No. 697,379. Patented Apr. 8, 1902.

G. W. MAXWELL.

MECHANICAL DIRECTORY.

(Application filed Oct. 23, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. I.

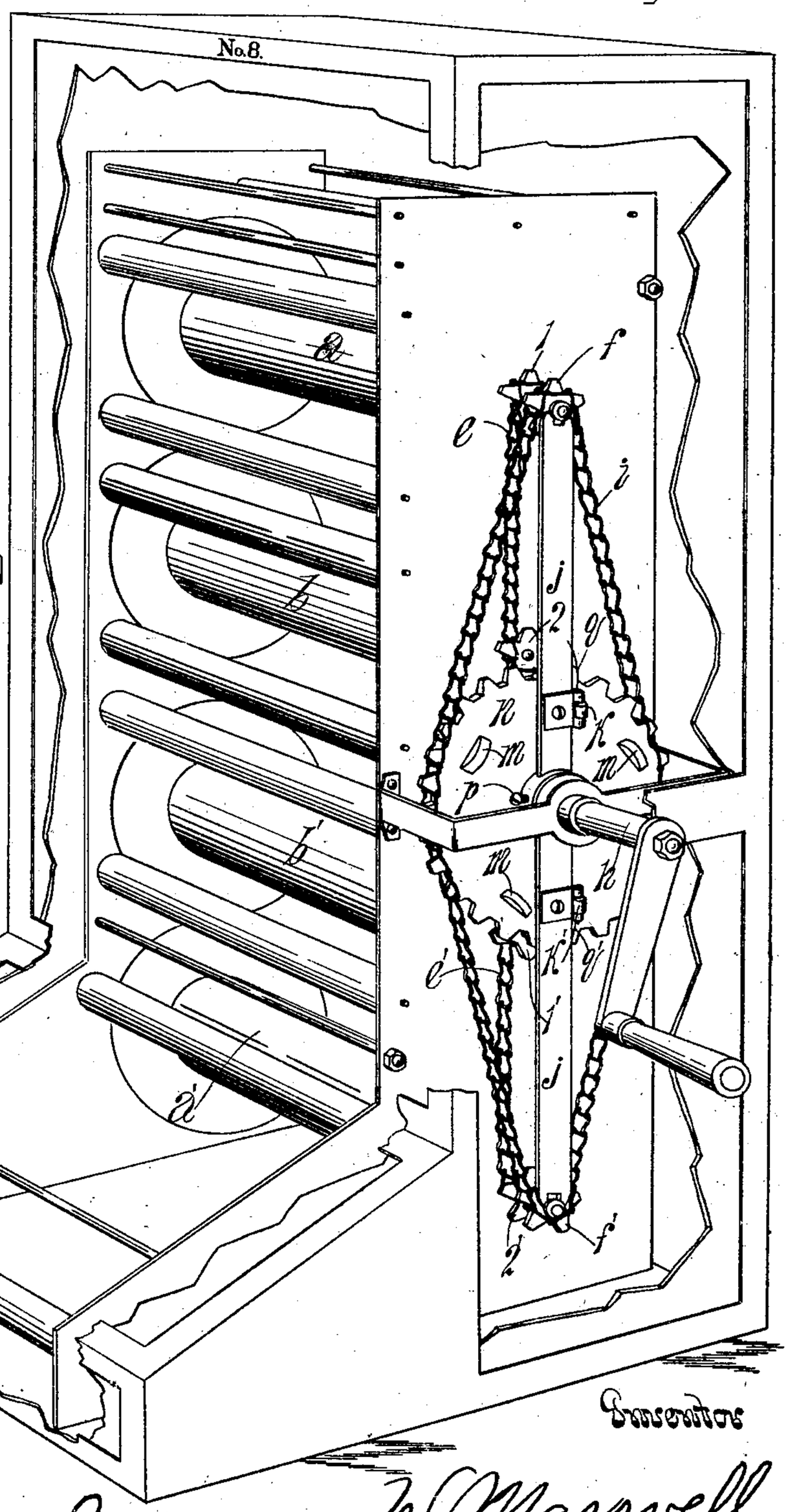

Fig. II.

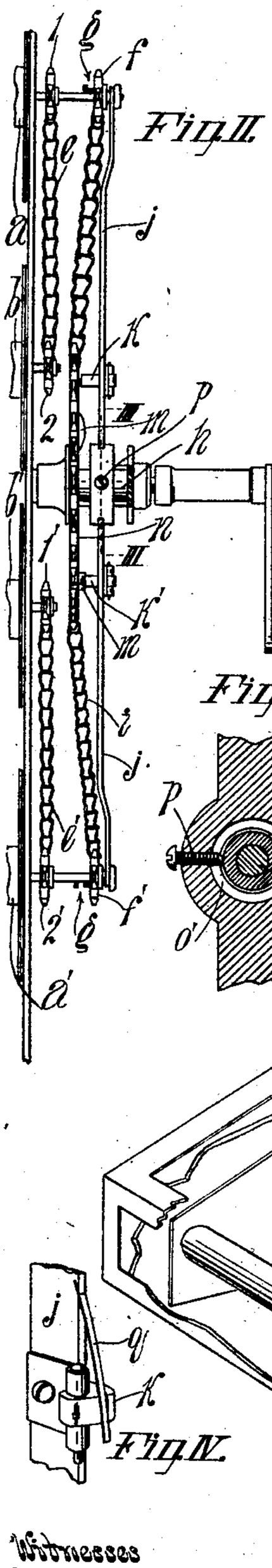

Fig. III.

Fig. IV.

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Fig. V.

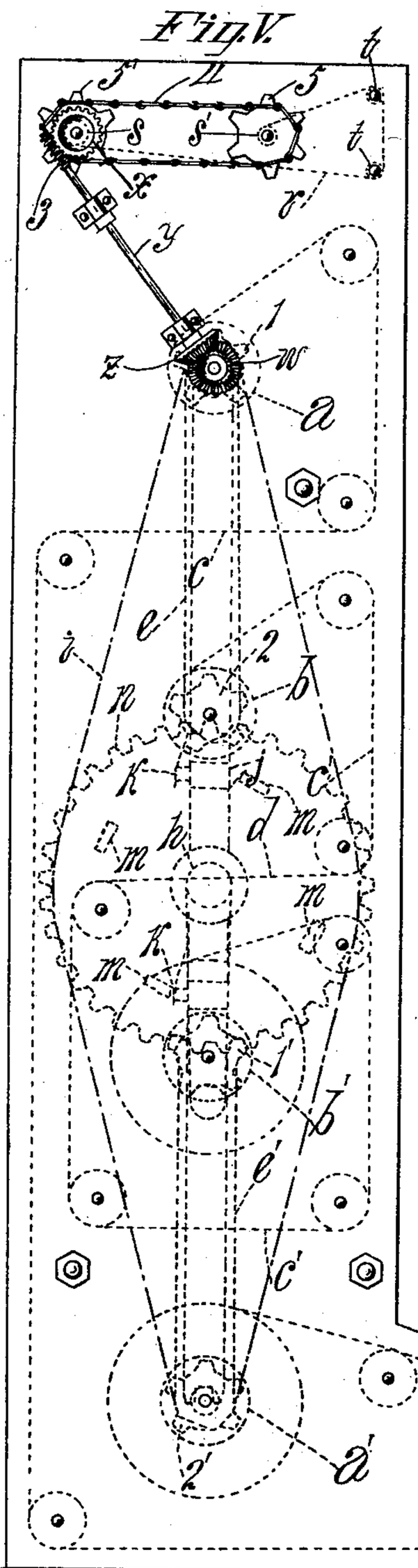
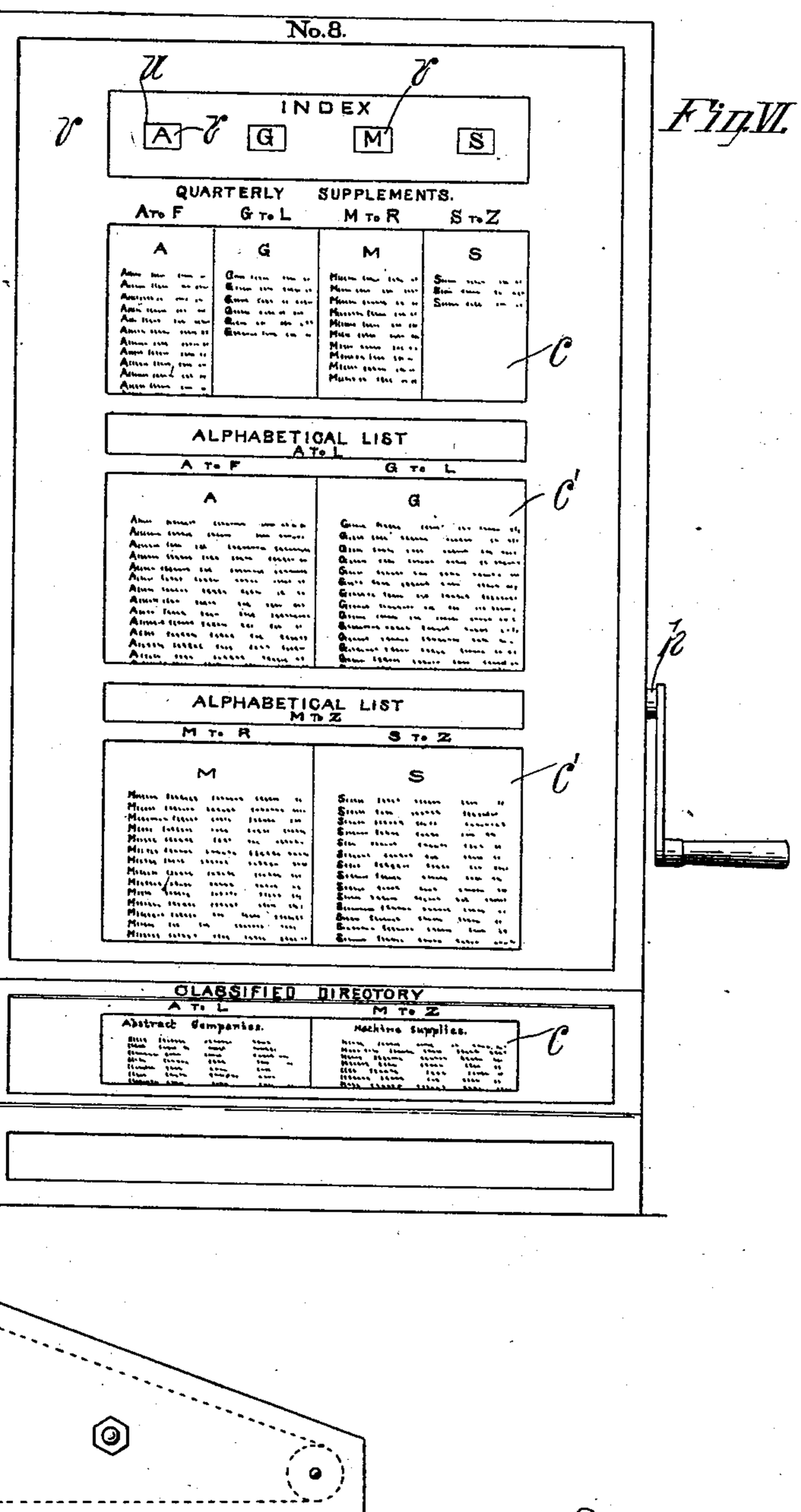


Fig. VI.



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UNITED STATES PATENT OFFICE.

GEORGE W. MAXWELL, OF LOS ANGELES, CALIFORNIA.

MECHANICAL DIRECTORY.

SPECIFICATION forming part of Letters Patent No. 697,379, dated April 8, 1902.

Application filed October 23, 1900. Serial No. 34,080. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WASHINGTON MAXWELL, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Mechanical Directories, of which the following is a specification.

This invention relates to a mechanical directory of the type heretofore invented by me and set forth in certain applications for patents which I have filed in the United States Patent Office as follows: Serial No. 676,132, filed April 1, 1898, renewed August 1, 1900, Serial No. 25,591; Serial No. 684,712, filed June 29, 1898, renewed August 1, 1900, Serial No. 25,592; Serial No. 705,446, filed February 13, 1899; Serial No. 737,688, filed November 20, 1899, and an application, Serial No. 34,079, filed contemporaneously herewith.

The object of my present invention is to provide novel means of simple and inexpensive construction for reversing the direction of the ribbons or strips when the prime mover is reversed.

Another object is to supply an index of extremely slow movement relative to the movement of the directory strips or ribbons.

The accompanying drawings illustrate my invention.

Figure I is a perspective view showing the mechanism of my novel mechanical directory in its case, fragments of which case are broken away for clearness of illustration. The directory strips or ribbons are omitted from this view for clearness of illustration of the mechanism. Fig. II is an elevation of the reversing mechanism, portions of the sprocket-chains being omitted. Fig. III is a section on line III III, Fig. II. Fig. IV is a perspective detail illustrating one of the lever-dogs. Fig. V is a side elevation viewed from the left of Fig. I, showing the index-operating mechanism and also showing by dotted lines the arrangement of the directory-strips upon their appropriate rollers and idlers or guides. Fig. VI is a front elevation of the directory.

a a' b b' indicate the several rollers of two pairs of rollers.

c indicates a strip fastened at its ends, respectively, to the rollers *a a'* of one pair. *c'* indicates a strip fastened at its ends, respectively, to the rollers *b b'* of the other pair. The sprocket-chain *e* and sprocket-wheels 1 2 constitute means operatively connecting one roller *a* of one pair with one roller *b* of the other pair for their simultaneous operation. The sprocket-chain *e'* and sprocket-wheels 1' 2' indicate like means operatively connecting the other roller *a'* of the one pair with the other roller *b'* of the other pair for their simultaneous operation. The sprocket-wheel *f* constitutes means for driving one of said first-named connected rollers. *g* indicates a clutch for connecting and disconnecting said means *f* with and from its said roller *a*. *f'* indicates means for driving one of said second-named connected rollers—viz., roller *a'*. *g'* indicates a clutch for connecting and disconnecting said means *f'* with and from its roller *a'*. *h* indicates a shaft constituting a prime mover for operating the directory. *i* indicates a sprocket-chain constituting means for operatively connecting said shaft *h* with both of said sprocket-wheels *f f'* for simultaneously driving them. A lever connection *j* is provided for connecting and disconnecting the clutches *g g'*. *k k'* indicate reversely-arranged spring-pressed dogs on said lever connection on opposite sides of said shaft *h*. *m* indicates tappets connected with the shaft *h* to rotate therewith and arranged to move across the path of said dogs, whereby when the shaft is rotated in the one direction said tappets operatively engage one of said dogs to operate the lever *j*, and the other dog will yield to allow the tappets to pass. The tappets *m* are connected with the shaft *h* through suitable means—viz., the master-wheel *n* of shaft *h*, which drives the sprocket-chain *i* to drive the roller-driving wheels *f f'*. The sprocket-chain *i* is trained around the master sprocket-wheel *n* and the driving sprocket-wheels *f f'*, so that when the shaft is rotated in one direction the lever and rollers will be operated in one direction, and vice versa when the shaft is rotated in the other direction.

o indicates an annularly-grooved member upon the shaft *h*. The lever *j* is mounted on said member *o* by means of set-screws *p*, which fit into the groove *o'* and pivot the lever *j* to the shaft *h*, but at the same time allow the lever *j* to vibrate on the shaft to throw one end of the lever in one direction and the other

end of the lever in the other direction when the shaft *h* is rotated to cause the tappets *m* to engage the dogs, thereby to operate upon one of the dogs to throw one end of the arm in one direction and the other end of the arm in the reverse direction, the other dog being arranged to yield to the pressure of tappets to let them pass without throwing the lever. *q* indicates springs for holding said dogs in place in the path of the tappets *m* and to allow the dogs to spring out of the way when the tappets engage them from the non-operative side. The dog *k* will operate to throw the upper end of the lever away from the rollers, thus to disconnect the clutch *g* when the prime mover *h* is rotated over toward the front, and the dog *k'* yields to the tappets *m* when the prime mover *h* is turned in said direction. When the prime mover is turned in the reverse direction, the dog *k'* will be operated upon by the tappets to throw the lower end of the lever away from the rollers and the upper end of the lever toward the rollers, thus connecting the clutch *g* and disconnecting the clutch *g'*. Said lever *j* is operatively connected, through sprocket-wheels *f f'*, to appropriately connect and disconnect the clutches, respectively, of such sprocket-wheels. The lateral movement of the shifting sprocket-wheels *f f'* need be only very slight in order to allow the proper operation of the clutches *g g'*.

Referring to Figs. V and VI, *r* indicates an index-strip. *s* and *s'* indicate two rollers, upon which said index-strip is mounted to be wound and unwound from roller to roller. Said strip is carried over the guides *t t* to exhibit the index-strip through the opening *u* of the case *v*. *w* indicates a bevel-wheel on one of the directory-rollers *a*. *x* indicates a worm gear-wheel on one of the index-strip rollers. *y* indicates a shaft furnished with a bevel-gear *z* at one end, meshing with the bevel-gear *w* on the directory-strip roller, and said shaft is also furnished with a worm 3, engaging the worm-gear *x* on the index-roller. 4 indicates a sprocket-chain led around sprocket-wheels 5 5', respectively fastened to the index-rollers *s s'*, whereby said index-rollers are connected to simultaneously rotate. When in the operation of the machine the roller *a* turns in one direction, the index-strip will be moved very slowly in one direction, and when the roller *a* is turned in the other direction the index-strip will be driven very slowly in said other direction.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of two pairs of rollers; a strip fastened at its ends respectively to the rollers of one pair; a strip fastened at its ends respectively to the rollers of the other pair; means operatively connecting one roller of one pair with one roller of the other pair for their simultaneous operation; means operatively connecting the other roller of the one pair with the other roller of the other pair for their simultaneous operation; means for driving one of said first-named connected rollers; a clutch for connecting said means with and disconnecting it from said roller; means for driving one of said second-named connected rollers; a clutch for connecting said means with and disconnecting it from its roller; a shaft; means operatively connecting said shaft with both of said roller-driving means for simultaneously driving them; a lever connection for connecting and disconnecting said clutches; reversely-arranged dogs on said lever connection at opposite sides of the shaft; and tappets connected with said shaft to rotate therewith and arranged to move across the path of said dogs whereby when the shaft is rotated in the one direction, said tappets operatively engage one of said dogs to operate the lever connection in one direction to connect one of said clutches and disconnect the other of said clutches, and when the shaft is rotated in the other direction said tappets will operate the other dog and throw the lever to connect the other clutch and disconnect the first-named clutch.

2. The combination of two pairs of rollers; a strip fastened at its ends respectively to the rollers of one pair; a strip fastened at its ends respectively to the rollers of the other pair; means operatively connecting one roller of one pair with one roller of the other pair for their simultaneous operation; means operatively connecting the other roller of the one pair with the other roller of the other pair for their simultaneous operation; means for driving one of said first-named connected rollers; a clutch for connecting said means with and disconnecting it from said roller; means for driving one of said second-named connected rollers; a clutch for connecting said means with and disconnecting it from its roller; a shaft; means operatively connecting said shaft with both of said roller-driving means for simultaneously driving them; a lever journaled on and pivoted to the shaft to allow the shaft to rotate in said lever and to allow the lever to vibrate on said shaft; reversely-arranged dogs on said lever; and one or more tappets connected with the shaft to rotate therewith and to move in the path of the dogs to operatively engage one of said dogs to throw the lever in one direction when the shaft is rotated in one direction and to operatively engage the other of said dogs to throw the lever in the other direction when the shaft is rototated in the other direction, said lever being operatively connected with the clutches to connect the one and disconnect the other when the shaft is thrown in one direction, and vice versa when the shaft is thrown in the other direction.

3. The combination of two pairs of rollers; a strip fastened at its ends respectively to the rollers of one pair; a strip fastened at its ends respectively to the rollers of the other pair; means operatively connecting one roller of one pair with one roller of the other pair for

their simultaneous operation; means operatively connecting the other roller of the one pair with the other roller of the other pair for their simultaneous operation; means for driving one of said first-named connected rollers; a clutch for connecting said means with and disconnecting it from said roller; means for driving one of said second-named connected rollers; a clutch for connecting said means with and disconnecting it from its roller; a shaft; means operatively connecting said shaft with both of said roller-driving means for simultaneously driving them; a lever connection for connecting and disconnecting said clutches; and reversely-arranged dog and tappet mechanisms for transmitting motion from the shaft to operate said lever connection for connecting one clutch and disconnecting the other clutch when the shaft is rotated in one direction, and vice versa when the shaft is rotated in the other direction.

4. The combination of two pairs of rollers; a strip fastened at its ends respectively to the rollers of one pair; a strip fastened at its ends respectively to the rollers of the other pair; means operatively connecting one roller of one pair with one roller of the other pair for their simultaneous operation; means operatively connecting the other roller of the one pair with the other roller of the other pair for their simultaneous operation; means for driving one of said first-named connected rollers; a clutch for connecting said means with and disconnecting it from said roller; means for driving one of said second-named connected rollers; a clutch for connecting said means with and disconnecting it from its roller; a shaft; means operatively connecting said shaft with both of said roller-driving means for simultaneously driving them; a lever journaled on and pivoted to the shaft to allow the shaft to rotate in said lever and to allow the lever to vibrate on said shaft; and reversely-arranged dog and tappet mechanisms whereby the rotation of the shaft in one direction throws the lever in one direction and the rotation of the shaft in the other direction throws the lever in the other direction, said lever being connected with the clutches to connect the one and disconnect the other when the shaft is thrown in one direction, and vice versa when the shaft is thrown in the other direction.

5. The combination of two pairs of rollers; a strip fastened at its ends respectively to the rollers of one pair; a strip fastened at its ends respectively to the rollers of the other pair; means operatively connecting one roller of one pair with one roller of the other pair for their simultaneous operation; means operatively connecting the other roller of one pair with the other roller of the other pair for their simultaneous operation; means for driving one of said first-named connected rollers; a clutch for connecting said means with and disconnecting it from said roller; means for driving one of said second-named connected rollers; a clutch for connecting said means with and disconnecting it from its roller; a shaft; a sprocket-wheel on said shaft; a sprocket-chain led around said sprocket-wheel and arranged to drive said roller-driving means; tappets on said sprocket-wheel; a pivoted lever extending across said sprocket-wheel and furnished at opposite sides of the center of said wheel with reversely-arranged dogs to be engaged by said tappets when said wheel is rotated, whereby the lever is thrown in one direction when the wheel is rotated in one direction and is thrown in the other direction when the wheel is rotated in the other direction, said lever being operatively connected with said clutches to connect the one and disconnect the other when the shaft is thrown in one direction, and vice versa when the shaft is thrown in the other direction.

6. The combination with the rollers and directory-strips of a mechanical directory, of means for operating said rollers to move the directory-strips in one and the other direction; an index-strip; two rollers upon which said index-strip is mounted to be wound and unwound from roller to roller; a bevel-wheel operatively connected with one of the directory-strip rollers; a worm gear-wheel operatively connected with the index-strip rollers; and a shaft furnished with a bevel-gear meshing with the bevel-gear on the directory-strip roller, and also furnished with a worm engaging the worm-gear on the index-strip roller.

7. The combination of two pairs of rollers; a strip fastened at its ends respectively to the rollers of one pair; a strip fastened at its ends respectively to the rollers of the other pair; means operatively connecting one roller of one pair with one roller of the other pair for their simultaneous operation; means operatively connecting the other roller of one pair with the other roller of the other pair for their simultaneous operation; means for driving one of said first-named connected rollers; a clutch for connecting said means with and disconnecting it from said roller; means for driving one of said second-named connected rollers; a clutch for connecting said means with and disconnecting it from said other roller; a shaft operatively connected with both of said roller-driving means for simultaneously driving them; means for rotating said shaft in one and the other direction; a lever extending crosswise of the shaft and furnished on opposite sides of the shaft with reversely-arranged dogs and one or more tappets connected to rotate with said shaft to move across the path of said dogs to engage the same to throw the lever in one direction when the wheel is rotated in one direction, and vice versa when the wheel is rotated in the other direction; said lever being operatively connected with said clutches, for alternately connecting the one and disconnecting the other, and vice versa.

8. The combination of two pairs of rollers; a strip fastened at its ends respectively to the rollers of one pair; a strip fastened at its ends respectively to the rollers of the other pair; means operatively connecting one roller of one pair with one roller of the other pair for their simultaneous operation; means operatively connecting the other roller of one pair with the other roller of the other pair for their simultaneous operation; a sprocket-wheel slidingly mounted on one of said first-named connected rollers; a clutch for connecting said sliding sprocket-wheel with and disconnecting it from said roller; another sprocket-wheel slidingly mounted on one of said second-named connected rollers; a clutch for connecting said sliding sprocket-wheel with and disconnecting it from said other roller; a master sprocket-wheel; a sprocket-chain led around said sprocket-wheels and master-wheel; means for rotating said master sprocket-wheel in one and the other direction; tappets connected with the master-wheel to rotate therewith; means for shifting the sprocket-wheels on their respective rollers to alternately connect and disconnect their clutches; and reversely-arranged dogs on opposite sides of the axis of the master-wheel, operatively connected with the sprocket-wheel-shifting means, and arranged in the path of the tappets to be actuated by said tappets.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, California, this 16th day of October, 1900.

GEO. W. MAXWELL.

Witnesses:

JAMES R. TOWNSEND,

JULIA TOWNSEND.