No. 621,701.

Patented Mar. 21, 1899.

F. R. PACKHAM.

DISK FURROW OPENER.

(Application filed Jan. 29, 1898.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1

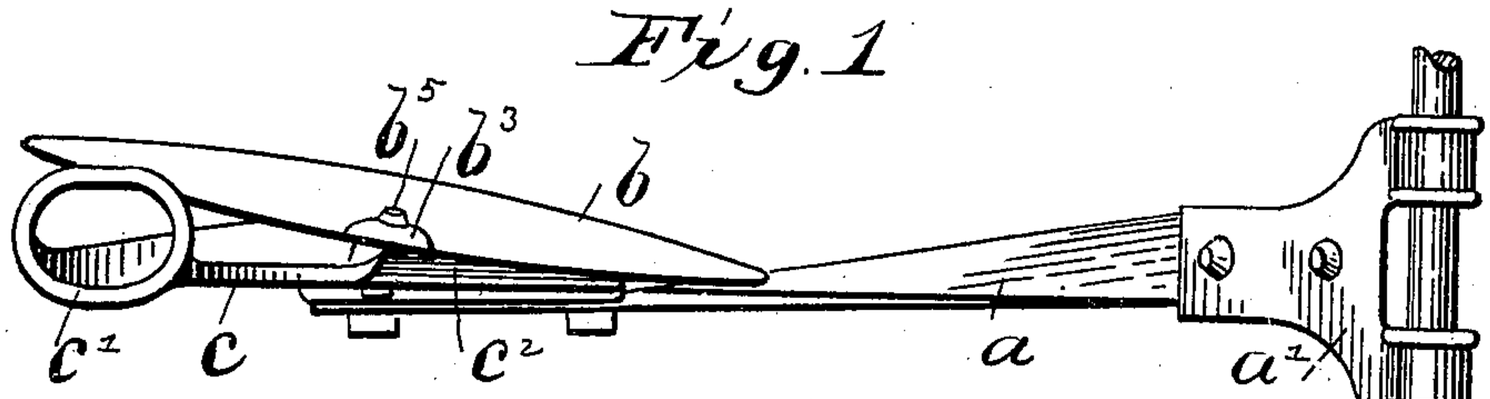


Fig. 2

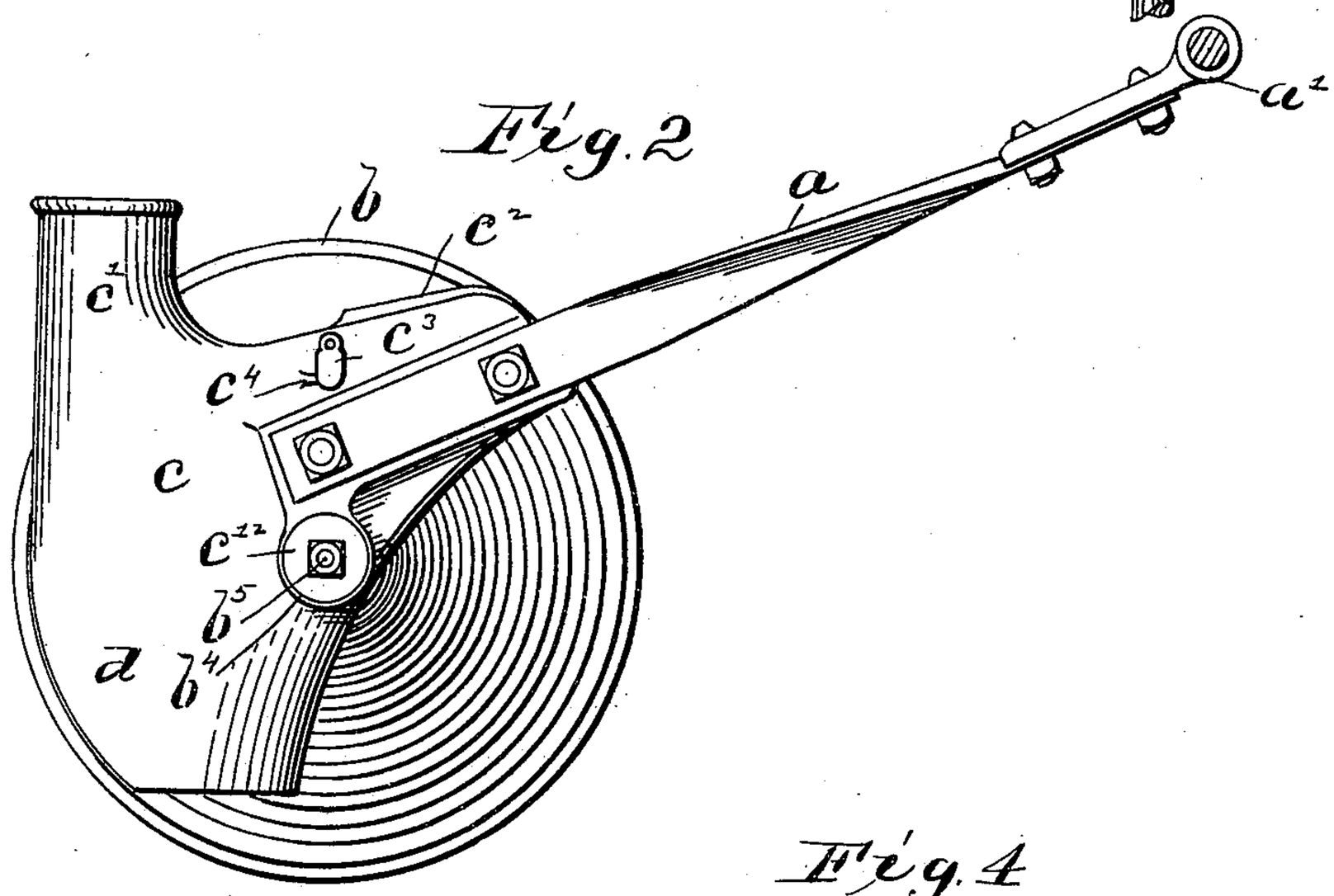


Fig. 4

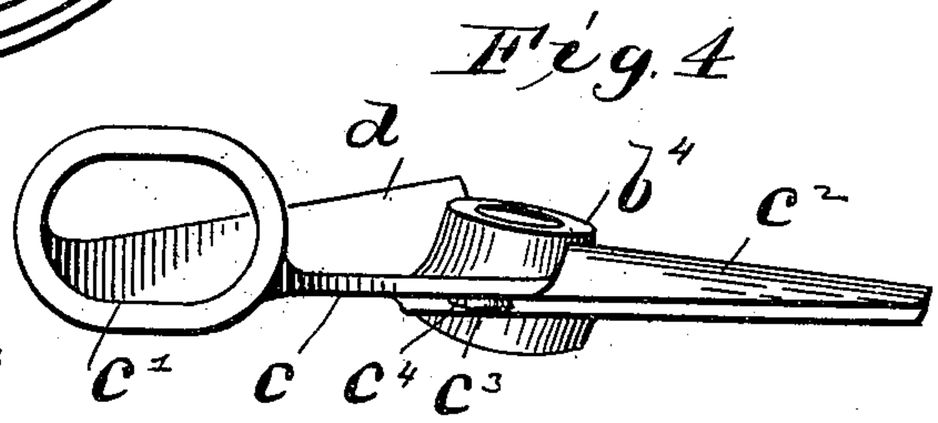
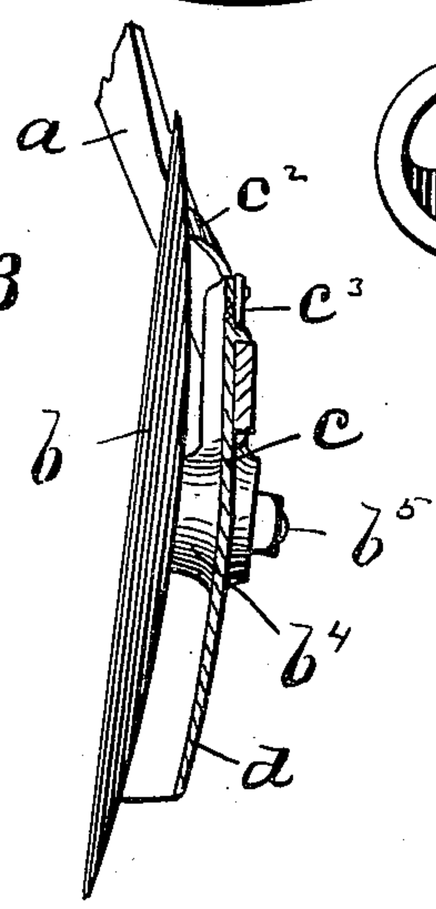


Fig. 3



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By his Attorney
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No. 621,701. Patented Mar. 21, 1899.

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(No Model.) 3 Sheets—Sheet 2.

Fig 5

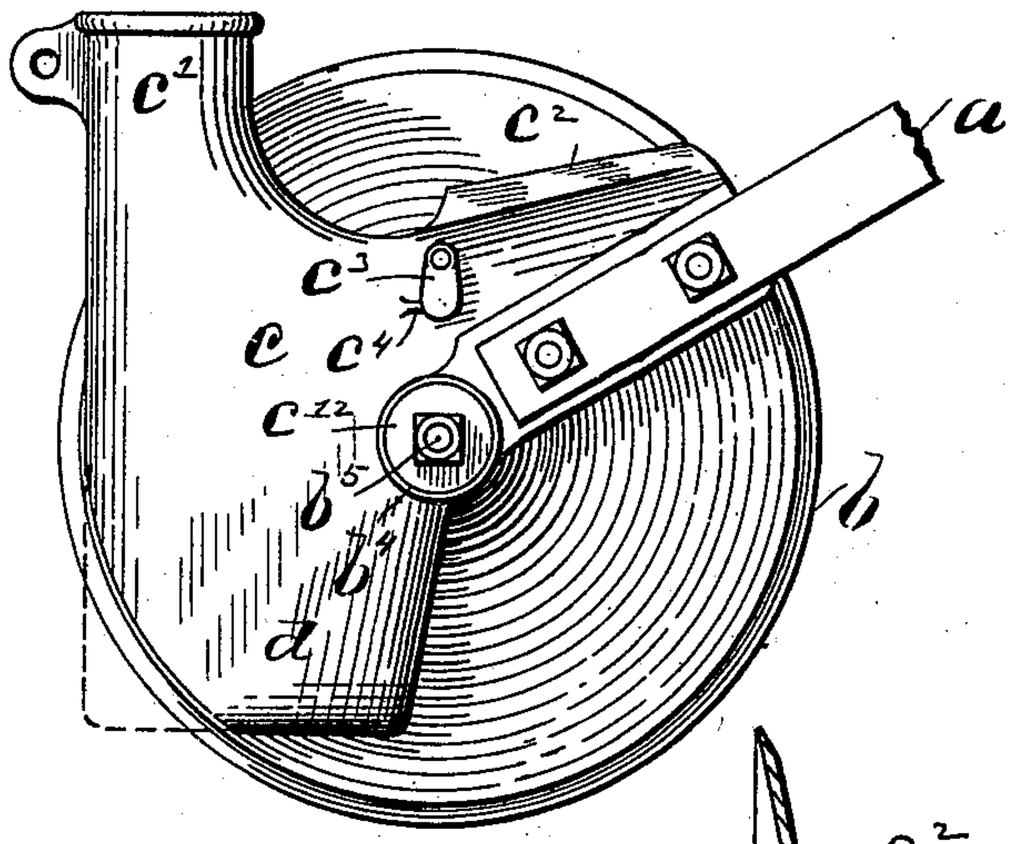


Fig. 6

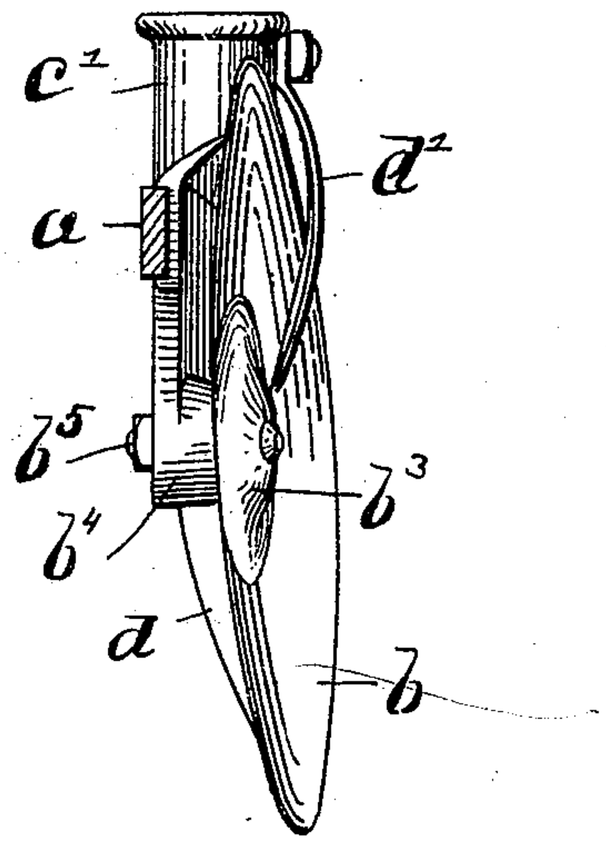


Fig. 7

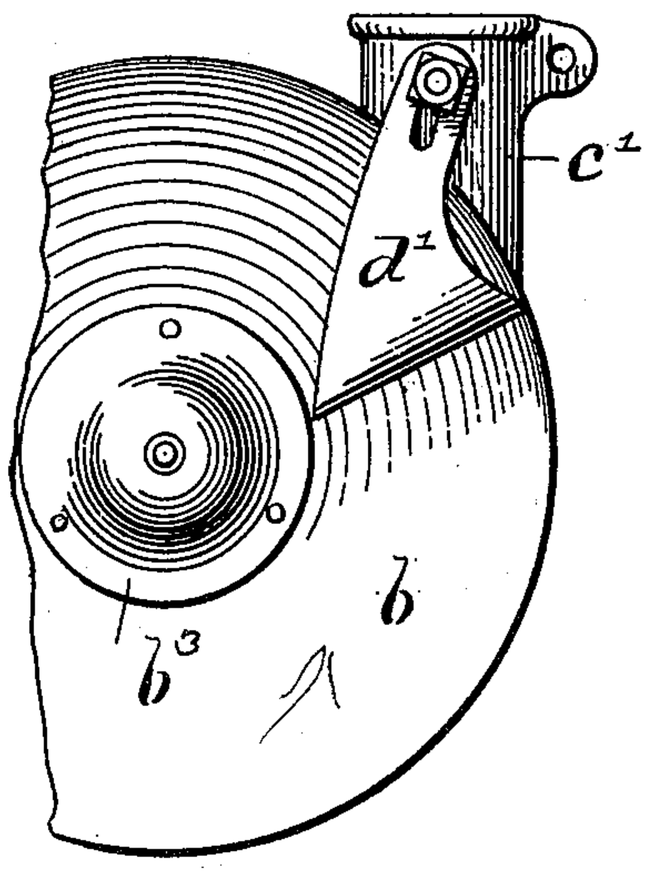


Fig. 8

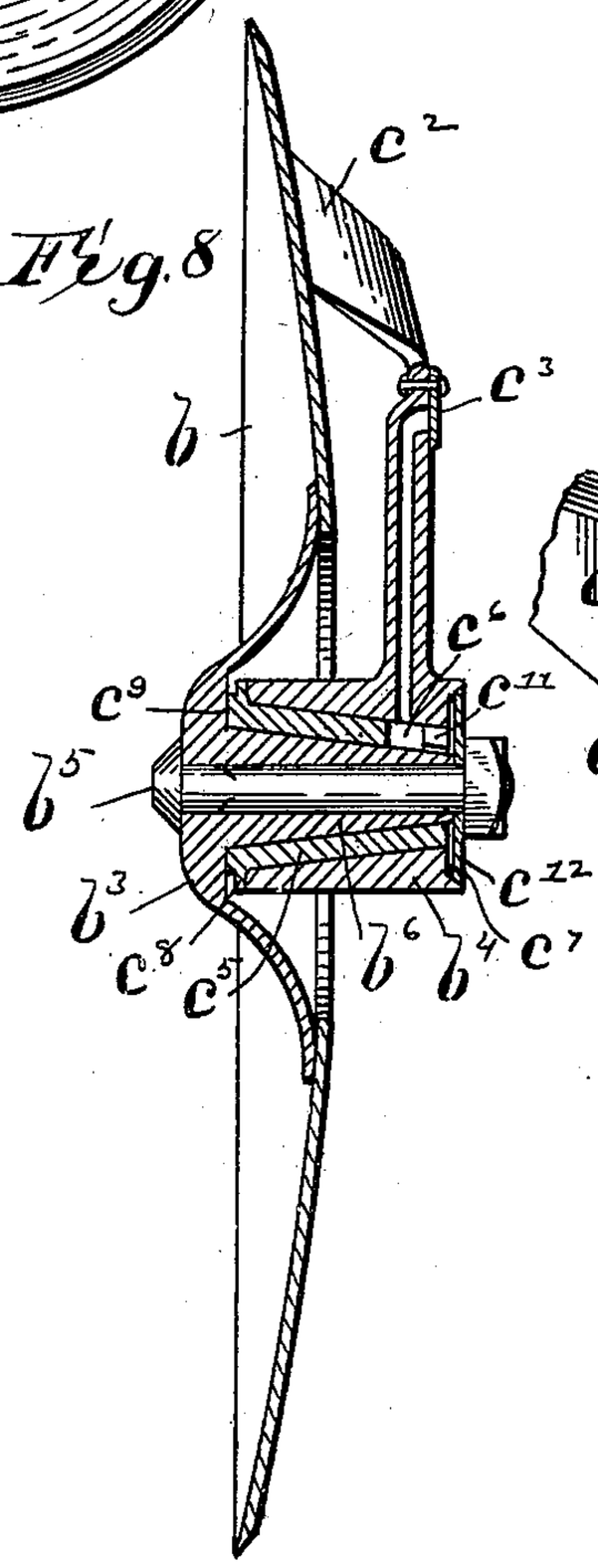
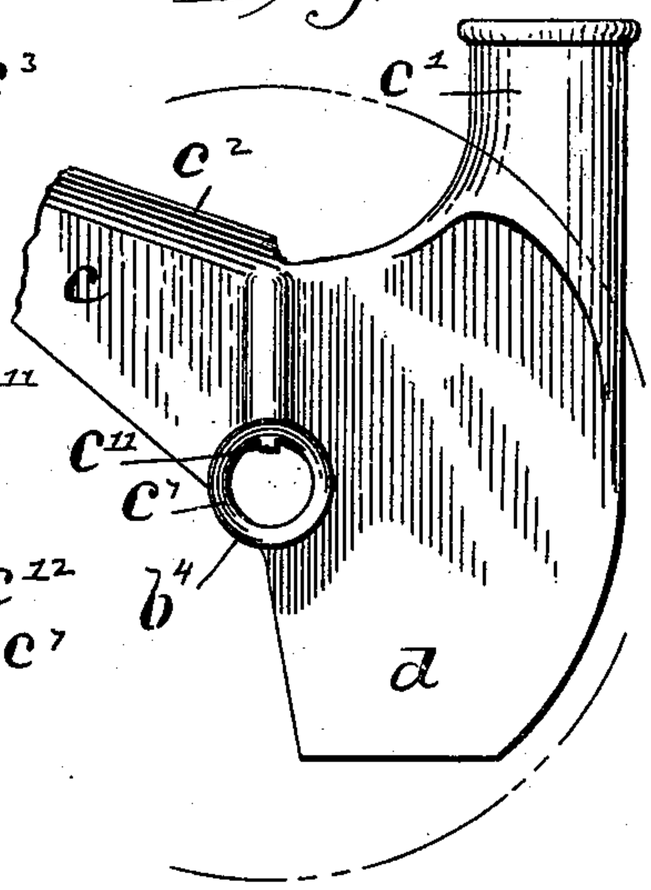


Fig. 9



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No. 621,701. Patented Mar. 21, 1899.

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DISK FURROW OPENER.

(Application filed Jan. 29, 1898.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 10

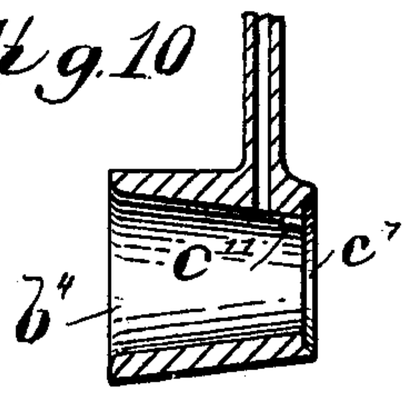


Fig. 11

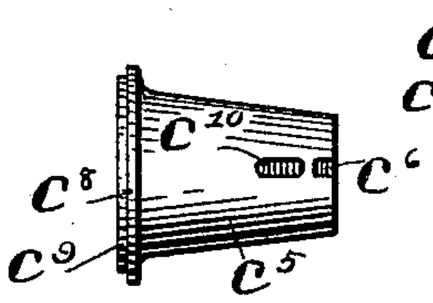


Fig. 12

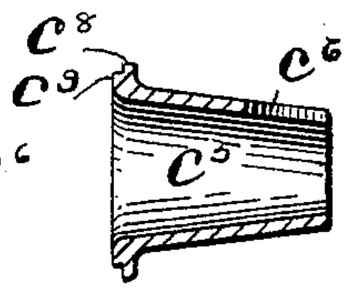


Fig. 13.

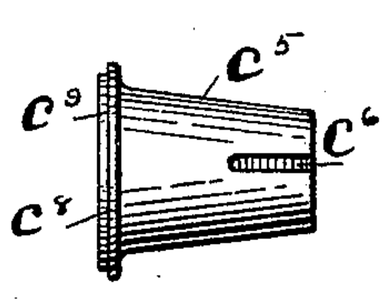
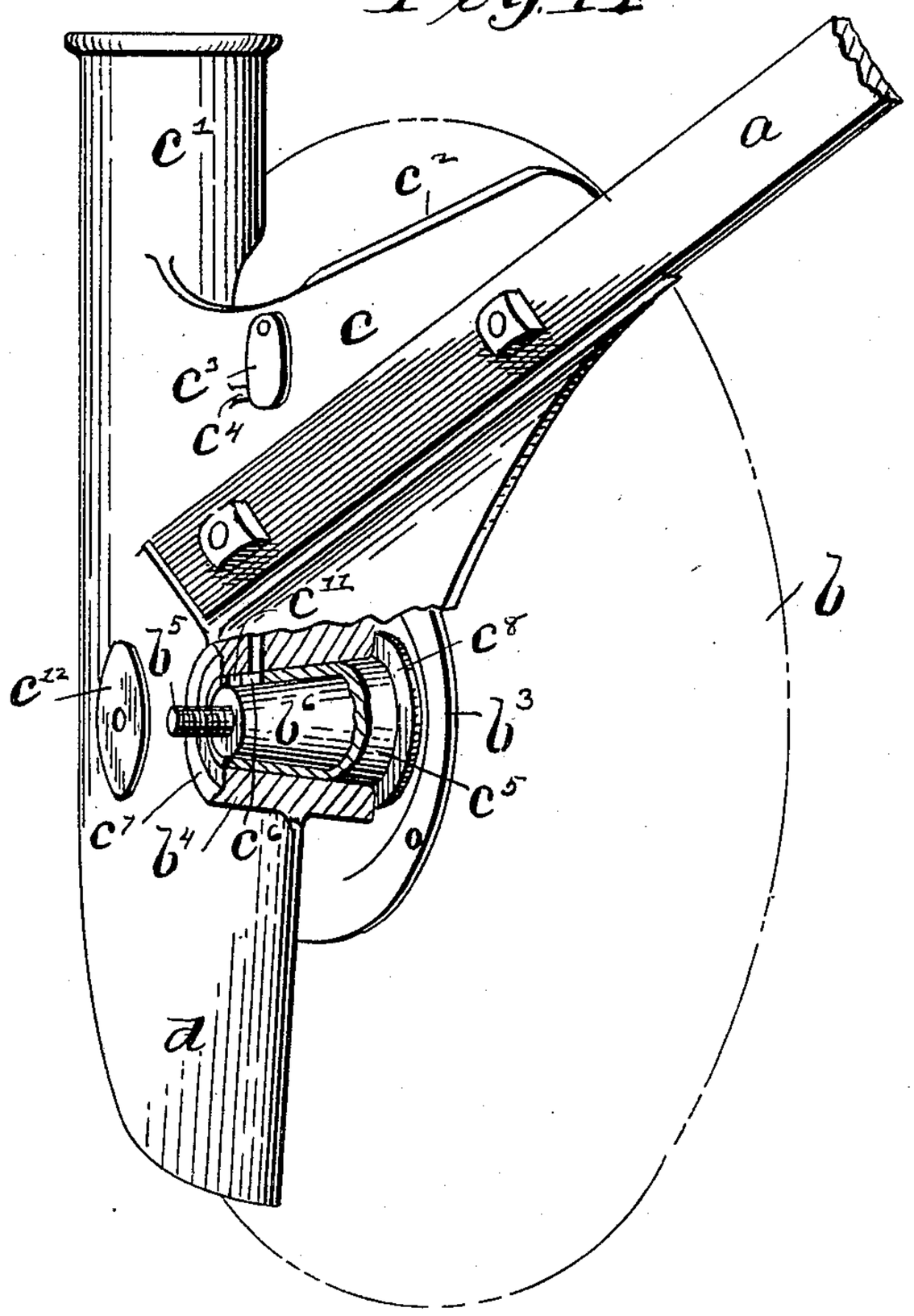


Fig. 14



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UNITED STATES PATENT OFFICE.

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DISK FURROW-OPENER.

SPECIFICATION forming part of Letters Patent No. 621,701, dated March 21, 1899.

Application filed January 29, 1898. Serial No. 668,399. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. PACKHAM, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Disk Furrow-Openers, of which the following is a specification.

My invention relates to improvements in disk furrow-openers, and it particularly relates to that class of disk furrow-openers known as the "single-disk" type and adapted especially to be used in connection with seeding implements and grain-drills, although the same may be used in connection with disk harrows, in which case seed would not be sown.

One of the objects of my invention is to provide novel means for keeping the disk clean and unencumbered, especially in wet or sticky soil.

A further object of my invention is to so construct the cleaning devices for the disk that the operation thereof shall result in a more perfect covering of the seed under certain conditions of use and character of soil.

A further object of my invention is to provide means for efficiently supporting the disk, so that it may properly revolve to form the trench or furrow and at the same time leave the front or working face of the disk entirely unobstructed by drag-bars or framework, which would impede the free passage of trash, standing cornstalks or loose clods, or any obstructions of unusual size between the adjoining furrow-openers.

A further object of the invention is to so construct the bearing of the disk that it shall be kept free from dirt or grit likely to interfere with the proper working thereof and at the same time to provide for properly lubricating the same and also for repairing or renewing the wearing parts.

A further object of my invention is to improve the seed-protecting devices forming part of or connected with the seed-conduit to adapt it to various conditions of soil.

To this end my invention consists in the various constructions and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a top view of a device embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view through the disk and its support. Fig. 4 is a top view showing the opening or cut-away portion of the shield on the convex side of the disk, which permits the mud on the back of the disk to pass up by the conduit and falling grain, and also shows the forward portion of the shield, which conforms to the shape of the disk. Fig. 5 shows a side elevation of the furrow-opener. Fig. 6 is a front elevation showing the scraper. Fig. 7 is a side view of the face of the disk and conduit with the scraper attached, showing the direction toward the trench that accumulations take when being scraped off. Fig. 8 is a sectional view of the disk and the bearing connections. Fig. 9 is a side elevation of the frame which supports the disk-bearing and conduit. Fig. 10 is a cross-section of the same. Fig. 11 is a detail of the bearing-sleeve, which permits the oil from the oil-reservoir to contact with the rotating parts. Fig. 12 is a cross-section of the removable sleeve. Fig. 13 is a side elevation of the sleeve or bushing, showing the slot which furnishes a means for preventing the rotation of the bushing and also means for communicating between the revolving parts and the reservoir. Fig. 14 is a perspective view of the furrow-opener and attachments with a portion cut away to show the relative position of the parts in the construction of the detachable bearings or bushing.

Like parts are represented by similar letters of reference in the several views.

In the said drawings, *a* represents a drag-bar, preferably formed of a single bar of iron having a quarter-twist, so as to join a head *a'* at one end, by which it is pivotally attached to the main frame of the machine, with its axis substantially horizontal, while the rear end is joined to the frame *c* of the furrow-opener in a substantially vertical plane. This frame *c* supports the conduit *c'*, which may for convenience be cast integral therewith, as shown. It also supports the bearing b^4 for the disk *b*. At the lower end or below the conduit is the extension or shield *d*, which stands within the angle of the disk and pro-

tects the seed as it falls into the trench or furrow within narrow limits and prevents its being scattered by stubble, &c. In the present case I not only locate this shield or extension within the angle of the disk, but I also so construct it at the rear that it will be within the periphery of the disk and preferably substantially concentric therewith. I have found in practice that if this wall or shield extends beyond the periphery of the disk, as shown in Fig. 5 in dotted lines, when the disk passes over an obstruction oftentimes the whole weight of the machine is transferred to the extended portion of the shield or wall of the conduit, resulting in injury and breakage of other connecting portions of the machine by reason of its sudden contact and the great strain brought to bear upon this one part. I most effectually overcome this difficulty in the manner shown and described, as the jar is not apparent consequent upon the rolling of the disk, which transfers all strain to the center, which is adapted to receive without breaking sudden shocks of this character.

In wet or sticky soil trouble has been experienced in the soil sticking to the disk. Sometimes the seed is not properly covered, because, owing to the wet or sticky soil, the trench or furrow does not readily cave in on the seed as the furrow-opener leaves it. To overcome this, I provide a scraper d' on the front or working face of the disk and so construct the scraper that its working edge shall stand on the line of a secant passing below the center of the disk, as shown, so that the scrapings will be directed rearwardly, so as to leave the disk at the rear edge thereof and be deposited in the trench over the seed. The scraper may be attached in any suitable manner to the conduit c' or its support. I provide at the back of the disk also means for cleaning the same, consisting of a scraper c^2, which is preferably, though not necessarily, a part of the frame or conduit-support. Immediately at the rear of this scraper, or to the rear of a vertical line passing through the center of the disk, the frame or support is cut away, as shown in Fig. 4, so that any mud or dirt which adheres to the back of the disk may pass the frame at this point without being scraped off, and thus will not interfere with the seed falling through the conduit. As soon as the accumulation passes the vertical line it contacts with the scraper c^2 and is discharged at the side of the furrow-opener, as indicated in Fig. 2, there being of course the accumulation of only one revolution at any time.

Inasmuch as all the passing obstructions—such as clods, stalks, &c.—contact with the face of the disk it is practically imposssible to prevent grit and dirt from finding their way into the disk-bearing if open on this front or working face. To overcome this, I have located the bearing at the rear or convex side of the disk, the only opening on the face of the disk being a perforation which receives the retaining-bolt b^5, which is adapted to fit snugly in said opening and completely close it.

The disk itself is preferably, though not necessarily, formed with a central portion b^3, which may be of cast-iron or other metal different from the disk proper, and this center portion b^3 is preferably formed convex on the working side of the disk and correspondingly depressed on the opposite side at the center, so that the bearing b^4 is brought closer to or within the line or plane of rotation of the disk, the convex face of the center or hub portion b^3 being rounded over to the center to direct the soil or other substance away from the working face of the disk. This center or hub portion also carries the spindle b^6, which projects into the bearing b^4. I preferably form this bearing b^4 with a removable sleeve or bushing c^5, which fits into the bearing or bearing-support b^4, the sleeve being preferably conical on its outside as well as its inside and fitted into the conical seat in the bearing b^4. The bearing b^4 is provided with an inwardly-projecting lug c^{11}, preferably cast in the small end of the bearing b^4, which fits in a slotted opening c^6 in the sleeve and prevents the same from turning. If this opening c^6 is extended, as shown in Fig. 13, it is obvious that considerable spring will be obtained, and by having the slot to drive snugly on the projection c^{11}, which may be made slightly wedge-shaped, the sleeve will be slightly extended into the bearing and be retained therein by friction. The slotted opening c^6 when thus extended also furnishes means for admitting the oil to the spindle. If it is not desired to expand the bushing into the bearing, a separate opening c^{10} may be formed, as shown in Fig. 11, to permit the passage of oil into the bearing. The sleeve is preferably formed with a projecting flange c^8, and this flange is further provided with an extended seat c^9 on its face, which is preferably cast on a chill and forms the bearing-seat to receive the end thrust of the disk. The bearing b^4 is also preferably cored out, as shown at c^7, to receive a hardened or chilled washer c^{12}, through which the bolt b^5 passes. This washer is secured by means of the bolt on the end of the trunnion b^6 of the disk, and by the arrangement of the chilled flange and the chilled washer the chilled surfaces are formed on each end of the trunnion against which the wear comes. These parts are also removable, as by loosening the bolt and taking out the disk-trunnion the bearing can be removed and renewed as desired, as may also the collar or washer.

The side of the disk support or frame is formed with an oil-opening which extends into the bearing b^4 and communicates with the spindle through the opening in the removable sleeve or bushing. This opening is adapted to be normally closed by a swinging cover c^3, which in its normal position stands vertical and in contact with a lug or projection c^4.

The cover c^3 is adapted, therefore, to swing only in one direction and that in the direction opposite to the line of travel of the furrow-opener, so that in the event that the cover should become open in dragging past obstructions or anything which would be apt to deliver dirt into the oil-opening the cover would be forcibly closed against the projection c^4 and remain in this position.

It is thought that the operation of the device will be fully understood from the foregoing description.

Having thus described my invention, I claim—

1. The combination with a rotating disk arranged at an angle to the line of draft, of a scraper on the face or working side of said disk, said scraper having an angular working edge on the line of the secant passing below the center of the disk to cause the scrapings from said disk to be thrown away from the bearing and deposited in the trench formed by the disk, substantially as specified.

2. The combination of the support with a bearing, a removable sleeve with a slotted opening forming part of said bearing, a projecting lug in said bearing adapted to fit said opening, a disk having a trunnion extending through said sleeve, and a bolt extending through said disk, a trunnion and a collar connecting with said trunnion and turning therewith, substantially as specified.

3. The combination with a support having a bearing, a removable sleeve with an extended slotted opening forming part of said bearing, a projecting wedge-shaped lug adapted to fit said opening and forming an opening for admitting the oil, a disk having a trunnion extending through said sleeve and a bolt extending through said disk and trunnion with a collar attached to said trunnion and turning therewith, substantially as specified.

In testimony whereof I have hereunto set my hand this 15th day of January, A. D. 1898.

FRANK R. PACKHAM.

Witnesses:

CHAS. I. WELCH,

JNO. S. GREEN.