(No Model.) 2 Sheets—Sheet 1.

F. A. RICE.

GEARING FOR GRAIN DRILLS.

No. 541,251. Patented June 18, 1895.

Fig. 1

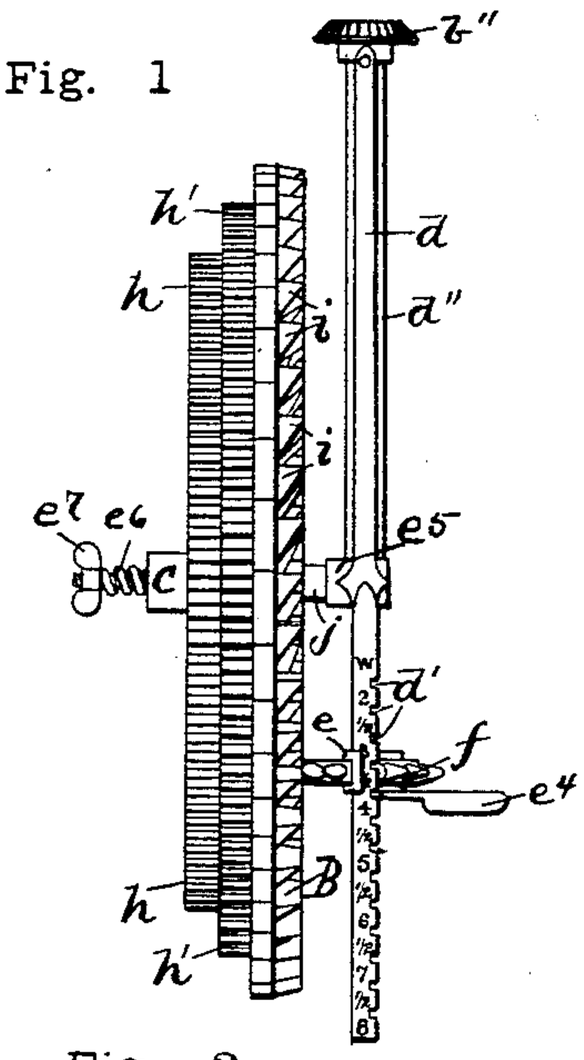


Fig. 3

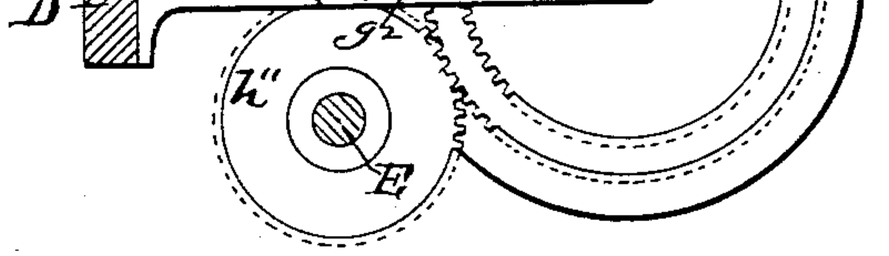


Fig. 2

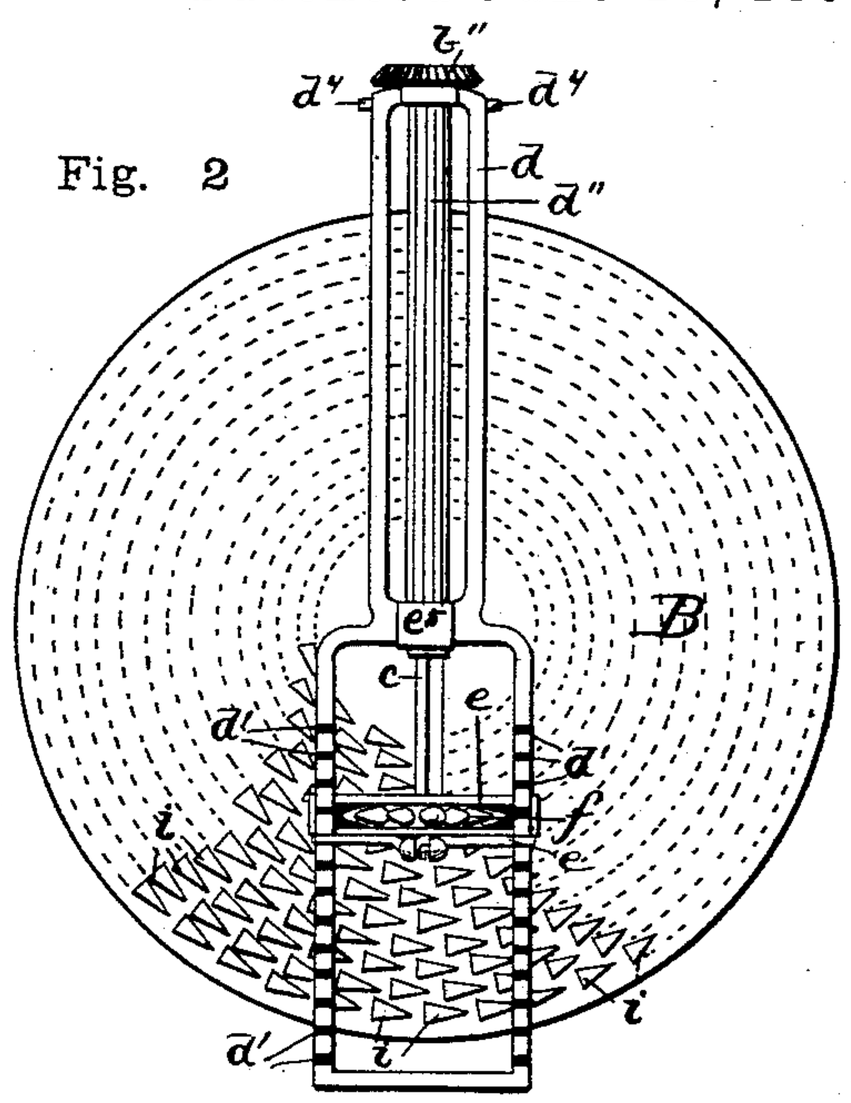
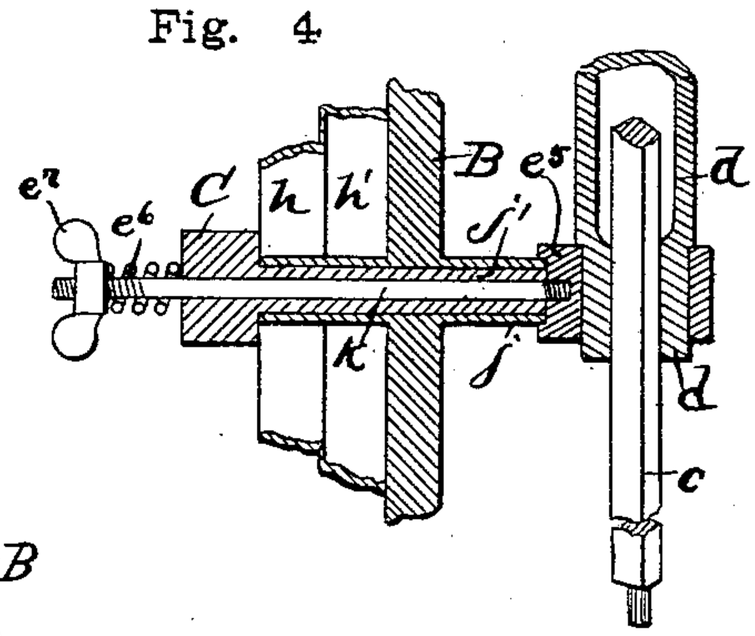


Fig. 4



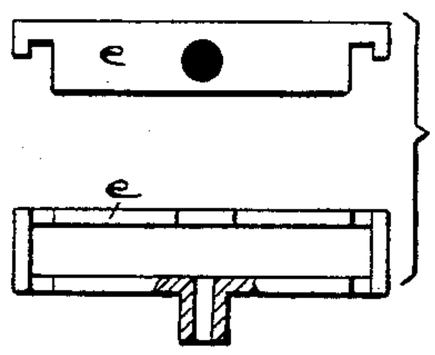


Fig. 5

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(No Model.) 2 Sheets—Sheet 2.

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GEARING FOR GRAIN DRILLS.

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Fig. 6

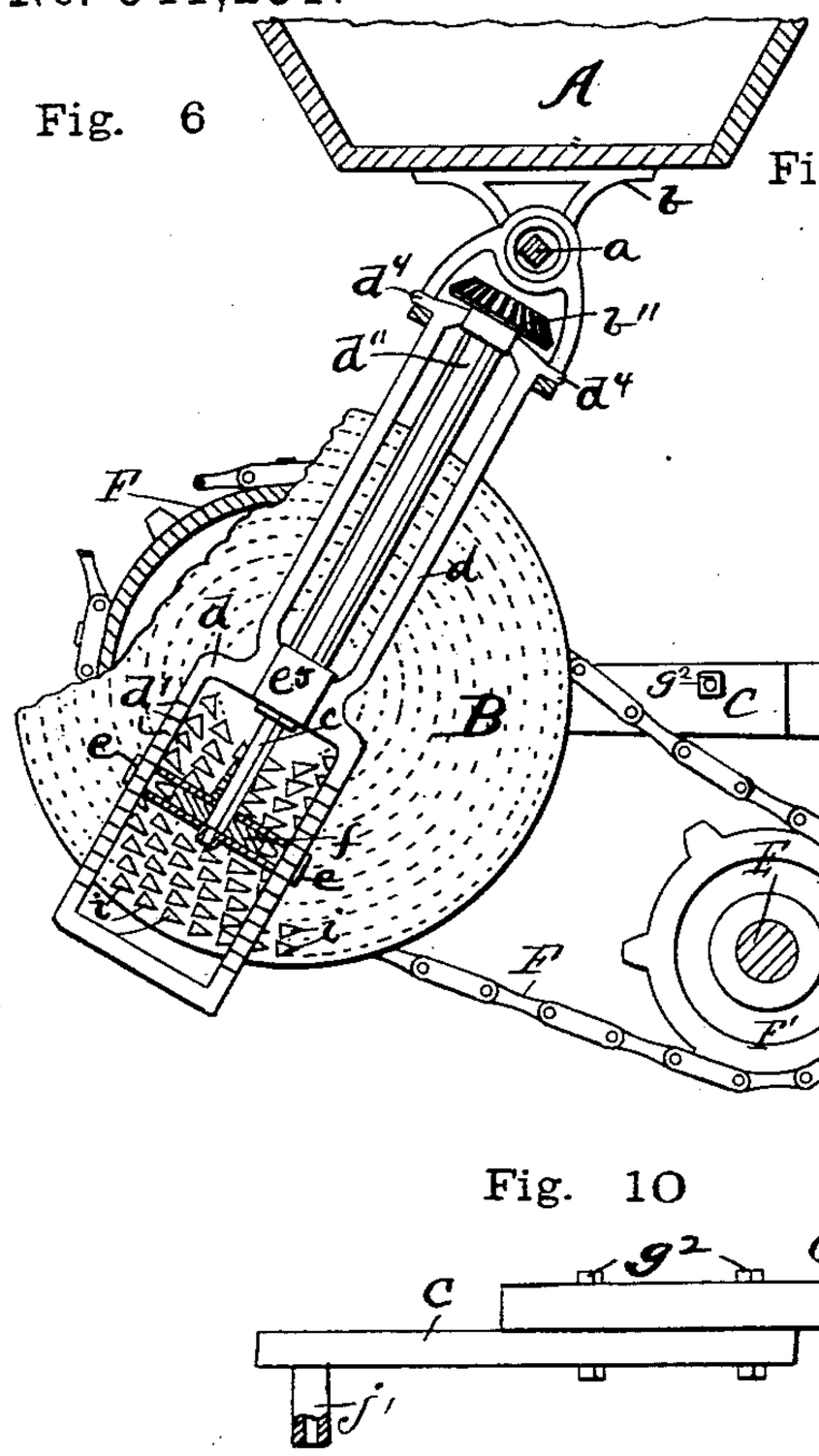


Fig. 7

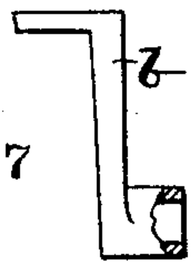


Fig. 8

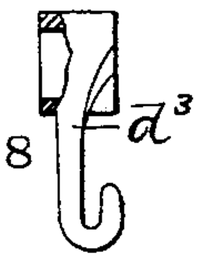


Fig. 9

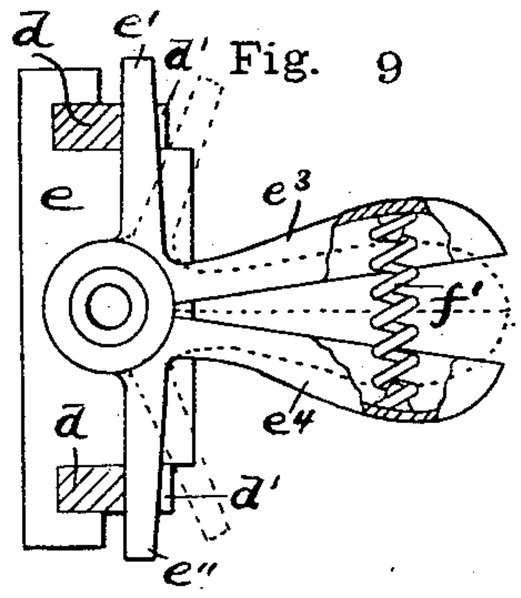


Fig. 10

Fig. 11

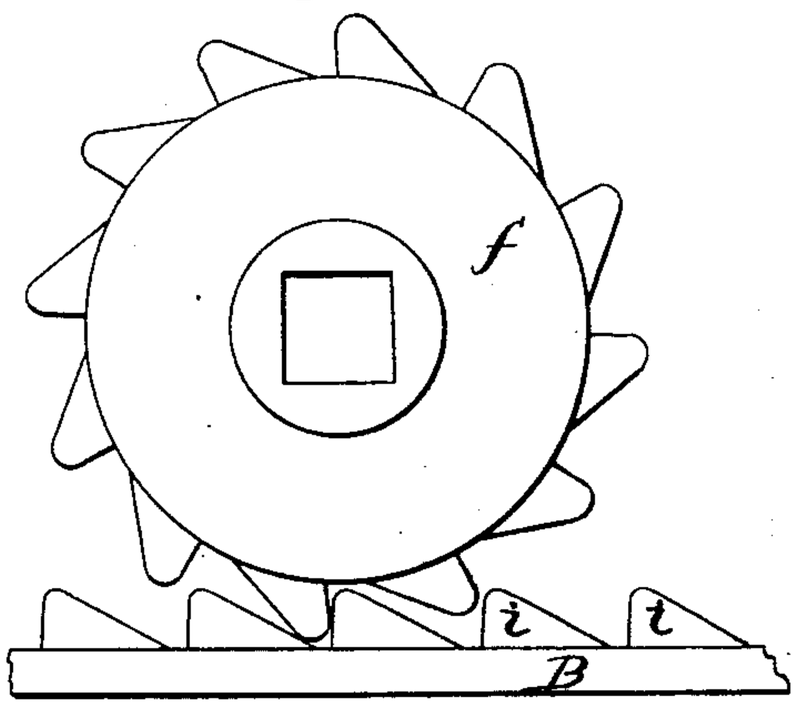
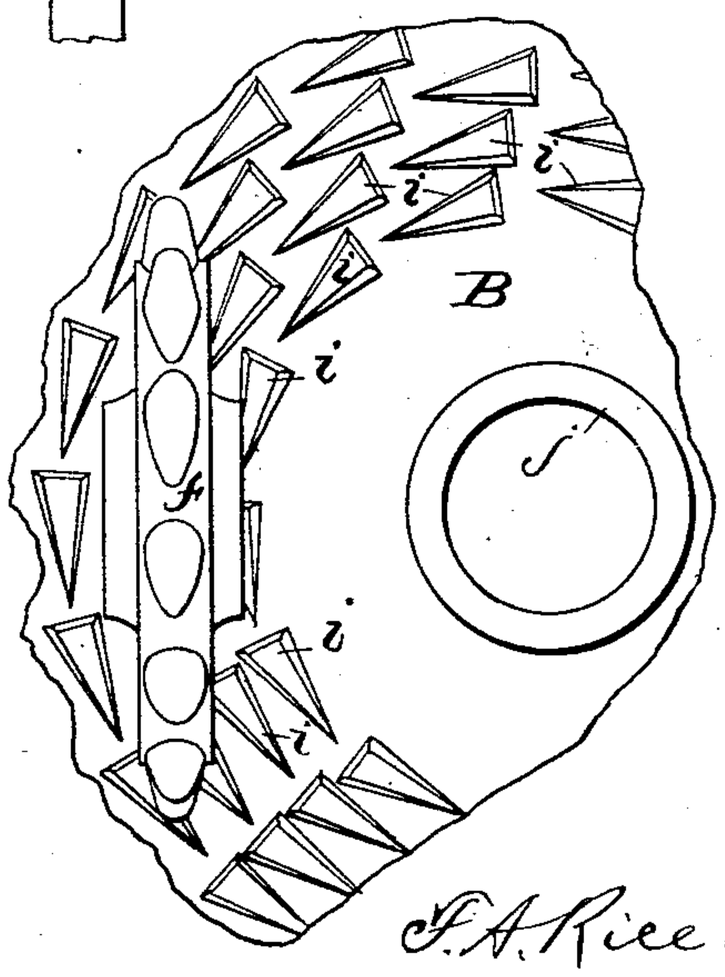


Fig. 12



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Inventor

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By Attorney

UNITED STATES PATENT OFFICE.

FORREST A. RICE, OF SPRINGFIELD, OHIO.

GEARING FOR GRAIN-DRILLS.

SPECIFICATION forming part of Letters Patent No. 541,251, dated June 18, 1895.

Application filed March 12, 1895. Serial No. 541,505. (No model.)

To all whom it may concern:

Be it known that I, FORREST A. RICE, of Springfield, county of Clark, State of Ohio, have invented a new and useful Improvement in Grain-Drills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in grain drills, with special reference to mechanism for regulating the feed of the grain.

The object of the invention is to provide improved means for obtaining a graduated change in the rate of speed at which the grain may be fed from the hopper, in order that the quantity of grain sown per acre may be regulated as desired.

A further object is to provide means for obtaining said graduated change of speed from one or both sides of the feed disk and to mount said feed disk separate from the main axle.

To these ends my improvements consist of a disk that is located between said main axle and the feed shaft, one side of said disk being provided with spur gears and the other side with a series of concentric rows of specially-designed teeth.

The said improvements further consist of devices that operate with said disk, all of which will be fully described in the following specification, and set out in the claims.

Referring to the annexed drawings, which form a part of this application and upon which similar letters of reference indicate corresponding parts, Figure 1 is a peripheral view of the feed-disk, also the telescoping shaft and frame therefor; Fig. 2, an elevation of the feed-disk, telescope-shaft, and frame, looking in the direction of the arrow, Fig. 1; Fig. 3, an elevation showing the side of the feed-disk upon which the spur-gears are located, also the driving or primary actuating spur-gear. The hopper and part of the carrying-frame are shown in section. Fig. 4 is a horizontal section through the axis of the feed-disk, parts of said disk and of the telescoping shaft being broken off; Fig. 5, detached detail top and front views of the bearing for the lower end of the telescope-shaft; Fig. 6, a view of the opposite side of Fig. 3, showing the feed-disk actuated by a chain and chain-wheels; Fig. 7, a detached detail edge view of the hanger below the hopper; Fig. 8, a similar view of the swivel connection between said hanger and the frame in which the telescope-shaft is mounted; Fig. 9, an enlarged detail lower plan view of the bearing for the lower end of said telescope-shaft, the frame that supports said shaft shown in section; Fig. 10, a top view of the arms that support the feed-disk; Fig. 11, an enlarged view of the pinion that gears with the teeth on the face of the feed-disk. An edge view of a portion of said disk is also shown. Fig. 12 is an enlarged view of the feed-disk and pinion. Parts of the disk are broken away.

(A) designates the hopper in which the grain is placed. (*a*) is a feed shaft an end of which loosely projects through an opening in a hanger (*b*) secured to said hopper. (*b'*) designates a bevel gear keyed to said shaft (*a*), and with which, a similar pinion (*b''*) meshes. This latter pinion (*b''*) is also rigid on the upper end of a telescope shaft (*c*) which is supported on an incline substantially as shown in Figs. 3 and 6, by a frame (*d*) that has its upper end connected to said hanger (*b*) by a swivel (d^3) the arms of which hook to projections (d^4), and said frame is thereby permitted to oscillate outwardly and sidewise to a desirable extent. The shaft (*c*) is inclosed in a tubular case (*d''*) in said frame, and has its lower end journaled in a bearing frame (*e*) that incloses the lower portion of said frame. This lower part of the frame (*d*) is provided with teeth (*d'*) for a purpose that will be hereinafter specified.

A clutch consisting of two pivotal engaging arms or members (*e'*) and (*e''*) terminating in handles (e^3) and (e^4), is attached to the lower side of the bearing frame (*e*), and said arms are maintained in contact with the teeth (*d'*) on the frame (*d*) by the tension of a helical spring (*f'*) which is inclosed between the handles (e^3) and (e^4). The function of this clutch is to adjust the position of the tele-

scope shaft (*c*) to bring the toothed pinion thereon in a proper position to mesh with the teeth of the disk (B), of which further mention will be made. This adjustment of said shaft is effected by pressing on the handles (e^3) and (e^4) until the arms (*e'*) and (*e''*) are disengaged from the teeth (*d'*), as shown in dotted lines, Fig. 9.

(*f*) designates a toothed pinion rigidly mounted on the lower end of the shaft (*c*) between the parts of the frame (*e*). The engaging sides of the teeth of this pinion are made to project in line with the radii of the pinion, and the opposite sides are tapering, as shown in Fig. 11. The face of each of said teeth is rounded as shown in Fig. 12.

(B) designates the feed disk, the hub (*j*) of which is an integral part thereof and projects beyond the face of said disk substantially as is shown in Fig. 4.

(*j'*) designates a spindle upon which said hub and disk are mounted, and which projects from an arm (C) attached to a second, horizontal arm (C') which is in turn rigidly supported on a cross beam (D) of the carrying frame. The arm (C) is adjustable both longitudinally and in an arc, by means of slots (*g*) and (*g'*) through which bolts (g^2) pass to penetrate the arm (C'). This adjustment is to enable one or the other of the spur gears (*h*) and (*h'*) to be placed in gear with the primary actuating spur gear (*h''*) that is keyed to the main axle (E).

The spur gears (*h*) and (*h'*) are integral parts of the disk (B), on the other side of which is a series of concentric rows of specially designed teeth (*i*), that is to say, each of said teeth has a triangular base; tapers from the top to the sides and apex, and has an engaging face that is perpendicular to the disk. The shape and form of these teeth are important as I am thereby enabled to properly utilize the space on the disk and obtain a desirable number of circles, and further, the tapering sides of said teeth are instrumental in obviating the possibility of dirt adhering to the face of the disk.

The pinion (*f*) occupies a position at a right angle to the disk, and meshes with the teeth (*i*) as shown in Fig. 11, and is subject to adjustments extending from the inner to the outer concentric row of teeth, by means of the clutch and adjunctive devices as hereinbefore specified. Each change in the position of said pinion from the axis of the disk outward increases the speed of said pinion one fourth. The lower end of the frame (*d*) is kept in a proper position with reference to the disk by a rod (*k*) that penetrates the arm (C), and spindle (*j'*), and is screwed into the center portion (e^5) of said frame. The outer end of the rod (*k*) is encircled by a spring (e^6) and has a wing nut (e^7) to regulate the tension of said spring, and to permit the pinion (*f*) to be disengaged from the disk when not in use.

The spur gears on the disk may be dispensed with and the speed of the feed shaft regulated entirely from one side of the disk, by substituting chain wheels (F) and (F') and chain (F''), as shown in Fig. 6.

The mode of operation, or the regulation of the speed is as follows: It will be noted from Fig. 1, that the sides of the frame (*d*) are provided with numerical scales, reading as follows: "W $2\frac{1}{2}$, $3\frac{1}{2}$," &c.; each of said numerals being adjacent to a respective tooth (*d'*) and indicating that any portion of wheat from two to six bushels, in bushel or half bushel quantities may be sown per acre, by adjusting the pinion (*f*) as hereinbefore described.

Having fully described my invention, I claim as new—

1. In a grain drill, a feed disk mounted separate from the axle of the machine, said disk being provided on one side with spur gears and on the other side with concentric rows of triangular shaped teeth, as described, and means for regulating the speed of the feed shaft from one or both sides of said disk, substantially as described.

2. In a grain drill, the combination with the main shaft or axle having a primary actuating spur gear thereon, and a feed shaft, of a feed disk provided with spur gears on one side and triangular shaped teeth on the other side, as described, a telescoping shaft, a toothed pinion on said telescoping shaft, substantially as described.

3. In a grain drill, the combination with the main shaft upon which is mounted a primary actuating spur gear, and a feed shaft, of a feed disk provided with spur gear teeth on one side and concentrically arranged teeth on the other side, adjusting arms upon which said disk is supported, a telescoping shaft, a toothed pinion thereon, and means for changing the position of said pinion relative to its engagement with the teeth on the side of said disk, substantially as described.

4. In a grain drill, the combination with a feed shaft, and a main shaft with a primary actuating gear thereon, of a feed disk mounted away from said shafts, said disk provided with two or more concentric rows of gear teeth adapted to mesh with said primary actuating gear, rows of concentrically arranged triangular shaped teeth as described, on the other side of said disk, a telescope shaft adapted to drive said feed shaft, a toothed pinion on said telescoping shaft adapted to mesh with the concentric teeth on the disk, an oscillating frame to support said telescoping shaft and toothed pinion, and a clutch for adjusting said pinion relatively to its engagement with said concentric teeth, substantially as described.

5. The combination with the main shaft of a grain drill, and the feed shaft, of a disk provided with spur gear teeth on one side and concentrically arranged teeth as described on the other side, an integral hub projecting beyond the side of said disk having the con-

centrically arranged teeth, a frame on an angle to the axis of said disk, means for maintaining said frame in proximity to the disk, a telescoping shaft supported in said frame, a pinion on the lower end of said shaft to gear with the concentrically arranged teeth on the disk, a clutch for changing the position of said pinion, and a pinion on the upper end of said telescoping shaft, whereby means are provided for rotating the feed shaft at different rates of speed, substantially as described and for the purposes set forth.

6. The combination with the main and feed shafts and a primary actuating spur gear on said main shaft, of a feed disk provided with differential spur gear teeth on the inner face and concentric rows of teeth on the outer face of said disk, a pinion adapted to mesh with the teeth on the outer face of said disk, a telescoping shaft to which said pinion is attached, a frame in which said telescoping shaft is mounted said frame having numerical scales thereon indicating the amount of grain sown in a given area of ground and means for adjusting said pinion relative to its engagement with the teeth on the face of said disk, substantially as described.

In testimony whereof I have hereunto set my hand this 7th day of March, 1895.

FORREST A. RICE.

Witnesses:
R. J. McCARTY,
CHARLES W. DOLE.