No. 617,738. Patented Jan. 17, 1899.

G. S. HALE.

VARIABLE SPEED FRICTIONAL GEARING.

(Application filed Apr. 22, 1898.)

(No Model.)

Fig. 1.

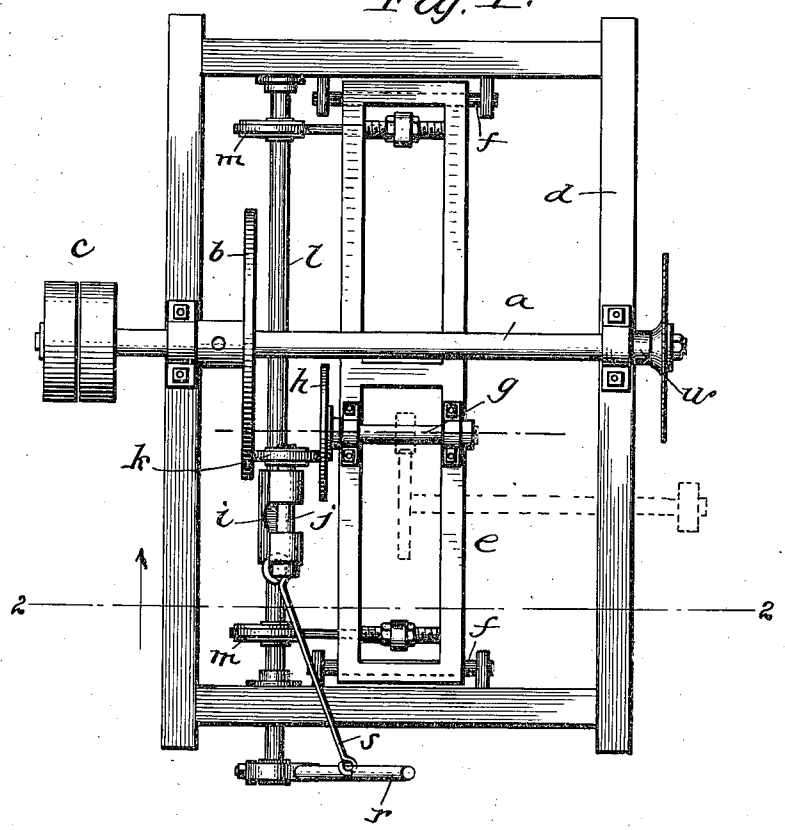


Fig. 2.

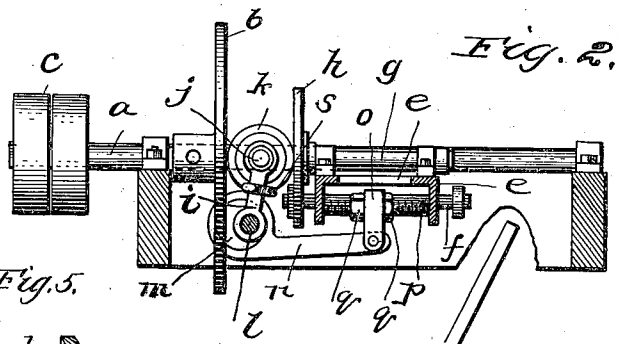


Fig. 4.

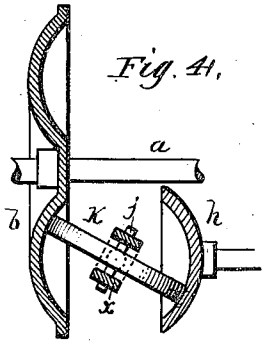


Fig. 5.

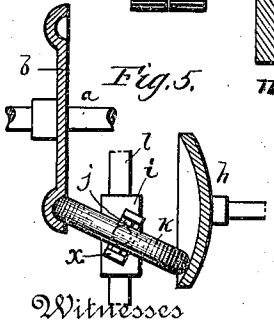
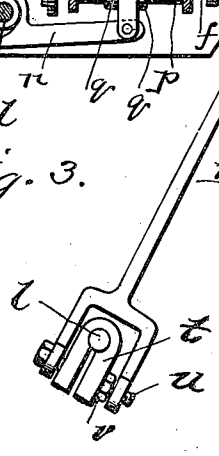


Fig. 3.



Witnesses

M. A. Davis

G. H. Walmsley.

Inventor

George S. Hale

By Davis & Davis

Attorneys

UNITED STATES PATENT OFFICE.

GEORGE S. HALE, OF BRIDGEWATER, VIRGINIA.

VARIABLE-SPEED FRICTIONAL GEARING.

SPECIFICATION forming part of Letters Patent No. 617,738, dated January 17, 1899.

Application filed April 22, 1898. Serial No. 678,490. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. HALE, a citizen of the United States, residing at Bridgewater, in the county of Rockingham and State of Virginia, have invented certain new and useful Improvements in Variable-Speed Frictional Gearing, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a plan view; Fig. 2, a transverse section on the line 2 2 of Fig. 1; Fig. 3, a detail view showing the manner of fastening the operating-lever to the rock-shaft, and Figs. 4 and 5 detail sectional views showing modified forms of the reversing mechanism.

The object of the invention is to provide a simple system of frictional gearing wherein the speed can be readily varied and the driven shaft thrown out of operation and reversed, these operations being controlled by a single lever, as more fully hereinafter set forth.

Referring to the drawings by letters, *a* designates the driving-shaft, carrying the driving-disk *b* and the drive-pulleys *c*, this shaft carrying a circular saw, if the apparatus be used in connection with a sawmill. Supported slidingly in the main frame *d* is a supplemental frame *e*, the ends of this frame being supported directly on suitable rods *f*, upon which it is adapted to slide. This frame *e* is adapted to slide to and from the face of disk *d*, and journaled upon it in suitable bearings is a counter-shaft *g*, whose center is preferably in the same horizontal plane as the drive-shaft *a*. Suitable gearing connects this shaft *g* with the sawmill-carriage or other part that is adapted to be moved. The shaft *g* has its axis within the periphery of the main disk *b*, and upon the end next to said main disk it carries a counter-disk *h*, whose face is parallel with the said main disk and whose center is in line horizontally with the center of said main disk.

Journaled upon a small carriage or block *i* is a short shaft *j*, which carries at one end a friction-disk *k*, lying intermediate the disks *h* and *b* and adapted to simultaneously contact with the adjacent faces of said disk. The disk *k* is supported vertically and shaft *j* horizontally, the center of the disk and shaft being in line radially with the centers of disks *h* and *b*. The carriage *i* is slidable upon a horizontal rock-shaft *l*, journaled in the main frame, this rock-shaft being parallel with the faces of disks *h* and *b*, so that the intermediate disk *k* may be moved back and forth across the center of disk *h* and toward and from the center of disk *b*.

Upon the rock-shaft *l*, one at each end, are secured two eccentrics *m*, and connected to each eccentric is an arm *n*, which extends in under the carriage *e* and at its extremity is pivotally connected to a link or arm *o*, whose upper end is adjustably clamped upon a threaded rod *p* by means of suitable nuts *q*, said threaded rod being secured in a horizontal position upon carriage *e*, as shown.

Upon one end of the rock-shaft *l* is secured an operating-lever *r*, which extends upward to be within convenient reach of the operator and is connected by a link *s* to a sliding part *i*. The operating-lever is connected to the shaft in any suitable manner whereby it may have a pivotal motion to and from the disks and a lateral rocking motion with the shaft upon which it is secured. One manner of securing it to the shaft is shown, in which said lever is forked at its lower end to embrace a split clamp *t*, adjustably clamped upon the end of the shaft by means of the pivotal bolt *u* and a clamp-nut *v* thereon. With this means of securing the lever it will be observed that the same is capable of a sort of universal movement, being capable of swinging to and fro laterally with the shaft and toward and from the disks independently of the shaft.

The operation of the device is thought to be obvious. Motion is transmitted through the intermediate wheel *k* to counter-shaft *g* and from this shaft to the part that is to be moved, be said part a sawmill-carriage or other device. The speed may be varied, as is obvious, by sliding the intermediate disk *k* to and from the center of counter-disk *h*, and the direction of rotation of said disk *h* may be reversed by sliding said disk *k* across its center, the speed of the disk *h* being of course increased the nearer said disk *k* is set to the center thereof; but when said disk *k* passes the center of said disk *h* the speed of said disk *h* begins to diminish as the said disk *k* moves toward the periphery of disk *h*, as is obvious. This peculiar variable motion will

be particularly advantageous in connection with sawmill-carriages, as it is desirable in machines of that class to advance the carriage slowly and return it quickly to its starting position; but it is obvious that this gearing may be used in connection with a great variety of machinery. It will be obvious that this simple method of varying and reversing the speed of the counter-shaft is obtained by journaling the counter-shaft at one side of the driving-shaft and within the radius of the drive-disk, the axes of both the counter-shaft and the shaft of the intermediate wheel being preferably in a radial line with the axis of the drive-disk.

It will be observed that to bring the disk *h* up against the intermediate disk and press this latter against the main disk the operator simply moves lever *r* to the right, whereupon shaft *l* is rocked and eccentrics *m* are made to draw the carriage *e* toward said main disk. In this way the operator is enabled to bring the desired or necessary pressure upon the intermediate transmitting-disk and at the same time and with the same lever slide said disk back and forth to vary the speed, whereby one hand of the operator will be free to perform any other work that may be required. A further advantage of this manner of operating the counter-shaft lies in the fact that the main shaft will be kept pressed endwise in a direction away from the point where the sawing operation is being performed, keeping the collar *w* on said shaft pressed against the adjacent bearing, whereby the saw will be guided truly and steadied in its operation.

It will be observed that the carriage *i* is rotatively supported upon rock-shaft *l*. It will be seen also that the throw of the eccentrics and the operating-lever may be readily adjusted by the devices shown to suit the exigencies of the case and the convenience of the operator.

In the modified form of frictional wheels shown in Fig. 4 the wheel *h* is dished on its inner surface and the main disk *b* is provided with an annular concave channel having a curvature equal to that of the dished surface of the wheel *h*, and the intermediate wheel *k* has its shaft journaled in a vertical fork *x*, mounted on a vertical pivot midway between the dished surfaces of the disks. In this form it will be observed that the speed is varied and the direction of rotation of the counter-shaft is reversed by simply turning the fork *x* on its vertical pivot. The shaft *j* of wheel *k*, as in the other views, has its axis in line radially with the axes of the main shaft and supplemental shaft. In the modified form shown in Fig. 5 the transmitting-wheel *k* is journaled, as in Fig. 4, on the fork *x*, which is pivotally supported on the carriage *i*, carried by rock-shaft *l*. In this form the wheel *k* bears in a groove in the face of disk *b* and is held in that groove, having no bodily movement on the face of said main disk, whereby as the slide *i* is moved back and forth the wheel *k* will swing across the face of concaved disk *h*, but will be held at its other side in the groove in disk *b*.

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

1. In a mechanism for transmitting motion, the combination of a main drive-disk, a counter-shaft journaled on an axis passing between the axis and periphery of said drive-disk and carrying a counter-disk, and another disk journaled between said disks and adapted to bear upon the adjacent faces of the same simultaneously, and means for moving said intermediate disk across the center of the counter-disk and to and from the center of the drive-disk as and for the purposes set forth.

2. In a mechanism for transmitting motion, the combination of a main shaft carrying a drive-disk, a counter-shaft carrying a supplemental drive-disk, the axis of this disk being parallel with the main shaft and passing through a point between the main shaft and the edge of the main drive-disk, the adjacent faces of said disks being parallel, an intermediate disk bearing simultaneously upon the adjacent faces of said disks, means for adjusting said intermediate disk, and means for bringing said disks together upon the intermediate disk and varying the pressure thereon, substantially as described.

3. The combination of a main shaft carrying a main drive-disk, a counter-shaft carrying a counter-disk, an intermediate disk transmitting motion from the main disk to the counter-disk, means for sliding said intermediate disk, devices for bringing the main and counter disks together upon the intermediate disk, and a single operating device controlling said means and said devices.

4. The combination of a main shaft carrying a main disk a counter-shaft carrying a counter-disk, an intermediate wheel transmitting motion from one disk to the other, a sliding carriage carrying said intermediate wheel, a carriage carrying one of said disks, a rock-shaft and devices connecting said rock-shaft to said carriage, and an operating-lever adapted to simultaneously rock said shaft and adjust the intermediate wheel.

5. In mechanism for transmitting motion, the combination of a main drive-disk, a counter-shaft carrying a counter-disk, an intermediate friction-wheel, a carriage carrying said wheel, a rock-shaft supporting said carriage, eccentrics carried by said rock-shaft, a sliding carriage carrying the counter-shaft, rods adjustably connecting said eccentrics with the latter carriage, a lever pivotally carried on said rock-shaft, a link connecting said lever to the carriage carrying the intermediate friction-wheel, whereby the one lever will serve to adjust said friction-wheel and to regulate the pressure exerted thereon by the counter-disk.

6. In mechanism for transmitting motion,

a main driving-shaft, carrying a main driving-wheel, a counter-shaft having its axis substantially parallel with the main shaft and at one side thereof, a friction-disk carried by said shaft, and a transmitting-wheel supported between the main driving-wheel and said friction-disk and having simultaneous contact therewith, said transmitting-wheel being movable across the center of said friction-disk whereby the motion of the latter may be reversed and its speed varied.

7. In mechanism for transmitting motion, the combination of a main drive-wheel, a counter-shaft carrying a friction-disk, the axis of said disk and shaft being to one side of the main shaft, a shaft supported in the same plane radially with the axes of the counter-shaft and main shaft and carrying a transmitting-wheel having contact with the main wheel and the friction-disk, said shaft being movable to permit said transmitting-wheel to travel from one side of the center of the friction-disk to the other side thereof, whereby the speed and the direction of rotation of said disk may be controlled.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 21st day of April, 1898.

GEORGE S. HALE.

Witnesses:
WM. R. DAVIS,
C. D. DAVIS.