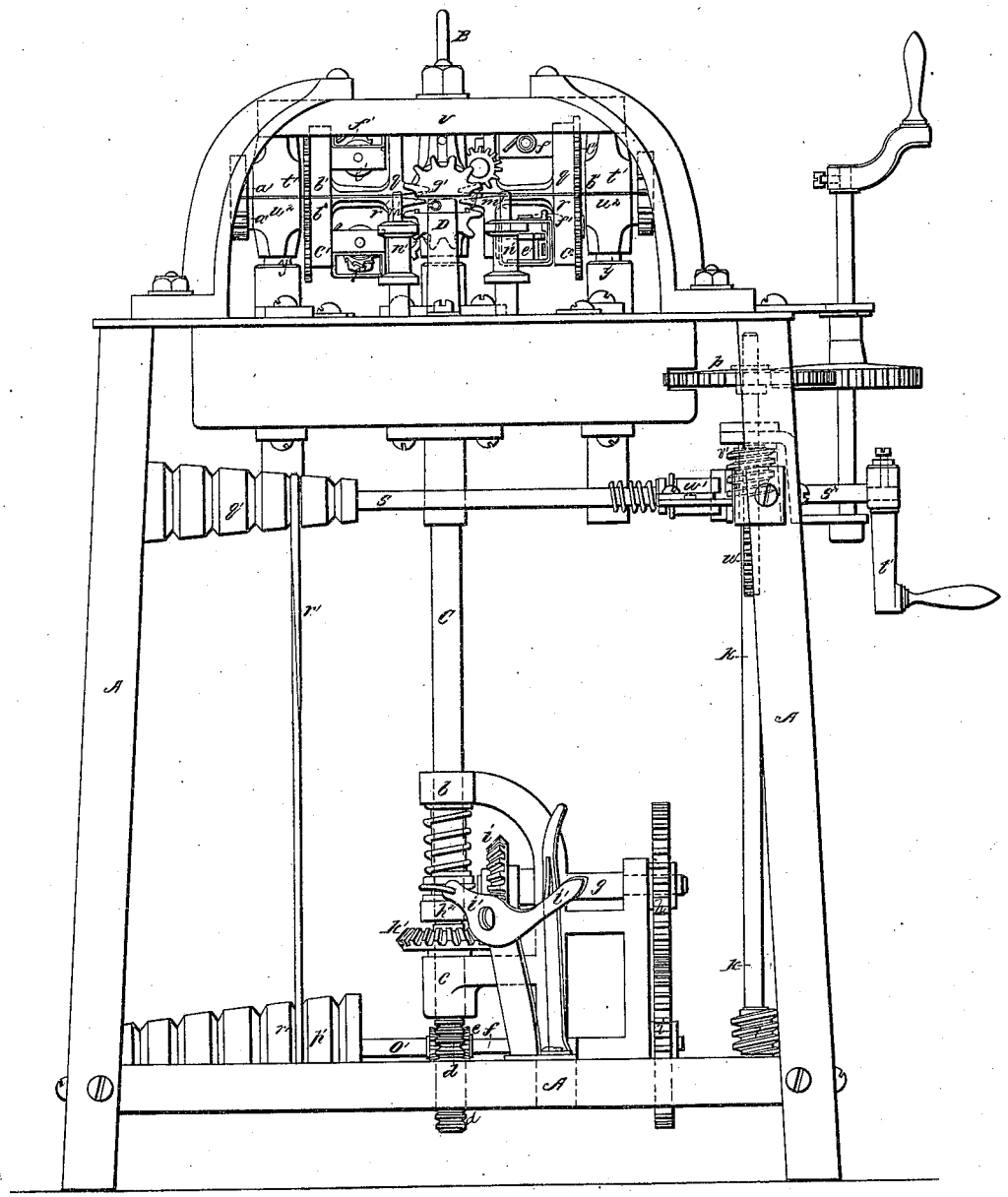
Sheet 3-4 Sheets.

L. Hull.

Circular Weaving.

No. 52,718. Patented Feb. 20, 1866.

Fig. 3.



Witnesses:

D. P. Hale Jr.

G. C. Washburn.

Inventor

Thivenus Hull

by his attorney

R. H. Eddy

Sheet 4 - 4 Sheets.

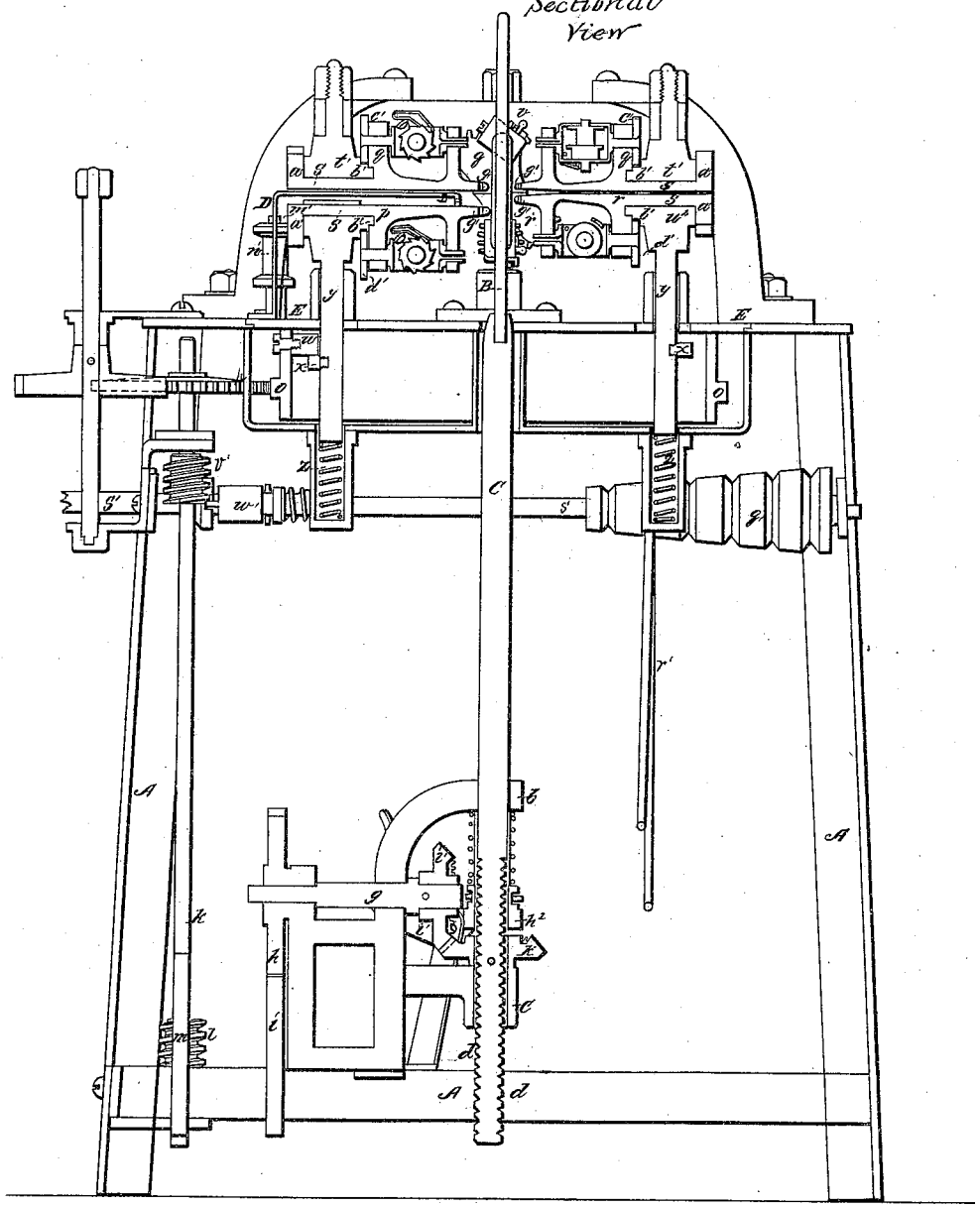
L. Hull.

Circular Weaving.

No. 52,718. Patented Feb. 20, 1866.

Fig. 4.

Sectional View



Witnesses:

D. P. Hall Jr.

G. H. Washburn

Inventor:

Iverus Hull

by his Attorney

R. H. Eddy

UNITED STATES PATENT OFFICE.

LIVERAS HULL, OF CHARLESTOWN, MASSACHUSETTS.

MACHINE FOR WEAVING COVERINGS FOR WHIP-HANDLES.

Specification forming part of Letters Patent No. **52,718**, dated February 20, 1866.

To all whom it may concern:

Be it known that I, LIVERAS HULL, of Charlestown, of the county of Middlesex and State of Massachusetts, have invented a new and useful Machine for Making the Coverings of Whip-Handles; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Figs. 2 and 3 are side elevations, and Fig. 4 is a vertical section, of it.

The said machine is intended to wind one or more threads in a helix around a whip-stock and to connect the coils of the helix by other threads bent or twisted together on each helix. These connecting-threads while being interlaid with the covering-threads may by the machine be caused to arrange themselves in helices going about the whip-handle.

In the drawings, A denotes the frame of the machine, it being suitably made for giving support to the operative parts.

The first constituent portion of the machine is a mechanism for sustaining a whip-stock or article to be covered and moving it vertically, as circumstances may require.

In the drawings the whip-stock is represented at B as having its butt or larger end inserted in a socket, or in the upper end of a vertical rod, C, which is so supported within bearings *b c* as to be capable of being revolved and moved lengthwise therein. The lower part of the rod has a series of grooves formed around it at equal distances apart, as seen at *d*. A pinion-gear, *e*, engages with these grooves, which form a cylindrical rack, such pinion being fixed on a tubular shaft, *o'*, which revolves on a horizontal shaft, *f*, that receives rotary motion from a driving-shaft, *g*, by means of a train of gears, *h i*, an upright shaft, *k*, a worm, *l*, and a worm-gear, *m*, the whole being arranged as represented in Figs. 2, 3, and 4.

The tubular shaft *o'* carries a cone-pulley, *p'*, about which and another cone-pulley, *q'*, an endless crossed band, *r'*, is arranged. The cone-pulley *q'* is fixed on a shaft, *s'*, which has a crank, *t'*, applied to its extremity.

A gear, *u'*, revolves freely on the shaft *s'* and engages with a worm, *v'*, fixed on the shaft *k*, hereinbefore mentioned. A clutch, *w'*, applied to the shaft *s'*, and the gear *u'*, serves to engage the said gear *u'* with the shaft *s'*, as occasion may require.

By means of the worm *v'*, the gear *u'*, the shaft *s'*, the cone-pulleys *p' q'*, the endless band *r'*, the shaft *o'*, and the gear *e* an upward vertical motion may be imparted to the rod or shaft C and a whip-stock when fixed therein, and the degree of the motion may be varied by shifting the belt on the cone-pulleys.

The next constituent part of the machine is the mechanism for winding one or more threads in a helix about the whip-stock during its upward movement, the same being described as follows:

A bent arm, D, projects from an annulus, E, arranged horizontally and on the frame of the machine. This annulus serves to support the spindles *m' m'* of two or any other suitable number of spools, *n n*, from which, when the machine is in action, threads pass to and through an eye at the inner end of the arm D, and from thence to the whip-stock. By giving a rotary motion to the annulus E the threads will be moved about the whip-stock during its upward movement. This rotary motion of the annulus E is effected by means of gears *o p*, one of which is affixed to the annulus and the other to the upright shaft *k*.

The next portion or constituent part of the machine is a mechanism for laying the binding or connecting threads about the helix-coils, the machine, as represented in the drawings being made to exhibit four sets of such mechanism. There may be more or less of them, as circumstances may require. As they are alike in action and construction, the description of one of them will suffice to answer for all. In each entire revolution of the thread-carrying arm D it will pass through each of these sets, so as to lay its thread or threads successively into the angles of decussation of the threads of the said sets, and immediately or soon after the threads have been so laid between any two of the binding-threads of any one set, as above described, such set will be revolved so as to lay the binding-thread around the covering-thread or threads and twist such binding-threads together.

Each of the said sets has a pair of two separate flier-frames, *q r*, each of which is provided with a semi-cylindrical journal, *s*. These semi-journals are supported in semi-boxes

t' w'', one, t', of which extends down from a stationary annulus, v, while the other is supported so as to be capable of being moved up and down, the downward movement being effected at the proper time by a cam, w, which projects from the rotary annulus E, and works against a stud, x, extended from the shank y of the semi-box. A spring, z, applied to such shank serves to effect the upward movement of the bearings. Each of the said semi-journals carries two half-gears, a' b', arranged on it, as represented. A train of two gears, c' d', is applied to each flier-frame. One of such gears is fastened on the end of the flier, and the train engages with the inner semi-gears, b' b', and during rotary motion of the pair or flier-frames q r operates to produce a rotary motion of these fliers. This rotary motion of the flier is for the purpose of preventing the thread of its bobbin from becoming further twisted.

Each flier carries a spool, e', supplied with a proper thread-tensioner and delivering apparatus, f, through which the thread passes from the spool to and through the nose of the flier, and from thence through the nose g' of the flier-frame. From the latter the thread extends to the whip-stock.

To the annulus E a curved rack, h', is fastened. This rack, during each revolution of the said annulus, engages in succession with the external pairs of semi-gears of the several pairs of flier-flames, and produces a revolution of each of the said frames.

The thread-carrying arm D, during its circuit of revolution, passes between each pair of flier-frames, the lower frame of such pair being moved downward or away from the upper frame to allow of the passage of the arm D between such frames. After the arm D, carrying the covering-thread, may have so passed each pair of flier-frames, so as to carry the threads into the vertex of the angle between the two binding-threads of such flier-frames, the said flier-frames are to be revolved so as to interlock their threads or twist them on the covering-thread.

If the whip-stock be simply moved vertically during the operation of working the covering on its handle, the binding-threads would lay on it in vertical courses or ranges; but in order that each of them may be laid on it in a helix, the whip-stock should have a proper rotary motion while being moved vertically. The machinery for effecting this is an auxiliary to the main part or combination on which my invention is based, and may be thus described.

A friction-clutch, h^2, operated by a lever, i', is fixed on the shaft or rod C, and engages with a beveled wheel, k', which is placed on and so as to be capable of freely revolving on the shaft c. This beveled gear is revolved by another beveled gear, l', and the gears h i, the latter—viz., i—being fixed on the shaft f.

When the clutch h^2 is out of action on the bevel-gear k' such gear will be freely revolved on and will produce no rotary motion of the shaft or rod C; but when the clutch bears on the wheel and the latter is in the act of being revolved the rod C will be slowly rotated.

The machine when in operation without the whip-handle or its equivalent placed within it will make a braid or cord.

I claim as my invention—

1. A mechanical combination comprised not only of machinery for sustaining a whip-stock or other article and moving it lengthwise and mechanism for winding one or more threads in a helix about the whip-stock or article while being so moved, but also of mechanism for laying binding or connecting threads about the helix-coils, the whole being substantially as hereinbefore described.

2. In combination therewith, mechanism for revolving the whip-stock so as to cause the binding or connecting threads to be laid in a helix thereon, as set forth.

LIVERAS HULL.

Witnesses:
R. H. EDDY,
C. C. H. GUILDEN.