

June 10, 1924.

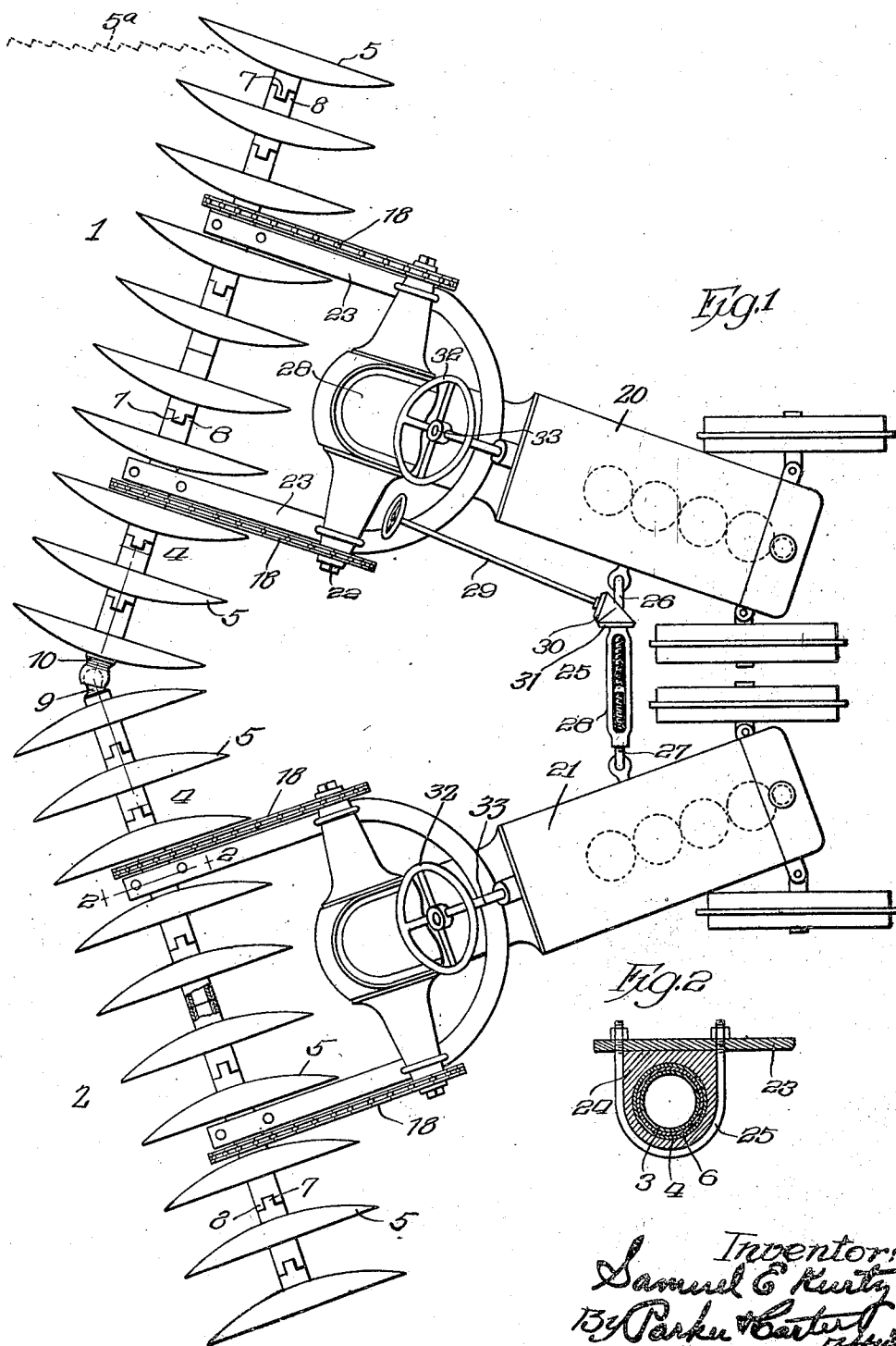
S. E. KURTZ

1,496,895

PLOW

Filed April 11, 1919

3 Sheets-Sheet 1



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Fig. 3

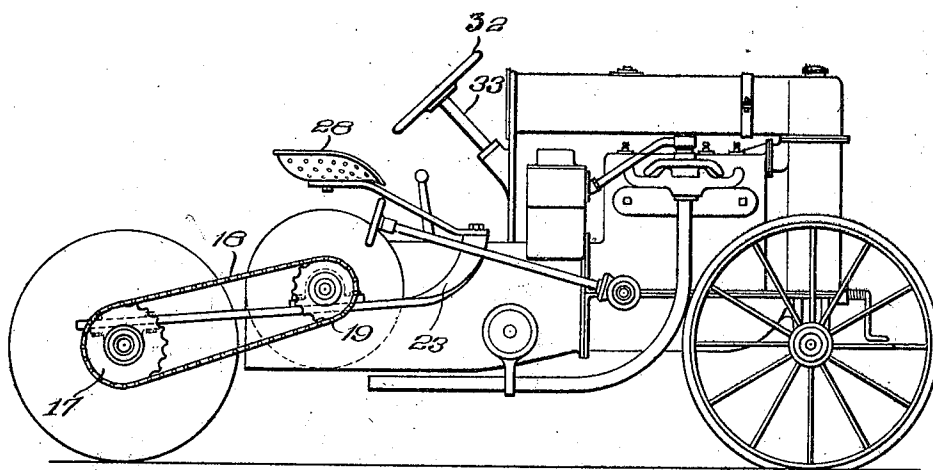


Fig. 4

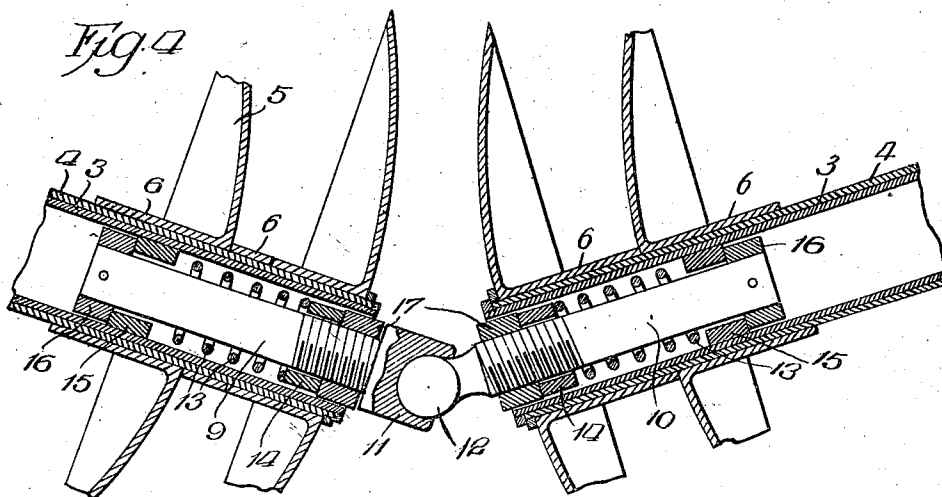
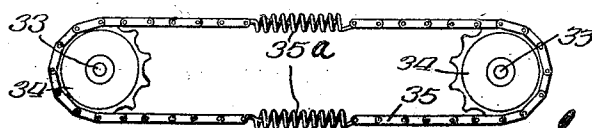


Fig. 5



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Fig. 6

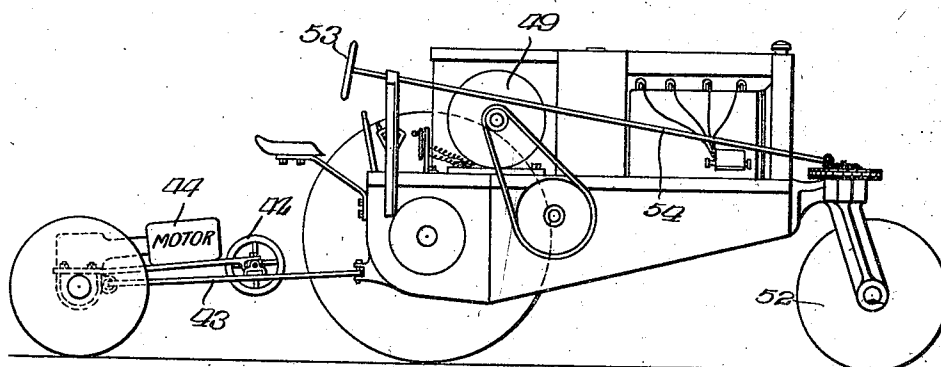


Fig. 7

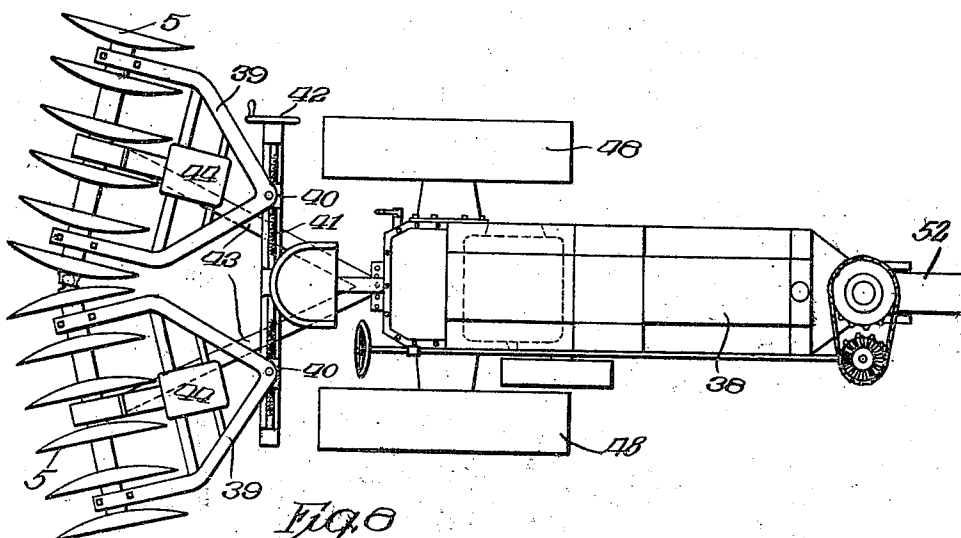
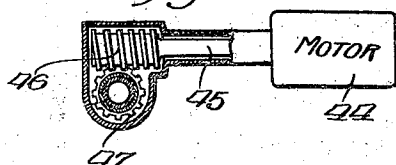


Fig. 8



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UNITED STATES PATENT OFFICE.

SAMUEL E. KURTZ, OF SAC CITY, IOWA.

PLOW.

Application filed April 11, 1919. Serial No. 289,249.

To all whom it may concern:

Be it known that I, SAMUEL E. KURTZ, a citizen of the United States, residing at Sac City, in the county of Sac and State of Iowa, have invented a certain new and useful Improvement in Plows, of which the following is a specification.

This invention relates to plows and has for its object to provide a new and improved device of this description. The ordinary mold board plow now commonly used is defective in many ways. It is different to handle. It compresses the earth against the mold board as it forces it loose, thus forming clods which must be broken up by a harrow after the ground is plowed. It also compresses the earth at the bottom of the furrow which is an objectionable feature and which cannot be remedied by the harrow.

My invention has among other objects to provide a plow which will obviate these difficulties and wherein the plowing is done by discs arranged in such a manner as to properly loosen and turn over the earth, the discs being connected up with a motor or power element so that a comparatively large area of ground may be plowed at one time. The invention has other objects more specifically set forth in the description following.

The invention is illustrated in the accompanying drawings, wherein

Fig. 1 is a plan view of one form of device embodying the invention;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a side elevation of the construction illustrated in Fig. 1;

Fig. 4 is an enlarged sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is a view showing a connection between the steering posts of the two tractors when it is desired to have them steered by one operator;

Fig. 6 is a side elevation showing a modified construction;

Fig. 7 is a plan view of the construction illustrated in Fig. 6;

Fig. 8 is a view in part section showing the worm and worm gear connected to the shaft carrying the discs.

Like numerals refer to like parts throughout the several figures.

Referring now to Figs. 1 to 5 I have il-

lustrated a construction comprising two sets of discs 1 and 2 arranged at an angle to each other and elastically connected together, the connection being preferably also a universal connection.

In the construction shown each set of discs is composed of two sections. The discs may be arranged in any desired manner. As herein shown there is an inner hollow shaft 3 (see Fig. 4). Surrounding this hollow shaft is a sleeve 4. When the construction illustrated in Fig. 4 is used, there are two of these sleeves as indicated. The discs 5 are mounted upon these sleeves and are thus divided into two separate sections. These discs are provided with hollow hubs 6 which are arranged so that they may be connected together to rotate in unison. In the construction illustrated these hubs are provided with teeth or interlocking projections 7 and 8 so that when these teeth or projections are interlocked the discs will rotate together. The elastic connection between the two sets of discs may be arranged in any desired manner. As shown in the drawings two connecting pieces 9 and 10 are provided, the connecting pieces projecting into the hollow shafts 3. One of these connecting pieces is provided with a ball 12 and the other with a cup 11 so as to form a universal connection. The connecting pieces 9 and 10 are free to move longitudinally in the hollow shaft.

Springs 13 are provided which resist the movement of these connecting pieces. The springs are confined between stops 14 on the connecting pieces, and the stops 15 connected with the shaft. The stops 14 may be made adjustable so as to adjust the tension of the springs. This may be done in any desired manner as for example by providing a threaded nut 17 on each of the connecting pieces. By turning these nuts the tension of the springs may be varied. The connecting pieces are provided with the stops 16 which prevent them from being withdrawn from the hollow shafts, said stops engaging the stops 15 when the connecting pieces are moved outwardly a predetermined distance.

The two sections of each set of discs are separately driven in any desired manner. In the construction shown in Figs. 1 and 2 each section is provided with a sprocket wheel 17 which is driven by a chain 18 con-

connected with the sprocket wheel 19. Each sprocket wheel 17 may be connected with the hub of one of the discs so that when it rotates it will rotate all of the discs of its associated section. The sprocket wheels 19 may be driven in any desired manner.

In Fig. 1 I have illustrated two tractors 20 and 21 as being employed one for each set of discs. In this construction the traction wheels are removed from the tractors and the sprocket wheels 19 connected with the rear axle 22 so as to be driven therefrom. A suitable connection is provided between each set of discs and its tractor. In Figs. 1 and 3 this connection is shown as a piece 23 attached to the tractor frame and also attached to the sections of the set of discs. This piece may have two branches or may be two pieces, one connected with each section of the discs. A bearing piece 24 may be provided (see Fig. 2), the bearing piece being connected with the piece 23 by the strap 25. The bearing piece is desirable because of the fact that the parts rotate. The two tractors are preferably connected together by a suitable connection 25. This connection is preferably adjustable and flexible. In the construction illustrated in Fig. 1 this result is secured by having the two threaded parts 26 and 27, said parts being movably connected with the frame of the tractors. These parts have right and left hand threads and work in threaded openings in the piece 28. Some means is provided for adjusting this connection, and in Fig. 1 I have shown an adjustment capable of being operated while the operator is sitting in the tractor seat 28. In this construction the rod 29 is provided having a beveled gear 30 which engages a beveled gear 31 connected with the piece 28. It will be seen that by rotating this rod the piece 28 may be rotated to vary the angular relation between the two tractors by adjusting this adjustable connection the angular relation between the two sets of discs may be varied. Each tractor is provided with a suitable steering wheel 32 and a steering post 33 and any of the ordinary forms of steering mechanism. I may provide a suitable means for guiding the two tractors in unison and this means may be arranged so that it may be controlled by an operator on one tractor, thus making it possible for one operator to drive both tractors.

In Fig. 5 I have illustrated one construction for this purpose. In this construction I provide the sprockets 34 on the steering post 33 of the two tractors. These pulleys are connected by a belt 35 so that when the steering wheel of one tractor is turned, the steering wheel of the other will be turned in the same way. I prefer to provide in this belt one or more elastic devices 35^a which may be springs. It will thus be

seen that this construction provides an elastic and flexible connection between the steering gears of the tractors, and also provides means whereby the operator of one tractor may steer the other tractor.

In Figs. 6 and 7 I have shown a modified construction. In this construction the discs are arranged in two sets at an angle to each other, and these two sets are driven by an electric motor, the current being derived from a generator on the single tractor 38. In this construction the two sets of discs are connected together by an elastic and a universal connection, the shafts being arranged at an angle. Connected with each set of discs is a frame 39. Connected with these frames are threaded parts 40 which engage the threaded rod 41, the rod being provided with right and left threads, the rod being controlled by a hand wheel 42. It will thus be seen that by rotating this rod 41 the angular relation between the two sets of discs may be varied. The two sets of discs are connected to the tractor 38 by the connections 43, these connections supporting the rod 41.

Each set of discs has mounted on its frame, a motor 44 which in this case is shown as an electric motor. This motor drives a shaft 45, provided with a worm 46 which in turn drives a worm gear 47 connected with the discs so as to drive them. In this case the tractor is provided with traction wheels 48 and also assists in pulling the two sets of discs. This tractor may be run by any desired motor, such as an internal combustion engine. This engine operates an electric generator 49 which is connected with the motor 44 so as to operate the same. The tractor is provided with the guiding wheel 52 which is controlled by the steering wheel 53 connected with the steering rod 54.

In the operation of the device the two sets of discs are pulled forward by the tractor or by any other desired means, preferably while they are being rotated by some suitable mechanism or means, and as the two sets of discs are at an angle to each other they tend to travel toward converging paths. In other words the discs of one set tend to approach those of the other set. This tendency compresses the springs 13 and actually permits the discs of one set to approach the discs of the other set for a short distance. A point is soon reached where the pressure of the discs on the sides of the furrows becomes less than the force exerted by the compressed springs 13, and when this happens the edges of the furrows break down and the two sets are moved away from each other by the force of the springs. As the sets move forward they again approach each other, the edges of the furrows breaking down, and they are again pushed away from

each other by these springs and this action continues throughout the operation of the device. Each disc therefore travels as it were along a zigzag path moving forward a certain distance and then moving laterally. In order to visualize this movement I have illustrated in Fig. 1 by the dotted line 5^a in a diagrammatic manner this zigzag path.

It will be understood that each of the discs follows a similar path. It will be further understood that the length of the forward movement will, of course, depend upon the conditions and may not always be the same or uniform as illustrated diagrammatically by this dotted line 5^a. If for example, the ground were soft, the forward movement would not be as great as if the ground were hard. It will be seen that the depth of the plowing, the nature of the soil, the strength of the springs and various other conditions determine, regulate and control this movement, but whatever the conditions are, the discs move forward, the resistance of the edge of the furrow becomes less than the power of the springs and the furrow breaks down and permits the discs to be moved laterally or sidewise or at an angle to the forward movement by the power of the springs, and this action in some form is present while the discs are performing their plowing function. This action may be assisted by making the discs themselves of spring metal, or under certain conditions the entire spring action might be produced by making the discs of such shape and such material as to have a sufficient spring action. The preferred form, however, is as illustrated because it obviates objections and gives a complete control and proper action to the discs.

It will be seen that by this means the discs actually plow the ground as they dig down into it, and throw it aside by this zigzag movement, and thus a proper, complete plowing is produced. It will further be seen that a large piece of ground can be plowed at one time, that is, each time the two sets of discs are moved around the field.

I claim:

1. A plow comprising two sets of discs arranged at an angle to each other, an elastic connection between these two sets of discs, a motor and a driving connection therefrom to said discs for rotating them simultaneously while in their angular position.

2. A plow comprising two sets of discs arranged at an angle to each other, means for applying power to said discs to rotate them, a connection between the two sets of discs, a spring interposed in said connection so as to be alternately compressed and expanded as the two sets of discs are moved forward.

3. A plow comprising two sets of discs the axis of the two sets being arranged at

an angle, driving mechanism for applying power to said discs to rotate them, a universal and elastic connection between the two sets of discs, and means for moving the two sets of discs forward simultaneously while in their angular position.

4. A plow comprising two sets of discs, said discs rotatably mounted upon suitable supports, the supports for the two sets of discs being at an angle to each other, two connecting pieces connected with said supports and engaging each other to form a universal connection between them, one of said connecting pieces being movable longitudinally, and an elastic connection between said latter connecting piece and one of said supports.

5. A plow comprising two sets of discs arranged at an angle to each other, a tractor for each of said sets, a driving connection between the axle of each tractor and the discs with which it is associated for rotating said discs about their axis, and an elastic connection between the two sets of discs.

6. A plow comprising two sets of discs arranged at an angle to each other, a tractor for each set of said discs, a driving connection between the axle of each tractor and the discs with which it is associated for rotating said discs about their axis, an elastic connection between the two sets of discs, and a flexible connection between the two tractors.

7. A plow comprising two sets of discs arranged at an angle to each other, a tractor for each set of said discs, a driving connection between the axle of each tractor and the discs with which it is associated for rotating said discs about their axis, an elastic connection between the two sets of discs, a flexible connection between the two tractors, and means for adjusting the length of the connection between the two tractors.

8. A plow comprising two sets of discs arranged at an angle to each other, a tractor for each set of said discs, said tractor having the tractor wheels removed, a driving connection between the axle of said tractor and the discs with which it is associated for rotating said discs, and a self adjusting elastic connection with the two sets of discs.

9. A plow comprising two sets of discs arranged at an angle to each other, an elastic connection between these two sets of discs, driving mechanism for applying power to said two sets of discs to move them forward simultaneously while in their angular position, and means for varying the depth of the plowing by varying the angular relation between the two sets of discs.

10. A plow comprising two sets of discs arranged end to end at an angle to each other each set divided into two sections, separate driving connections to each of the sec-

tions of the two sets of discs, whereby the sections may be driven at different speeds to facilitate turning.

11. A plow comprising two sets of discs arranged at an angle to each other each set divided into two sections, separate driving connections to each of the sections of the two sets of discs, whereby the sections may be driven at different speeds to facilitate turning, and an elastic connection between the two sets of discs.

12. A plow comprising sets of discs set oppositely angular to each other, connecting pieces connecting the sets of discs, said connecting pieces being connected together and having a longitudinal movement with relation to said discs, elastic connections between them and means for applying power to said discs to move them forward simultaneously while in their angular position.

13. A plow comprising two sets of plowing discs arranged at an angle to each other, a tractor for each set of discs, means for steering the two tractors in unison comprising elastic and flexible connections between the steering gears of said tractors.

14. A plow comprising two sets of plowing discs, said discs rotatably mounted upon

suitable supports the supports for the two sets of discs being at an angle to each other the two sets of discs being independently supported, and a universal flexible connection between the two sets of discs.

15. A plow comprising two sets of discs arranged at an angle to each other, power mechanism connected with said discs so as to move them forward simultaneously while in their angular position, and means associated with said discs for causing them to move laterally at intervals at an angle to the path of their forward travel.

16. A plow comprising two sets of discs arranged at an angle to each other, power mechanism connected with said discs so as to move them forward simultaneously while in their angular position, and means for causing said discs to travel a zigzag path while being acted upon by said power mechanism.

In testimony whereof, I affix my signature in the presence of two witnesses this 29th day of March 1919.

SAMUEL E. KURTZ.

Witnesses:

MINNIE M. LINDENAU,
EDNA B. PETERSON.