(No Model.) 2 Sheets—Sheet 1.

C. E. BARNES.

MACHINE FOR MAKING CORDAGE.

No. 366,064. Patented July 5, 1887.

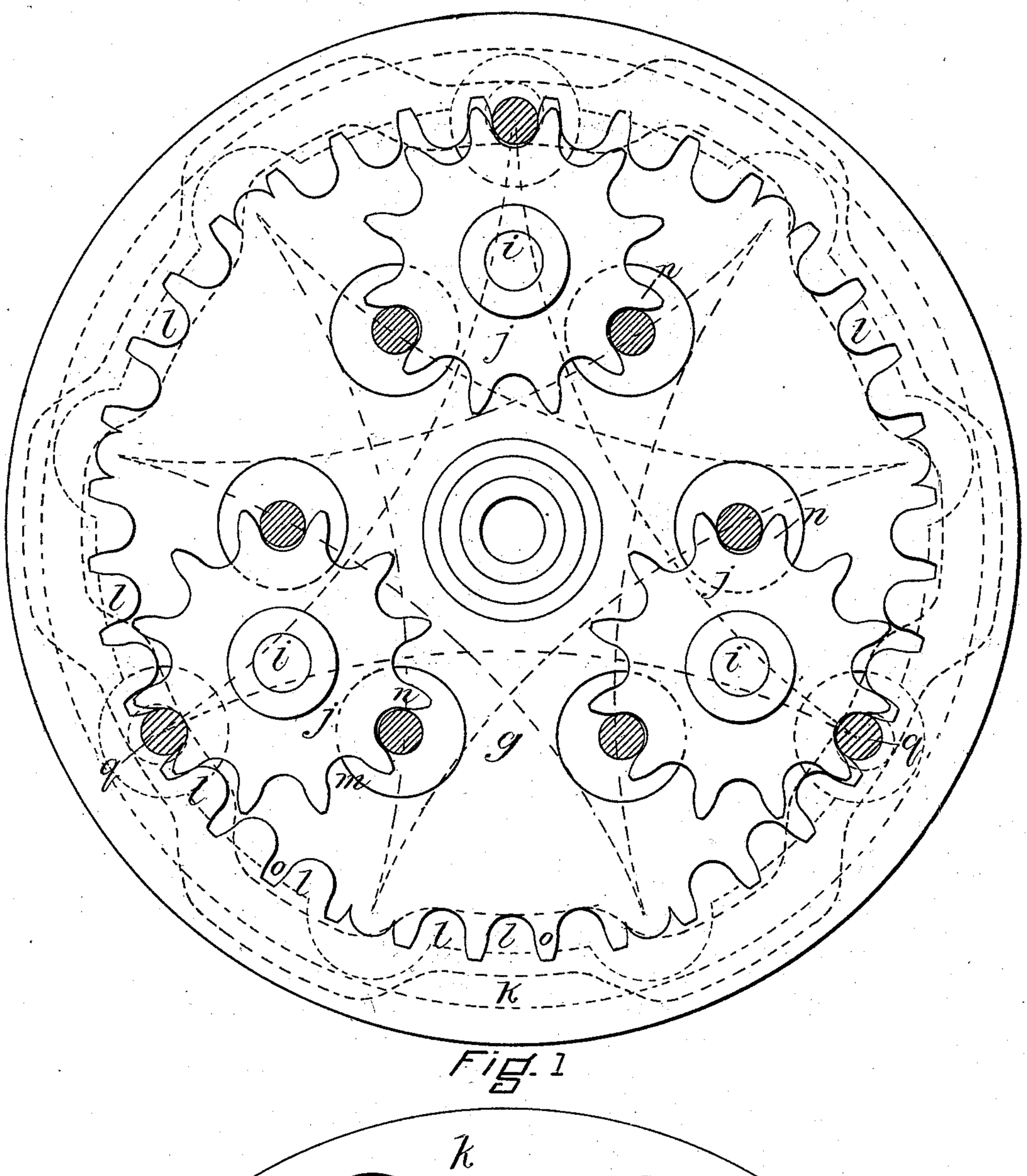

Fig. 1

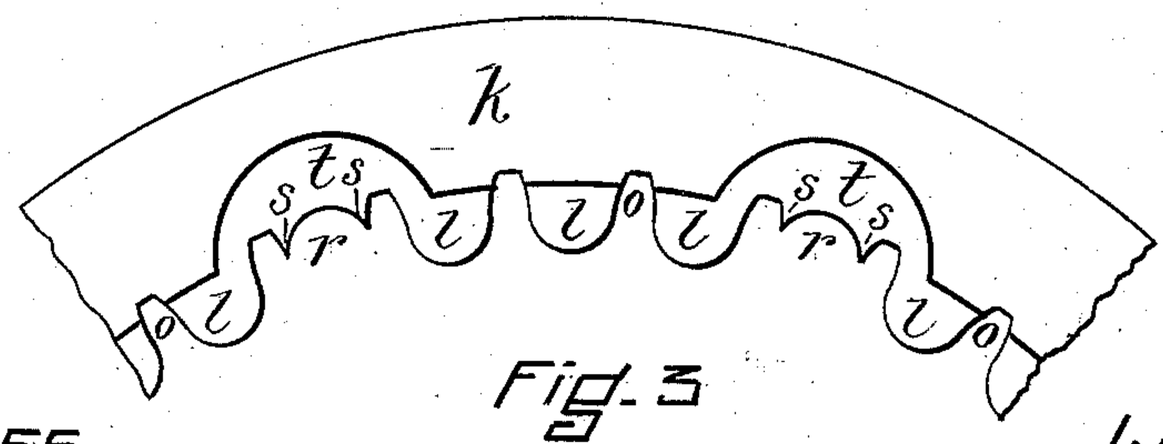

Fig. 3

WITNESSES
H. Brown.
A. D. Harrison.

INVENTOR
Chas. E. Barnes.
by Wight, Brown & Crossley.
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

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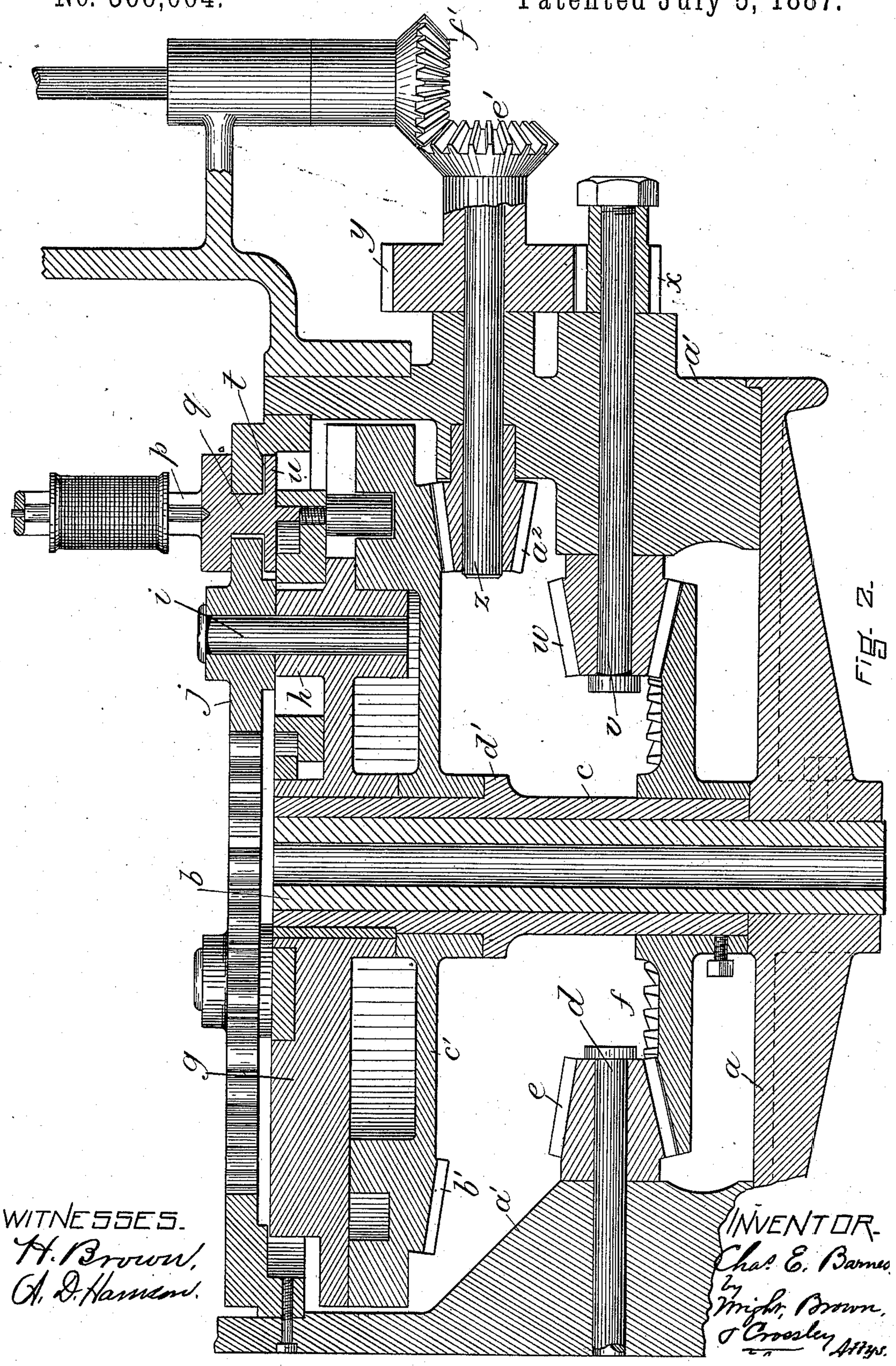

Fig. 2.

WITNESSES.
H. Brown.
A. D. Harrison.

INVENTOR.
Chas. E. Barnes.
by Wright, Brown, & Crosley Attys.

UNITED STATES PATENT OFFICE.

CHARLES E. BARNES, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WILLIAM MEEHAN, OF SAME PLACE.

MACHINE FOR MAKING CORDAGE.

SPECIFICATION forming part of Letters Patent No. 366,064, dated July 5, 1887.

Application filed December 13, 1886. Serial No. 221,448. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BARNES, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Cordage, of which the following is a specification.

My invention relates to machines for making cordage—that is, machines adapted to plat, entwine, or interweave a plurality of threads or strands of any character to form a cord, or for the purpose of covering a cord, wire, or the like.

It is the object of my invention to simplify the construction of machines of the class mentioned, and so improve the same as to secure greater certainty of operation and avoid liability of misplacing any of the parts in assembling them after disassociation for the purpose of cleaning or repair.

To these ends my invention consists in the peculiar construction of the stationary gear, as also in the travelers and carriers in adapting them to said gear.

My invention also consists in improvements whereby the cam-disk is operated or driven from the outside of the machine proper, whereby I am enabled to simplify its construction and permit any part or parts to be easily and quickly removed and accurately replaced when such manipulation is desirable for the purpose of cleaning or repair.

Reference is to be had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, in which similar letters of reference indicate similar parts wherever they occur.

Of the drawings, Figure 1 represents a top plan view of the machine proper, the shanks of the travelers being represented in section. Fig. 2 represents a vertical sectional view of the same and of the driving or operating means, parts being shown in elevation, other parts broken away, and a single traveler being pictured in operative position. Fig. 3 represents an under side view of a portion of the stationary gear.

The particular style or kind of machine upon which my improvements have been wrought is that exemplified in the patent granted to me October 5, 1880, No. 232,920, as also that granted to myself and A. C. Winn December 18, 1883, No. 290,624, and reference may be had to said patents for information as to the purposes and manner of using the machine as a whole, as also details, forming no part of the present invention, and therefore not herein shown.

In the drawings, *a a'* represent the bed and frame of the machine of a form and character suited to support the various operative parts.

b indicates the central hollow shaft secured to the bed, and around which the sleeve *c* is adapted to be revolved.

d indicates the main or driving shaft journaled in the frame *a'*, and provided on its inner end with a bevel-pinion, *e*, intermeshing with a bevel-gear, *f*, secured to the lower end of sleeve *c*, which latter device has the disk *g* secured to its upper end, as shown in Fig. 2. Said disk *g* is provided at suitable intervals with bearings *h* for the journals *i* of the notched or toothed carriers *j*, constructed to rest upon said disk and be carried around therewith as the latter is rotated.

k indicates the fixed gear or ring secured to and supported by the frame, and provided on its inner edge with comparatively broad teeth *l*, the outer ends of which are rounded and adapted to fall into the notches *m* of the carriers *j*, the comparatively sharp teeth *n* of which engage the notches *o* of corresponding form in the stationary gear *k*, between its teeth *l*. This form of the teeth and notches in the stationary gear and carriers enables me to adapt each notch in each carrier to receive the shank of the traveler, and at the same time reduce the size of the carriers and stationary gear to a minimum consistent with strength and efficiency, so that the interlocking of the threads to form cords may be accomplished with the shortest possible movements of the parts, securing also speed, certainty of operation, simplicity, and cheapness of construction, and a minimization of the room occupied by the machine.

p represents a traveler of usual form and function. The shanks *q* of the travelers are adapted to fit in any of the notches *m* between

the teeth of the carriers *j*, and be transferred from point to point on the fixed gear *k*, and at the same time carried around other travelers in position around gear *k*, in order to effect the platting or interweaving of the strands to form a cord, as will be understood by those skilled in the art.

In order to provide for the reception of the shanks *q* of the travelers by the fixed gear *k*, and at the same time leave unimpaired the adaptability of said gear to operate the carriers *j* as the latter are carried around by disk *g*, I cut away or mutilate said teeth I at suitable intervals, as represented at *r*, Fig. 3, leaving slight projections *s s* on both sides of the rounded notch formed by the mutilation of the tooth, as described, which projections serve not only to embrace and keep the shanks of the travelers in position, but serve to perform the functions of a full tooth, *l*.

By the construction thus far explained it will be seen that whenever necessity may require a single carrier, *j*, may be removed, after first removing the travelers in engagement therewith by any of the known provisions for that purpose, by simply raising it with its journal-stud *i* from its bearing *h* in the disk *g*, and when it is replaced it is not necessary to exercise care in its arrangement, so that particular teeth *n* shall fall in particular notches *o* of the fixed gear *k*, so that it is impossible for it to be misplaced to throw the machine out of gear or cause other trouble or damage. By this construction, also, the shanks *q* of the travelers fit any of the notches *m* of the carriers, and are adapted to be operated by the latter, the only care necessary in placing the travelers in position being such as will insure their falling in notches *r* of the stationary gear when the machine is operated.

The stationary gear *k* is slightly recessed or chambered out, as represented at *t*, Fig. 3, for the reception of the flange *u* of the traveler, by which the latter is supported on the disk *g*. This chamber *t*, at the base of the mutilated tooth of the stationary gear, performs an important function in connection with the flange *u* of the traveler, in that said features serve to hold the traveler securely against lateral displacement, even though one or both of the teeth or projections *s s* should be accidentally broken off.

I am aware that plates have heretofore been riveted to the under side of the stationary ring or gear, which plates have been designed to fit on each side of the carriers when they are in engagement with said gear or ring to prevent them from being thrown out of place until taken by the carriers; but such plates do not hold the travelers securely or steadily in position, and, besides, they are very liable to be broken off, causing loss of time and expense for repairs, to say nothing of the increased expense of constructing the gear or ring in the first instance.

v represents a shaft having its bearings in the frame *a'* and arranged substantially opposite main shaft *d*. Said shaft *v* is provided on its inner end with a bevel-pinion, *w*, engaging with bevel-gear, *f*, so that as the latter is operated the shaft will be rotated. A gear, *x*, is fixed on the outer end of shaft *v*, which gear *x* intermeshes with a larger gear, *y*, on the outer end of a shaft, *z*, which latter shaft has a bevel-pinion, a^2, secured to its inner end, adapted to engage with the teeth *b'*, formed on the under side of cam-disk *c'*, adapted to be supported and turn on a collar, *d'*, of sleeve *c*.

The cam-disk *c'* is adapted to perform the function usual to such devices in braiding-machines, and is necessarily rotated at a slower rate of speed than disk *g*, which difference in speed of rotation is effected by the difference in gears *x* and *y*. By this arrangement I am enabled to bring the gearing for operating the cam-disk in such position as to make it easy of access in case of needed repair or a cleaning or lubrication of any of the parts—a source of trouble and annoyance in all other structures known to me.

Gears *e' f'* and their adjuncts are for the purpose of operating the take-up mechanism, (not shown,) forming no part of my present invention.

In the operation of the machine, as disk *g* is rotated carriers *j* are carried around therewith, and are rotated on their journal-studs *i* by the engagement of their teeth *n* with the teeth *l* of the stationary ring or gear *k*, the projections or remaining portions *s s* of the mutilated teeth serving, in connection with the adjacent full teeth, all the purposes of such full teeth for effecting the rotation of the carriers. As said carriers move around with and are rotated on said disk their teeth engage the shanks *q* of the travelers *p*, and transfer the latter from point to point of the circle described by the teeth on the inner edge of the stationary ring or gear *k*, carrying such travelers around others on disk *g* and leaving them, with their shanks *q*, in notches *r* of the mutilated teeth, and flanges in chambers *t* of the stationary ring or disk, to be taken up and transferred by the next following carrier in a similar manner, thus platting or interlocking the strands carried by the travelers into a cord having the appearance of being formed in crochet-stitch. The chambers *t* at the base of the mutilated teeth on fixed ring or gear *k* serve, as has been stated, to support the sides of the flanges *u* of the travelers and maintain the latter in position, even though the projections *s s* of said mutilated teeth should by accident be broken off.

The cam-disk *c'* operates on the travelers in the common and well-known manner to move the latter into engagement with the teeth of the carrier, maintain them in that position, and transfer them to proper position in the teeth of the stationary gear; but said cam-disk does not form a part of my present invention or improvements.

Having thus described my invention, what I claim is—

1. The ring *k*, provided on its inner edge with teeth *l*, certain of which teeth at regular intervals are mutilated or partially cut away to form notches *r*, and having recesses or chambers *t* formed in the body of the ring or gear at the base of such mutilated teeth, as set forth.

2. The combination, with a stationary ring, *k*, provided on its inner edge with teeth *l*, certain of which teeth at regular intervals are mutilated or partially cut away to form notches *r*, and having recesses or chambers *t* formed in the body of the ring or gear at the base of such mutilated teeth, of carriers *j* and travelers *p*, provided with shanks *q* and flanges *u*, as set forth.

3. The combination, with a stationary ring or gear, *k*, provided on its inner edge with teeth, portions of certain of which at regular intervals are mutilated or partially cut away to form notches *r*, and having recesses or chambers *t* formed in the body of the ring or gear at the base of such mutilated teeth, disk *g*, rotary carriers *j*, journaled therein, and provided with teeth adapted to engage with the teeth of the stationary ring or gear, and travelers *p*, provided with shanks *q*, adapted to fit the notches between the teeth of the carrier and the notches *r* of the stationary ring or gear, and flanges *u*, adapted to be received in the chambers *t* of said ring or gear, as set forth.

4. The frame and bed, driving-shaft *d*, pinions *e w*, gear *f*, shafts *v z*, gears *x y*, pinion a^2, cam-disk *c'*, provided with gear-teeth *b'*, and sleeve *c*, combined, arranged, and operating substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 6th day of December, 1886.

CHARLES E. BARNES.

Witnesses:

ARTHUR W. CROSSLEY,

A. D. HARRISON.