(No Model.)

S. N. GALLUP.

GEARING FOR CHANGING SPEED.

No. 345,377. Patented July 13, 1886.

Fig. 1

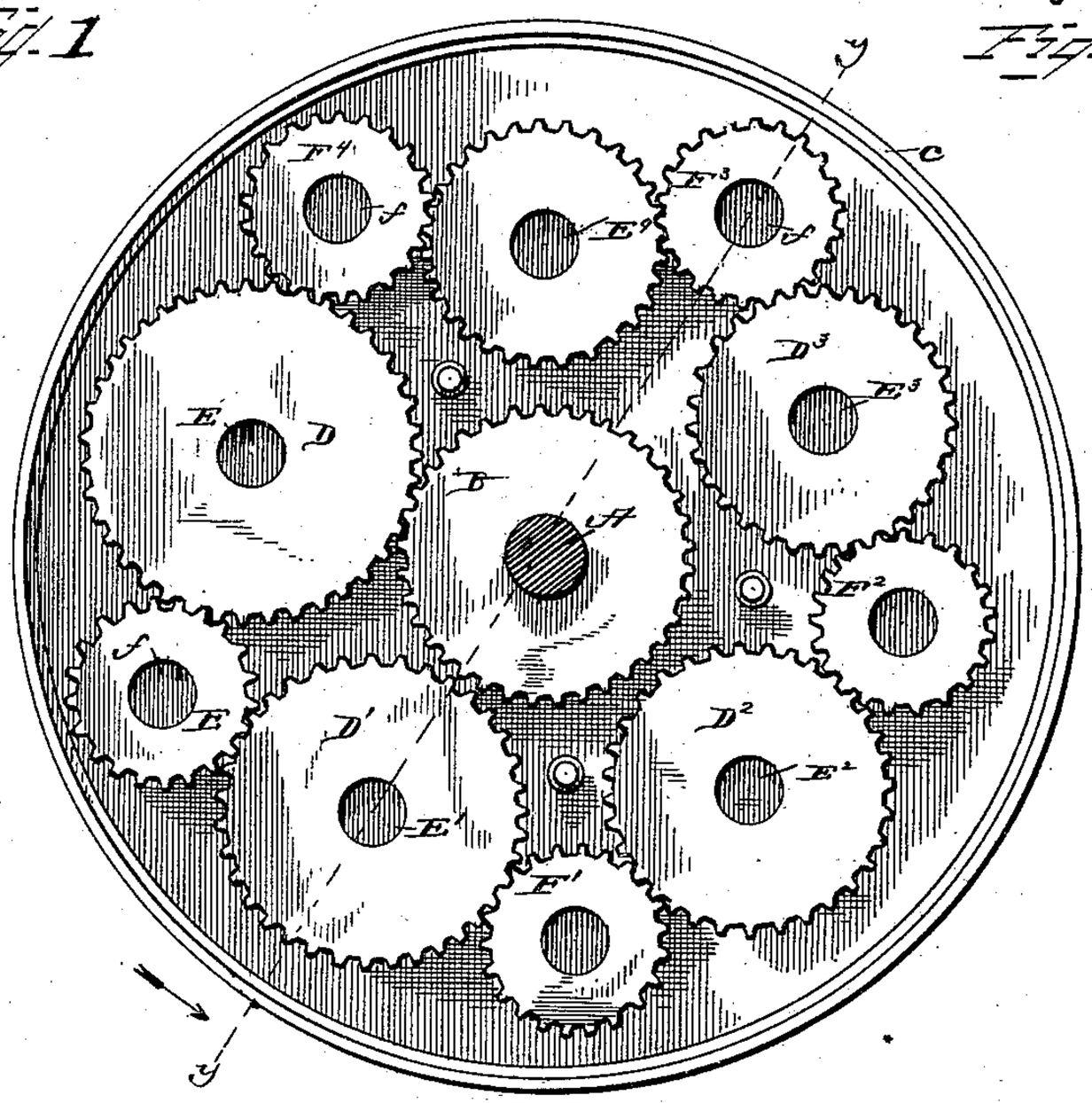

Fig. 2.

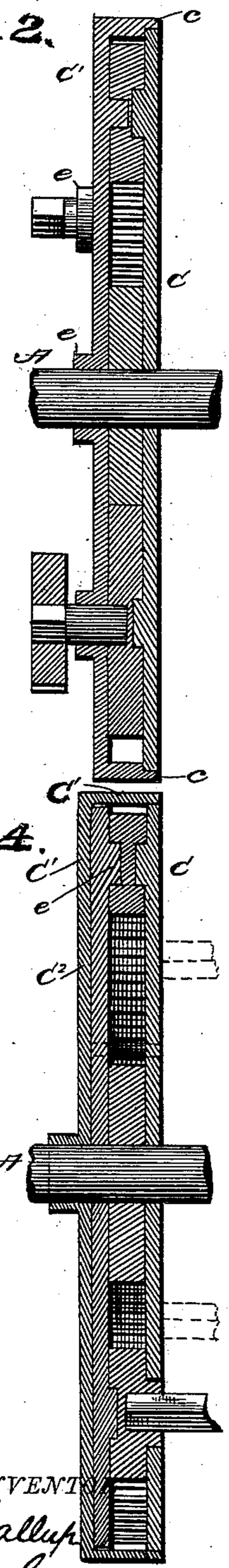

Fig. 3.

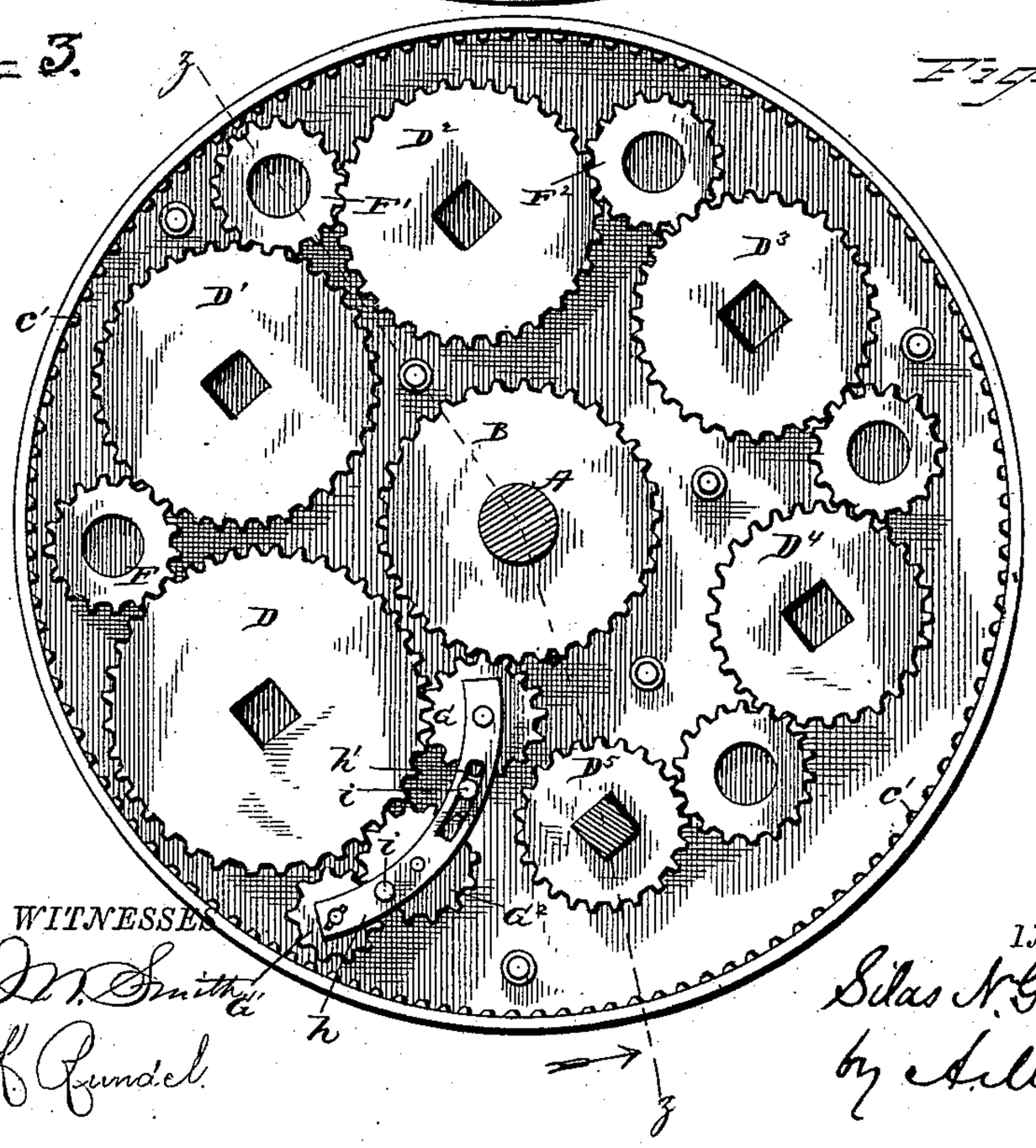

Fig. 4.

WITNESSES:

Robt. D. V. Smith.

Geo. L. Rundell.

INVENTOR:

Silas N. Gallup

by A. M. Smith

Attorney

UNITED STATES PATENT OFFICE.

SILAS N. GALLUP, OF MACEDON, NEW YORK, ASSIGNOR TO LYMAN BICKFORD AND HELEN M. KIRKPATRICK, OF SAME PLACE.

GEARING FOR CHANGING SPEED.

SPECIFICATION forming part of Letters Patent No. 345,377, dated July 13, 1886.

Application filed July 16, 1884. Serial No. 137,818. (No model.)

To all whom it may concern:

Be it known that I, SILAS N. GALLUP, of Macedon, county of Wayne, and State of New York, have invented a new and useful Improvement in Gearing for Changing Speed, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

This invention relates to a novel gearing for changing speed, particularly designed for use in connection with seeding-machines or grain-drills for varying the quantity of seed to be distributed over a given quantity of land, but applicable elsewhere wherever a changeable speed is required.

It consists in a novel arrangement of gears of different diameters around or relative to a common drive-wheel, and any one of which may be brought or adjusted into proper position to communicate motion to the shaft or gear to be driven, and preferably at points equidistant from a common center or driving-gear, and connecting them with each other and the common driver by intermediate gear-wheels; in a novel arrangement of the gears of different diameters, in combination with a central driving-gear, an internally-geared rim surrounding them, and means whereby said different-sized gears can be connected with and driven either from the central driving-gear or the internally-cogged rim, thereby increasing the number of changes in speed, all as hereinafter explained.

In the accompanying drawings, Figure 1 is a side elevation, with one side casing-plate removed, showing the arrangement of the gearing; and Fig. 2 is a section on line *y y* of Fig. 1. Fig. 3 is a side elevation similar to Fig. 1, showing a modification in the gearing for giving an increased number of changes of speed; and Fig. 4 is a section on line *z z* of Fig. 3.

A represents the main driving-shaft, which in the case of a seeding-machine or grain-drill may be the main drive-wheel axle; B, the main driving-gear secured to and turning with the axle or drive-wheel, and C and C′ two centrally-perforated disks, which, in the construction shown in Figs. 1 to 4, inclusive, are journaled on and adapted to be adjusted around the shaft or axle A as a center, but not turning with it. The disk C′ is of slightly-greater diameter than the disk C, and is provided on its side adjacent to the latter with an annular flange, *c*, which overhangs the periphery of the disk, the two disks and flange forming a shell or case inclosing the central gear, B, and a series of gears, D D′ D^2 D^3, &c., of different diameters, arranged around and engaging with or driven from the central gear, B.

In Figs. 1 and 2 the gears D D′, &c., are all shown with their axes or shafts E arranged in a circle concentric with the shaft or axle A, in which case only the larger wheel, D, engages directly with the central driver, B, the other gears, D′, D^2, D^3, and D^4, being connected with gear D and with each other by intermediate gears, F F′, &c., as shown. By this arrangement the shafts E are all equidistant from the central driving-shaft, and their connection with the shaft to be driven is facilitated, as by the adjustment of the disk C, in which they have their bearings, around the shaft A any one of the shafts E E′ may be brought into the desired position for connecting it with the shaft to be driven.

The gears D D′ D^2, &c., are fast on the shafts E E′ E^2, &c., which have their bearings in the disk, which, if desired, may be elongated into bearing-sleeves on the outer face of the disk, as shown at *e*, and where the disk C′ is made non-rotating and adjustable with the disk C, said disk C′ may be provided with short cylindrical stud-projections *e′*, which enter corresponding sockets in the adjacent faces of the gears D D′ F F′, &c., and serve as journals to steady and support said gears.

The shell or casing composed of the disks C and C′ may be adjusted around the central driving-shaft and held at the desired adjustment by any suitable means for that purpose, and when so adjusted the shaft from which motion is to be imparted may be connected with the shaft to be driven in any suitable manner. Thus the ends of the shafts E E′ E^2, &c., projecting outside of the bearings in disk C may be squared, polygonal in shape, grooved or feathered, or otherwise adapted to receive and drive a gear-wheel from which motion is imparted to a similar gear on the shaft to be

driven. The shafts *f* of the intermediate or connecting gears F F′, &c., are journaled in the disks C, or disks C and C′, where both are stationary or adjustable, as described.

For the purpose of increasing the number of changes in speed I prefer, under some conditions, to make the disk C′ fast on the drive-wheel or drive-wheel axle A, to turn with it, in which case the bearings of the shafts of the gears D D′ F F′, &c., will of course be entirely in the disk C, and in this case I make the annular flange *c* of the disk C in the form of an internally-cogged rim, *c′*, as shown in Fig. 3, from which motion may be communicated to the different-sized gears, as will be described. In this arrangement the larger gear D is not geared directly to the central driving-gear, B, but is adapted to be indirectly engaged therewith by an adjustable intermediate pinion, G, mounted on a stud-shaft secured to a plate or bar, *h*, adjustably connected with the plate or disk C.

Either the disk C or the plate *h* may be slotted in the arc of a circle of which the shaft E of the gear D is the center, as shown at *h′*, to permit the adjustment of plate *h*, and the latter may be held at the desired adjustment, for a purpose which will be explained, by bolts, as indicated at *i*, or other suitable fastening device.

The plate *h* is by preference made in an arc of a circle of which shaft E is the center, and is provided near its outer end with a stud-shaft on which is mounted a pinion, G′, which, by the adjustment of the plate *h* may be moved into engagement with the gear-rim *c′*, by which movement the pinion G will be removed from engagement with the central driving-gear, B, and will act simply as an idle-wheel driven through its engagement with gear D.

To avoid changing the direction of rotation of the gear D and the other gears driven therefrom when thrown out of gear with B and into gear with the rim *c′*, I interpose a second intermediate pinion, G², between the geared rim *c′* and the gear D, the latter receiving motion from G′ and being mounted upon a stud-shaft on the adjustable plate *h*. By thus adapting the gear D and the other gears of different diameters receiving their motion through D to be driven from either the central driving-gear, B, or from the internally-geared rim *c′*, double the number of changes of speed can be made as compared with the construction shown in Fig. 1, where the central driving-gear, B, only is employed for actuating the different-sized gears, and this without interfering with the inclosing of the gears within or between the disks forming the casing.

The casing-disks are arranged at such a distance apart as to accommodate the gears and permit them to work freely and easily.

The means for effecting the adjustment of the plate *h* and the pinions or gear-wheels supported thereby may be varied, as may also the form of said gear-wheels—as, for instance, by substituting friction-wheels for the spur-gears shown and described.

Where the internally-cogged rim is employed for driving the train of gears, said rim is made separate from the rim C′, as indicated in section in Fig. 4, and the driving-rim C² is adapted to fit over and inclose the rim C′, and in this manner the inclosing and driving rim C² is adapted to rotate or revolve around the rim C′ for actuating the inclosed gears.

Having now described my invention, I claim as new—

1. The combination of the central gear-wheel, a series of gear-wheels of different diameters arranged around and receiving motion from said central gear-wheel, and intermediate gear-wheels connecting said different sized and central gear-wheels, substantially as described.

2. A series of gear-wheels of different diameters arranged around a central driving gear-wheel upon shafts or axes equidistant from said central wheel, and intermediate gear-wheels connecting said different-sized gear-wheels, in combination with an adjustable disk or case supporting said different-sized gear-wheels, substantially as described.

3. The combination of the central driving-gear, the different-sized gears arranged around said central gear and adapted to receive motion therefrom, the internally-cogged rim surrounding said gears, and means for throwing the different-sized gears into or out of gear with either the central gear or the internally-geared rim, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand this 3d day of July, A. D. 1884.

SILAS N. GALLUP.

Witnesses:
G. W. KIRKPATRICK,
GEO. NOXON.