J. A. SHIRA.

MOTION CONVERTING DEVICE.

APPLICATION FILED SEPT. 16, 1914.

1,198,283.

Patented Sept. 12, 1916.

2 SHEETS—SHEET 1.

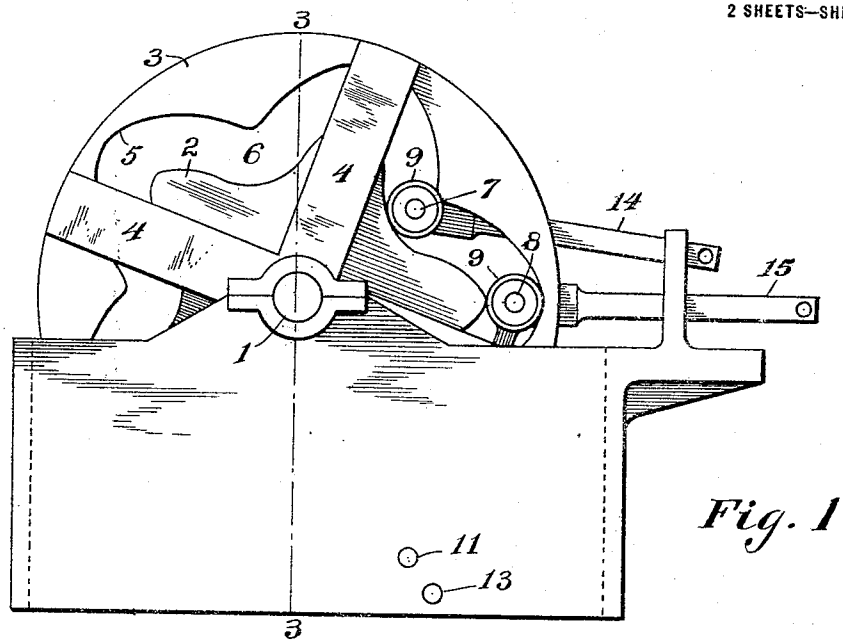


Fig. 1

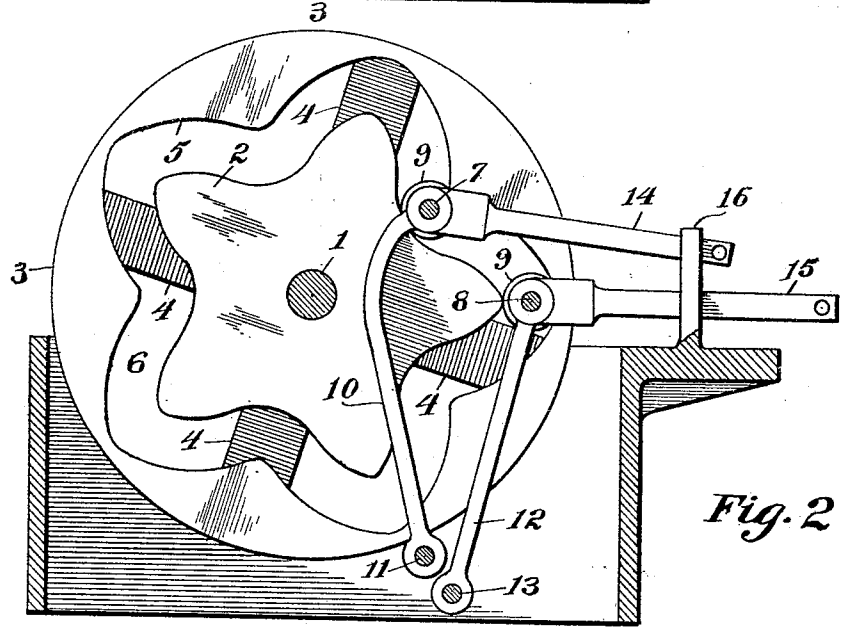


Fig. 2

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Witnesses

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John J. McCarthy

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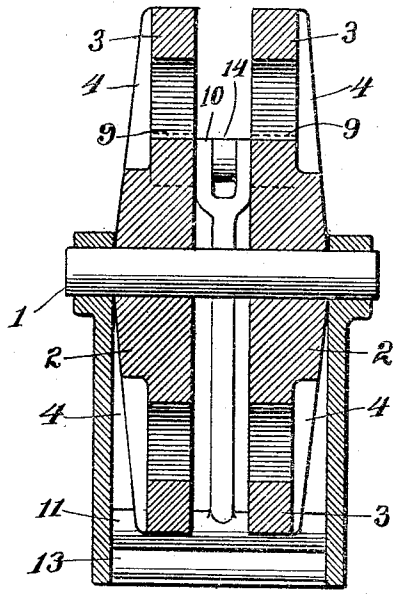


Fig. 3

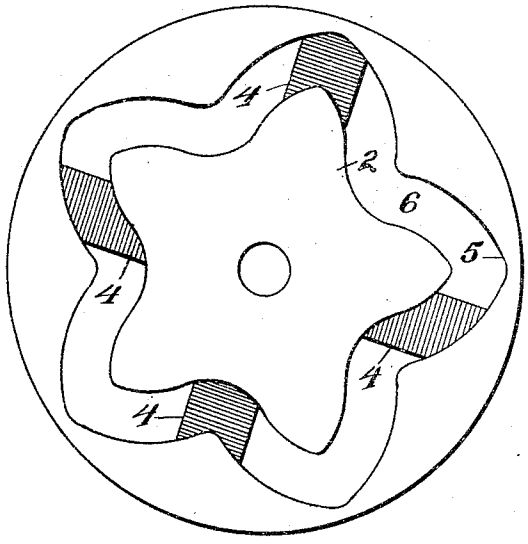


Fig. 4

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN A. SHIRA, OF LA GRANDE, OREGON, ASSIGNOR OF ONE-FIFTEENTH TO WILLIAM C. ALEXANDER, OF ELGIN, OREGON, ONE-THIRD TO ARTHUR L. BERRY, OF CALDWELL, IDAHO, AND ONE-SIXTIETH TO MAMIE ALEXANDER AND ONE-SIXTIETH TO MARY C. ALEXANDER, BOTH OF ELGIN, OREGON.

MOTION-CONVERTING DEVICE.

1,198,283. Specification of Letters Patent. Patented Sept. 12, 1916.

Application filed September 16, 1914. Serial No. 862,039.

To all whom it may concern:

Be it known that I, JOHN A. SHIRA, a citizen of the United States, residing at La Grande, in the county of Union and State of Oregon, have invented new and useful Improvements in Motion-Converting Devices, of which the following is a specification.

This invention relates to improvements in motion converting devices and has particular application to a device for converting rotary motion into reciprocatory movement.

In carrying out the present invention, it is my purpose to provide a device of the class described which will be found especially useful on mowing machines, harvesters, binders, threshers and the like and whereby the speed of the sliding or reciprocating part will be relatively high as compared with that of the driving or rotating element.

It is also my purpose to provide a device of the class described whereby the reversely sliding cutting knives of mowing machines and other reversely reciprocating elements may be actuated rapidly and at properly timed intervals so that as one knife reaches the limit of its path of movement in one direction the other knife will be at its limit of movement in the opposite direction and both knives reverse simultaneously and move in relatively opposite directions thereby facilitating the cutting operation.

A further object of my invention is to improve and simplify the general construction of motion converting devices of the type set forth and to provide a device which will embody comparatively few parts and these so correlated and arranged as to reduce the possibility of derangement to a minimum and enable the device to be lubricated whenever necessary so as to reduce the friction between the parts.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter set forth in and falling within the scope of the claim.

In the accompanying drawings; Figure 1 is a view in side elevation of a motion converting device constructed in accordance with the present invention. Fig. 2 is a vertical longitudinal sectional view therethrough. Fig. 3 is a cross sectional view through the same. Fig. 4 is a view in side elevation of one of the star wheels and the coöperating annulus removed from the device.

Referring now to the drawings in detail, 1 designates a drive shaft capable of rotation and journaled in suitable alining bearings. Fixed to the shaft 1 concentrically thereof are star wheels 2, 2 disposed side by side and appropriately spaced apart and surrounding the star wheels 2, 2 concentrically thereof are annuli 3, 3 having the confronting edges thereof spaced apart a distance equal to the space between the star wheels. In the present instance, each annulus 3 is fixed to the outer ends of spokes 4 radiating from the shaft and secured thereto at the outer side of the adjacent star wheel. In this form of my invention, the star wheel 2 is provided with five arms and in this connection I wish it to be understood that the star wheels may be formed of any desired number of arms, for instance, three or nine arms. The inner edges of the annuli 3, 3 are cut as at 5 to conform to the peripheries of the star wheels and spaced apart from such peripheries to provide sinuous ways 6, 6.

Arranged parallel with the shaft 1 are shafts 7, 8 spanning the space between the star wheels and having the opposite ends thereof disposed within the ways 6, 6, while rotatably mounted upon the extremities of each shaft 7, 8 are rollers 9 disposed within the ways 6, 6 respectively and in engagement with the walls of such ways formed by the peripheries of the star wheels and the inner edges of the annuli. These shafts 7, 8 are spaced apart a distance equal to the lengths of the arms of the star wheels so that when the shaft 7 is at the inner ends of the arms the shaft 8 will be at the outer extremities thereof and vice versa whereby in the continued rotation of the star wheels under the action of the drive shaft the shafts 7 and 8 will be bodily shifted laterally. The shaft 7 is secured to one end of an arm 10 disposed between the star wheels and having the opposite end thereof pivotally mounted upon a stub shaft 11 disposed adjacent to the peripheries of the annuli 3, 3 parallel with the shaft 7, while the shaft 8 is secured to one

end of an arm 12 disposed between the adjacent faces of the star wheels and having the remaining end thereof pivoted upon a stub shaft 13 parallel with the shaft 8 and disposed adjacent to the stub shaft 11. The central portion of the shaft 7 is fastened to one end of a pitman 14, while the similar portion of the shaft 8 is secured to a pitman 15 and the pitmen 14 and 15 are mounted for sliding movement within bearings 16 and are adapted to have their outer ends connected with the mechanism to be reciprocated.

In practice, assuming the outer ends of the pitmen rods 14, 15 to be connected with the adjacent extremities of the cutting knives of a mowing machine and the drive shaft to be connected up with a suitable source of power or prime mover, the star wheels 2, 2 and the annuli 3 will rotate in unison thereby shifting the shafts 7 and 8 laterally and imparting a reciprocatory movement to the pitmen 14 and 15, incident to the rollers following the walls of the ways 6, 6. When one of the cutter blades is at the end of its path of movement in one direction, the remaining blade is at the extremity of its movement in the opposite direction and as the star wheels and annuli continue to rotate the cutting knives slide in relatively reverse directions and are thus reciprocated to facilitate the cutting action, the forward edges of the arms of the star wheels driving the pitmen in one direction successively, while the inner edges of the annuli actuate the pitmen in the opposite direction, incident to the inner edges of the annuli engaging the rollers succeeding the outward movement of the shafts carrying such rollers under the action of the particular edges of the arms of the star wheels.

From the foregoing description taken in connection with the acompanying drawings, the construction, mode of operation and manner of employing my improved motion converting device will be readily apparent.

It will be seen that I have provided a motion converting device whereby the speed of the driven elements is greater than that of the driving parts and whereby coöperating cutting knives and analogous devices may be reciprocated so that the strokes will overlap in the usual manner.

I claim:

In a device of the class described, in combination a support, said support being substantially rectangular, a shaft mounted upon said support, a pair of star wheels fixed upon said shaft, each of said star wheels consisting of a plurality of oppositely curved lobes providing intervening grooved edges, a pair of annuli, arms connecting the sides of said star wheels to said annuli whereby to hold them in concentric relation, said annuli being cut to conform to the outline of said star wheels whereby to provide grooves with the star wheels, a vertical bracket fixed upon said support and having two guide openings, a pair of pitmen adapted to slide in said guide openings, a roller journaled at one end of each of said pitmen and working in said last named grooves, a pair of pivot pins carried by said support, a straight arm fulcrumed at one end upon one of said pivot pins and upon which one of said pitmen is pivotally mounted for movement, a second arm of greater length than the first arm and being curved forwardly at its upper end upon which the other pitman is pivotally connected for movement, the disposition of said pivot pins being such that when one of said rollers engages any of the lobes of said star wheels, the opposite roller will be disposed in the grooved edge between two of the lobes immediately in advance of the first named roller, and being also such that when these rollers exchange position the curved end of the curved arm will curve in the direction of the grooved edge of two of the lobes to clear that roller engaging the grooved edge adjacent thereto.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. SHIRA.

Witnesses:
GLENN RYDER,
FOREST C. RYDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."