

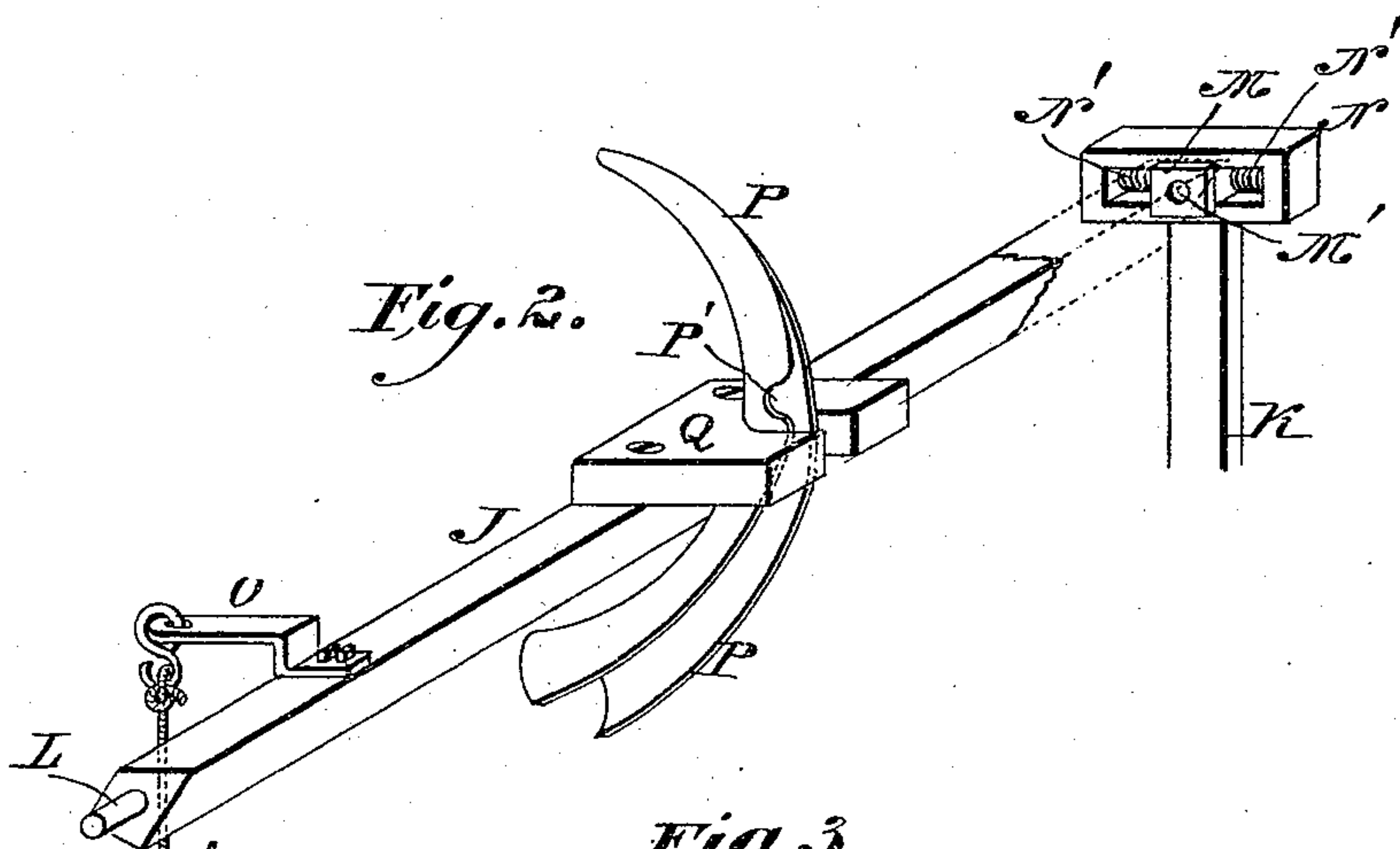
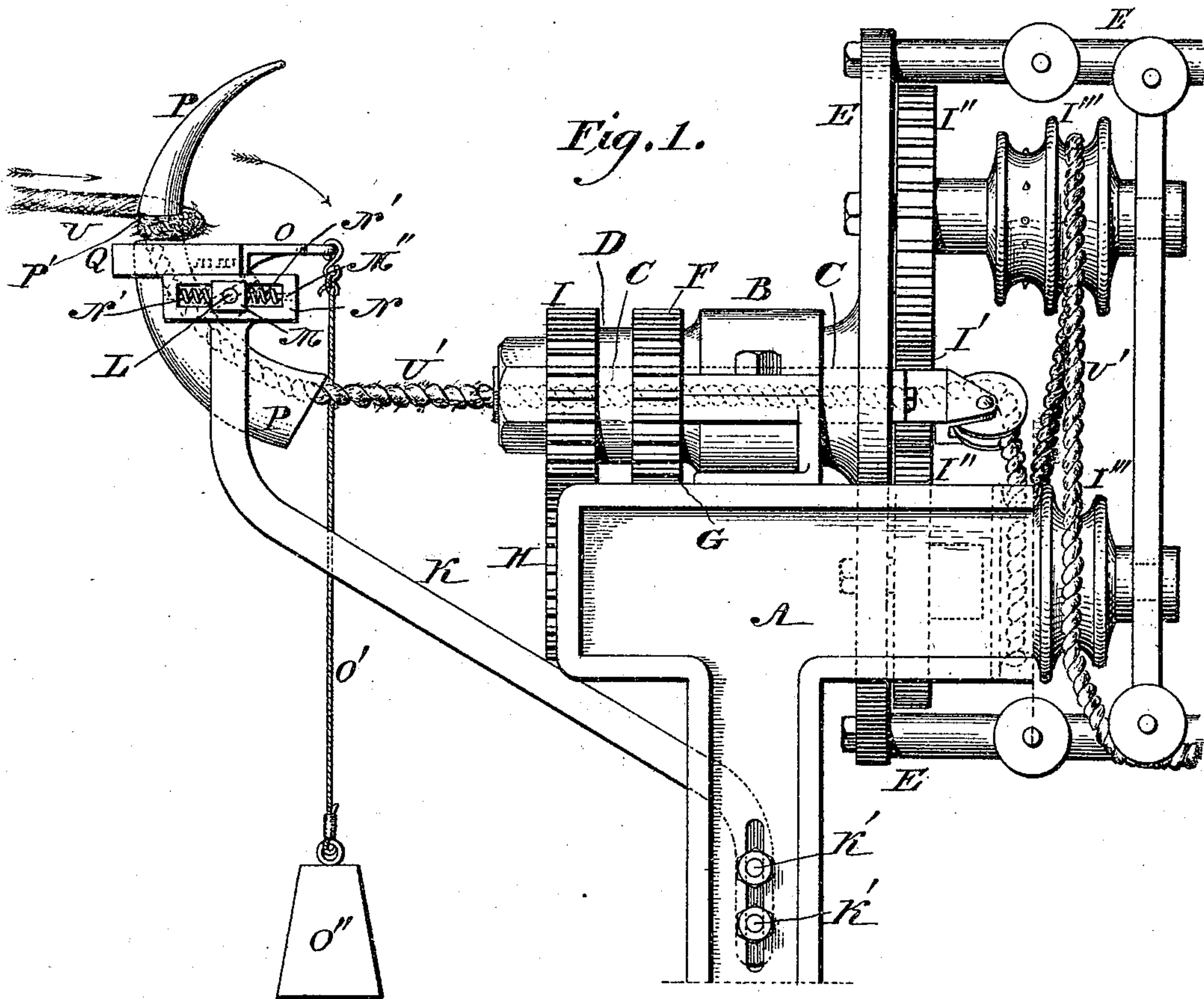
(No Model.)

P. WOLL, Jr.

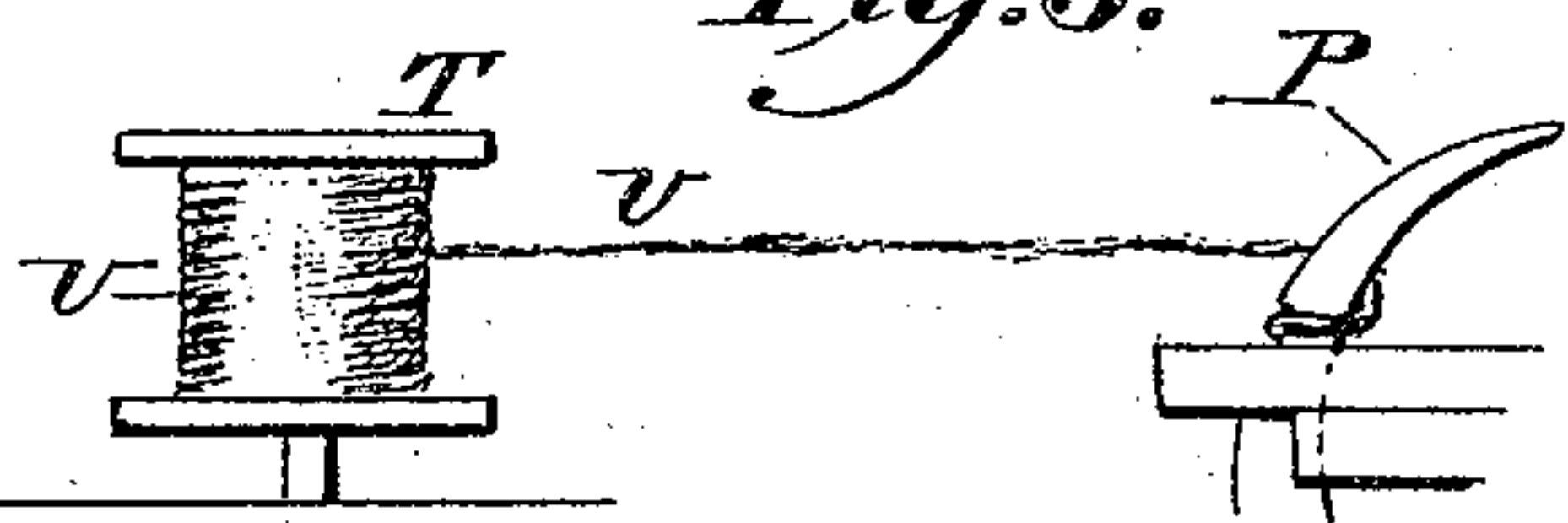
MACHINE FOR TWISTING AND CURLING HAIR.

No. 493,004.

Patented Mar. 7, 1893.



Witnesses:  
H. Buckley  
Alfred Breckford



Inventor:  
Peter Woll Jr.  
per Albert D. Zacharke  
and George D. Buckley  
Attys.



# UNITED STATES PATENT OFFICE.

PETER WOLL, JR., OF PHILADELPHIA, PENNSYLVANIA.

## MACHINE FOR TWISTING AND CURLING HAIR.

SPECIFICATION forming part of Letters Patent No. 493,004, dated March 7, 1893.

Application filed July 8, 1891. Serial No. 398,771. (No model.)

*To all whom it may concern:*

Be it known that I, PETER WOLL, Jr., a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Machines for Twisting and Curling Hair, of which the following is a description, reference being had to the annexed drawings, making part hereof.

In my application for Letters Patent filed November 21, 1890—Serial No. 372,192, afterward embodied in Letters Patent of September 1, 1891, No. 458,721, I have described an improved method of manufacturing curled hair, which method consisted in forming the raw hair into a sliver by means of a "set of preparers"—passing said sliver to a "curler" and then treating the thus far finished product to set the curl,—and instancing the use of a twisting machine such as the J. C. Todd twisting machine (well known in the manufacture of rope), or if necessary two of such machines, for the purpose of imparting to the said sliver the desired twist and curl.

My present invention which is to be used where two twisters are employed,—the first (which I denominate the twister) to simply twist the sliver, and the second (which I denominate a curler) to impart the excess twist or curl to the twisted sliver,—is designed more effectually to accomplish the purposes of my former invention and consists in the mounting of a "tension curling brake" between the spool or bobbin containing the twisted sliver and the second twisting machine or curler.

In the drawings herein, which show sufficient of my machinery to illustrate the method of employing my present invention; Figure 1 is a side elevation showing the broken off end of the curler and the manner in which I mount my tension brake upon the machine. Fig. 2, a detached view showing the rocking and sliding device upon which the brake is set. Fig. 3, a detached view showing the spool or bobbin containing the twisted sliver or gasket of hair mounted upon a spindle adapted to deliver the gasket to the curling brake.

A, is the frame of the curler; B, a bearing, mounted on this frame, in which is set the hollow shaft C (shown in dotted lines); D, a sleeve carrying gear wheel F, upon which

sleeve is also mounted one end of flier E. G, a gear wheel engaging with gear wheel F and mounted on the same shaft as gear wheel H which latter engages with and turns gear wheel I which is mounted on hollow shaft C. This shaft C pierces sleeve D to the inner face of flier E, and carries pinion I' engaging with gears I'' I''' which operate capstans I''' respectively.

The machine thus far described is well known in the art of rope making as a twisting machine. The machine of which I have shown part is known as the Todd twisting machine.

J is a rocking bar sustained by stanchions K K, each secured by bolts K' K' through slots in the frame A. The rocking bar J is mounted directly at its ends by a lug L in each shifting block M, each of which is provided with a hole or socket M' to receive this lug. Each block M is mounted on a pin or short carrier shaft M<sup>2</sup>, which pierces the heel of the block M and sets in the ends of open box N and upon this shaft on each side of the block is mounted a spiral spring N' N'.

O is a depressor mounted on bar J and from which, by band O', is suspended the bracing weight O''.

P is a tension brake set by a support Q on the rocking bar J and projecting above and below the latter; the form of brake shown being that of the well known "curling horn."

T is the spool or bobbin upon which the twisted sliver or gasket U has been anteriorly wound by the "twister" and U' is this twisted sliver or gasket converted into a curl between the "tension brake" and the "curler" by the operation of the latter and by which operation it is wound upon a second spool or bobbin mounted upon flier E and ready for further manipulation.

The operation of my machine is as follows:—The first twisting machine or "twister," as already mentioned, simply twists the sliver of raw hair and converts it into a plain twisted gasket, which latter by the same machine is wound upon a spool or bobbin. This spool or bobbin is then mounted upon a spindle (as shown in Fig. 3) in front of the tension brake P around which the gasket U is given a pass and its end carried through the hollow shaft C to the capstans I''' and interior



mechanism of the curler, which latter is then started. The revolutions of the flier E imparts to the already twisted gasket an excess twist which causes the plain twisted gasket to curl upon itself, as shown at U'—Fig. 1,—the curler being so speeded as to produce a certain number of "curls" (provided the plain twisted gasket is perfectly uniform) per each integer of "curled" gasket and the capstans of the curler by the proper arrangement of their operative gears are set to draw the like integer into the machine in same unit time—that is, assuming the curler to be speeded to produce say forty curls to the foot in a certain unit of time, the capstans will draw in a foot of curled gasket in the same time. Since, however, it is not practicable to have the twisted gasket exactly of uniform diameter throughout its entirety, obviously the "curls" will vary in size, so that when the gasket runs thicker, the fixed number of curls will occupy a space greater than the integer which is drawn in by the curler:

It is evident that the "fixed number of curls" cannot be placed on the common integer of gasket and since curls cannot extend beyond the curling brake P, any unaccommodated curls will evince themselves by the curling or doubling upon itself of the curled gasket U'. This might be avoided by dispensing with the tension brake P and allowing the curls to extend beyond that point, but by such dispensation, as I have found, the curls are apt to extend around the material on the bobbin and to be formed at irregular intervals on the gasket. Should, however, the gasket U run thin on the contrary, while the capstans I''' will draw in the common integer—the curls formed being small will not fill up said integer properly—instead of being close and round, will be open and elongated. These difficulties are all overcome or obviated by the use of a brake such as I have described or its equivalent. As before stated, the curls cannot extend beyond the point P' where the twisted gasket is delivered to the tension brake P and it is to be noted that the brake is preserved in its normal position by the "pull" of the capstans. When, however, the plain twisted gasket runs thick and, as before explained the "fixed number of curls" cannot find room on the integer of gasket, the unaccommodated curls will draw in sufficient of the plain gasket U for their development, thus increasing the length of the curled gasket between the brake and the curler,—lessening the pull or tension on the curled gasket U', which, however, is adjusted by action of weight O'', causing depressor arm O to fall and carrying the lower edge of the brake, which bears on the curled gasket U', away from the curler,—or if this be not sufficient, the rocking bar together with the brake will be forced from the curler, thus keeping the gasket firm and the tension uniform. Should the plain gasket U now run

thin, the action of the brake is reversed—the integer of gasket which has been trespassed upon by the thick curls is filled up with the "fixed number of small curls"—the tension on gasket U' is increased and the brake returns to its first position; and should the plain gasket U still run thin, the lower end of the brake will be drawn toward the curler by the excess tension,—which excess is relieved by the shifting of the rocker shaft J with the brake in the same direction. Thus the brake will continually automatically accommodate itself to the varying thicknesses of twisted gasket and I have found it to be so sensitive as to be in an almost constant state of vibration owing to such slightly varying thicknesses and as a result the curls being confined between the brake and curler, are close and round and will be continued in unbroken succession throughout the entire length of the gasket.

Weight O'' it is obvious may be attached directly to or made a part of depressor O. Furthermore, instead of using the ordinary curling horn as a brake (though I find it very well adapted for the purpose) the gasket may be passed around a rod. Again, support Q may be provided with boxes N, the shifting blocks M, and springs N' N', and the brake P, by means of lugs, mounted therein and thus adapted to be rocked and shifted without intervention of rocker bar J. The tension brake, furthermore, instead of being attached to the frame A of the curler may be mounted on an independent stand or attached to the frame supporting the bobbin T—the only requisite being its interposition between the curler and the source of supply. It will also be evident that instead of the springs N' and sliding blocks M, before described, the brake may be provided with a sliding "eye" through which the twisted gasket may be passed at point P' and fed to the curler; I do not limit myself in these particulars.

It will be observed that the operation of the curling machine upon the gasket is subsequent to the passage of the latter around the brake. The brake P does not revolve and is in no sense a twisting mechanism; as, for instance a revolving spindle would be; therefore, in my claim, I shall designate it a tension brake to distinguish its action from that of a spindle. A revolving spindle would perform no useful office if used here in the manufacture of curled hair and I do not claim a spindle for the brake does not revolve.

I desire that the term "brake" shall be so construed as to disclaim a twisting device. One of its principal offices, also, is to act as a barrier between the curled part and the plain twisted part of the gasket to brake or check the progress of the curling process from extending to and interfering with that part of the gasket being twisted and is peculiar to a machine adapted to make curled hair. Its action is automatic.



The parts A, B, C, D, E, F, G and H constitute all the parts which are necessary to indicate a curling machine for the purpose of enabling others skilled in the art to use my invention.

A curler-brake for hair is distinct from the concentrators or holders employed in the manipulation of flax and hemp in rope manufacture and from those used in the making of cotton and woolen yarns. In all of these the strands pass directly through the holder or concentrator. In the concentrator a number of threads pass through it and, uniting on the other side, are there twisted into a yarn. In the holders the strands or gasket are bitten while passing through and are only retarded sufficiently to admit of being twisted. The rope continues to pass on thereafter and its movement is directly forward, not sinuous. A curler-brake, however, is so constructed as to permit a turn, or partial turn, of the already twisted gasket around it, thus starting the curl, and the construction of the brake must be such, even if a simple spindle is used, as to permit this turn to be in the direction of the subsequent curl or spiral: it assists in the operation of curling by starting the spiral. It is a stop against which the end of the enlargement caused by spiralizing the hair impinges. In a curling machine it is a "curler-brake" distinct in form from all other brakes used in the manipulation of fibers, and is the only interposition between the source of supply and the curling mechanism. To avoid verbiage I desire that the term "curler-brake" shall be construed as above explained, and be so interpreted when used in my claim. The capstans I''' are directly driven by cog-wheels I'' I''; these latter are driven by the intermediate cog-wheel I', which is mounted on the shaft of cog-wheel I, which latter is driven by wheel H. Wheel H is mounted on the shaft of cog-wheel G, which drives it and also cog-wheel F of the flier mechanism. Wheel F is mounted on a hollow sleeve through which passes the shaft of cog-wheels I and I'. By varying the sizes of cog-wheels H and I, respectively, it is apparent that the speed of revolution (consequently the draft) of the capstans upon the material can be increased or diminished, and that the

degree of spiralization of the curl can thus be governed at the will of the operator.

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

1. In a machine for manufacturing curled hair, the combination of the curler-brake and the curler, the former being set immediately before the latter, and the latter being provided with a capstan I''', by changing the speed of the revolution of which the degree of spiralization of the curl can be changed, substantially as described.

2. In a machine for manufacturing curled hair, a tension and brake and a rocking bar the former being set on said bar and the latter set on a support and provided with depressor O and weight O''; so arranged that the gasket may be fed to the brake, and a curling machine, the said brake being set in front of the latter and adapted to feed the gasket to it in the conversion of the latter into a curl, all arranged and operating substantially as described.

3. In a machine for manufacturing curled hair, a tension and curling brake for the twisted gasket, a bar J, blocks M M carried in boxes N N arranged substantially as shown which latter are provided with springs N' N', to permit the bar J to give to tension upon the brake and to return it to place when the tension is relieved, and a curling machine; the said brake being set in front of the latter, whereby the twisted gasket may be fed to the brake and thence to the curling machine, substantially as and for the purposes described.

4. In a machine for manufacturing curled hair, a tension and curling brake for the twisted gasket, bar J, sliding blocks M M and boxes N N arranged substantially as described to permit the bar J to give to tension, and a curling machine the said brake being set in front of the latter, whereby the twisted gasket may be fed to the brake and thence to the curling machine, substantially as described.

In witness that the above is my invention I have hereunto set my hand.

PETER WOLL, JR.

Witnesses:

ALBERT E. ZACHERLE,  
GEORGE E. BUCKLEY.