J. Cumnock,

Spinning Mule.

No. 108,688. Patented Oct. 25. 1870.

Fig. 1.

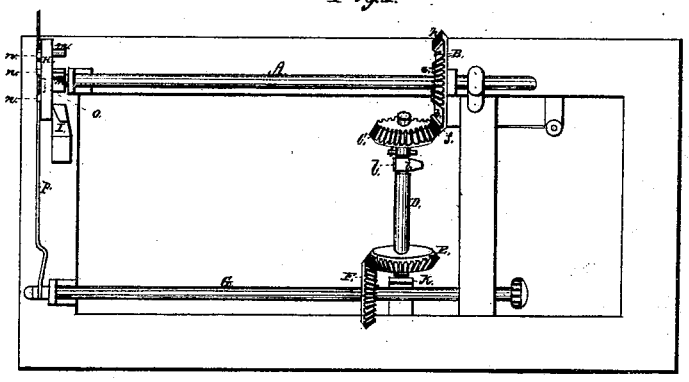


Fig. 2.

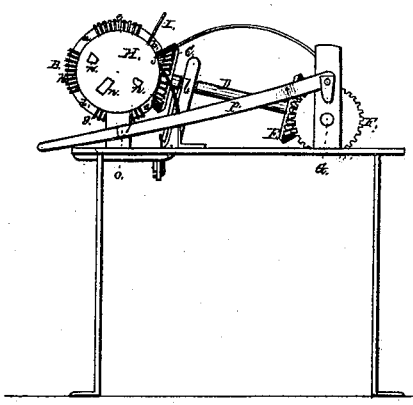


Fig. 3.

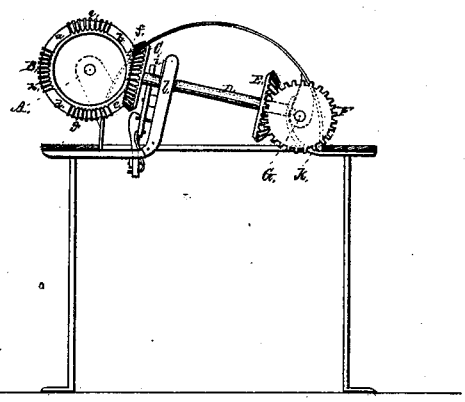
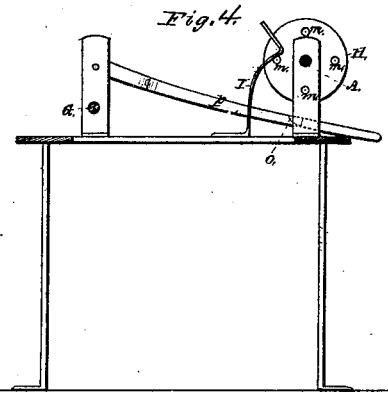


Fig. 4.



Witnesses

S. N. Pepin

L. N. Möller

John Cumnock

by his attorney.

N. Wood

United States Patent Office.

JOHN CUMNOCK, OF SALMON FALLS, NEW HAMPSHIRE.

Letters Patent No. 108,688, dated October 25, 1870.

IMPROVEMENT IN SELF-ACTING MULES FOR SPINNING.

The Schedule referred to in these Letters Patent and making part of the same.

To all persons to whom these presents may come:

Be it known that I, JOHN CUMNOCK, of Salmon Falls, of the county of Strafford and State of New Hampshire, have invented a new and useful Mechanism for Operating the Cam-Shaft of a Self-acting Mule for Spinning; and I do hereby declare the same to be fully described as follows, reference being had to the accompanying drawing, of which—

Figure 1 is a top view.

Figure 2, an end elevation.

Figures 3 and 4, transverse sections of such mechanism.

The sections are broken through the middle of the cam-shaft, one exhibiting the machinery to the right and the other to the left of the plane of section.

The object of the invention is to produce the necessary stoppages of rotary motion of the cam-shaft while the mule may be in operation, and to accomplish this by what mechanics term a "positive motion."

In the drawing—

A denotes the cam-shaft, which, in this instance, is shown as without its usual cams.

There is fixed on the said shaft a bevel-gear, B, having sundry arcs or spaces, *a b c d*, of its periphery without teeth, the remainder of the periphery, or the intervening parts, having arcs, *e f g h*, of teeth to engage with those of a beveled pinion, C, fixed on a shaft, D.

The said shaft D has its journals supported in boxes or bearings in two standards, *i k*, there being a spring, *l*, applied to one of the said standards to rest directly against the shaft D at that point which is in the bearing next to the pinion C. The spring serves as a cap to the bearing of the journal, and to admit of the shaft moving laterally and in a horizontal direction in case at any time a tooth at one extremity of any one of the arcs of teeth of the wheel B should encounter a tooth of the driving-pinion. Were it not for the spring, there would be a liability of breakage of the teeth or injury to the machine taking place.

The shaft D carries another bevel-gear, E, which in turn engages with a gear, F, fixed upon a driving-shaft, G, that, when the mule is in operation, is to have a constant rotary motion imparted to it.

On the end of the cam-shaft A is an escape pin-wheel, H, from whose inner side four studs or pins, *m m m m*, are extended.

A spring, I, formed and arranged in manner as represented, operates with the said series of pins.

Furthermore, from the outer side of the wheel three escape-teeth, *n n n*, are extended, to operate with a stud or tooth, *o*, extended from a lever, *p*.

To the said lever certain vertical movements are to be imparted, whereby its tooth *o* will be brought into and out of the path or paths of revolution of the teeth *n* of the escape-pin wheel. When such tooth *o* is in such path and at rest, it will block or stop the rotary motion of the shaft A, as a tooth, *n*, will be carried against the tooth *o* of the lever, and while the two are in contact no rotary motion of the escape-wheel can take place. As soon, however, as the lever may have moved its tooth *o* out of engagement with a tooth of the escape-wheel, the spring I, by its pressure against one of the pins of the wheel, will cause the said wheel to turn a little, so as to throw a toothed section of the intermittent gear B into engagement with its driving-pinion, which then will put the gear B in revolution until the next space without teeth of such gear is entered by such driving-pinion. On such space receiving the pinion, motion of the intermittent gear and cam-shaft will cease, and not again take place until the next succeeding arc of teeth of the intermittent gear is thrown into action with the teeth of the pinion.

From the above it will be seen how, by the mechanism described, the cam-shaft may have imparted to it an intermittent rotary motion, whereby its cam may be caused to act in the order required.

I am aware of the subjects of the British patents Nos. 203 of 1856, 2,141 of 1859, and 1,926 of 1860, and make no claim thereto, or to any device, combination, or arrangement of devices described in either of such patents.

In the mechanism shown in the said patent No. 1,926, spur-gears are employed for transferring motion to the cam-shaft; and the gear that meshes with and drives the intermittently-toothed wheel is journaled in the end of a vibratory lever, whose lower end is provided with a spring and designed to yield for the same purpose, but not in the same manner, as the gear C in my case.

In my invention, when a tooth of the wheel B engages a tooth of the wheel C the latter is enabled, by the peculiar construction of the spring-bearing of its shaft, to retreat from the former in a straight line, or in a line parallel with the two teeth which come together, and returns to gear in the same line, so that the teeth are not struck at an angle to their sides, and not liable to be broken off; whereas in the English case the gear corresponding to the gear C of my invention retreats in the arc of a circle, and the teeth, in retreating from as well as in returning to gear, will always strike each other at an angle to their sides, whereby they are rendered liable soon to become broken off.

Therefore, by the employment of the bevel-gears of the kind described and in the way set forth, and with

the shaft D supported against a spring, *l*, a new and important result follows, and I obtain not only a durable but a simpler operating mechanism.

I claim—

The combination, with the cam-shaft A, of the intermittently-toothed bevel-gear B, the bevel-gear C, its shaft D and spring-bearing *l*, driving-wheels E F, escape-wheel H and its spring I, and escape-lever *p*, all arranged and to operate as hereinbefore described.

JOHN CUMNOCK.

Witnesses:
R. H. EDDY,
S. N. PIPER.