H. ALLES.

CURRENT MOTOR.

APPLICATION FILED MAR. 16, 1911.

1,014,930.

Patented Jan. 16, 1912.

4 SHEETS—SHEET 1.

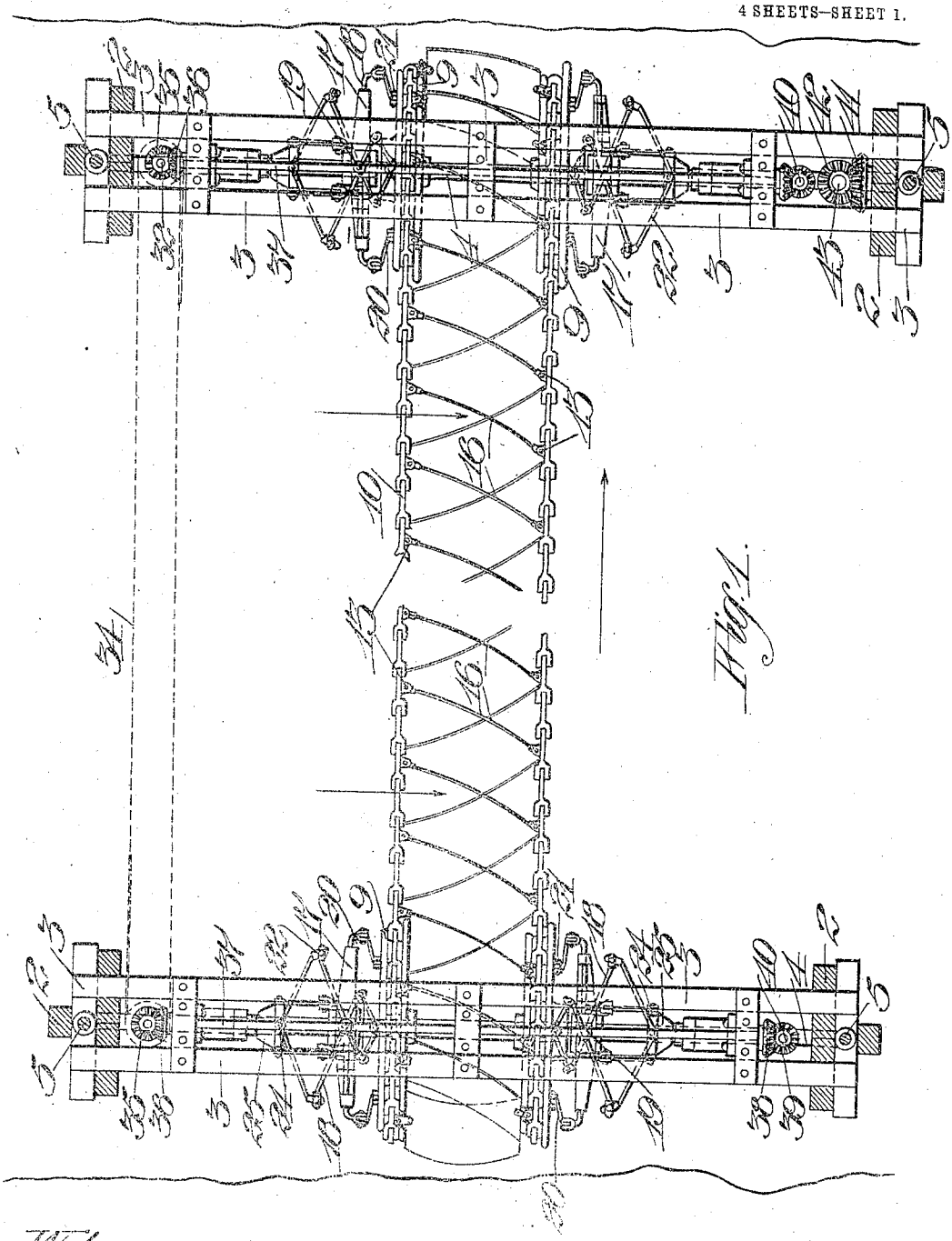

Fig. 1.

Witnesses.
Chas. Eastberg
G. E. Maynard.

Inventor
Henry Alles.
by G. H. Strong
his Atty.

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4 SHEETS—SHEET 2.

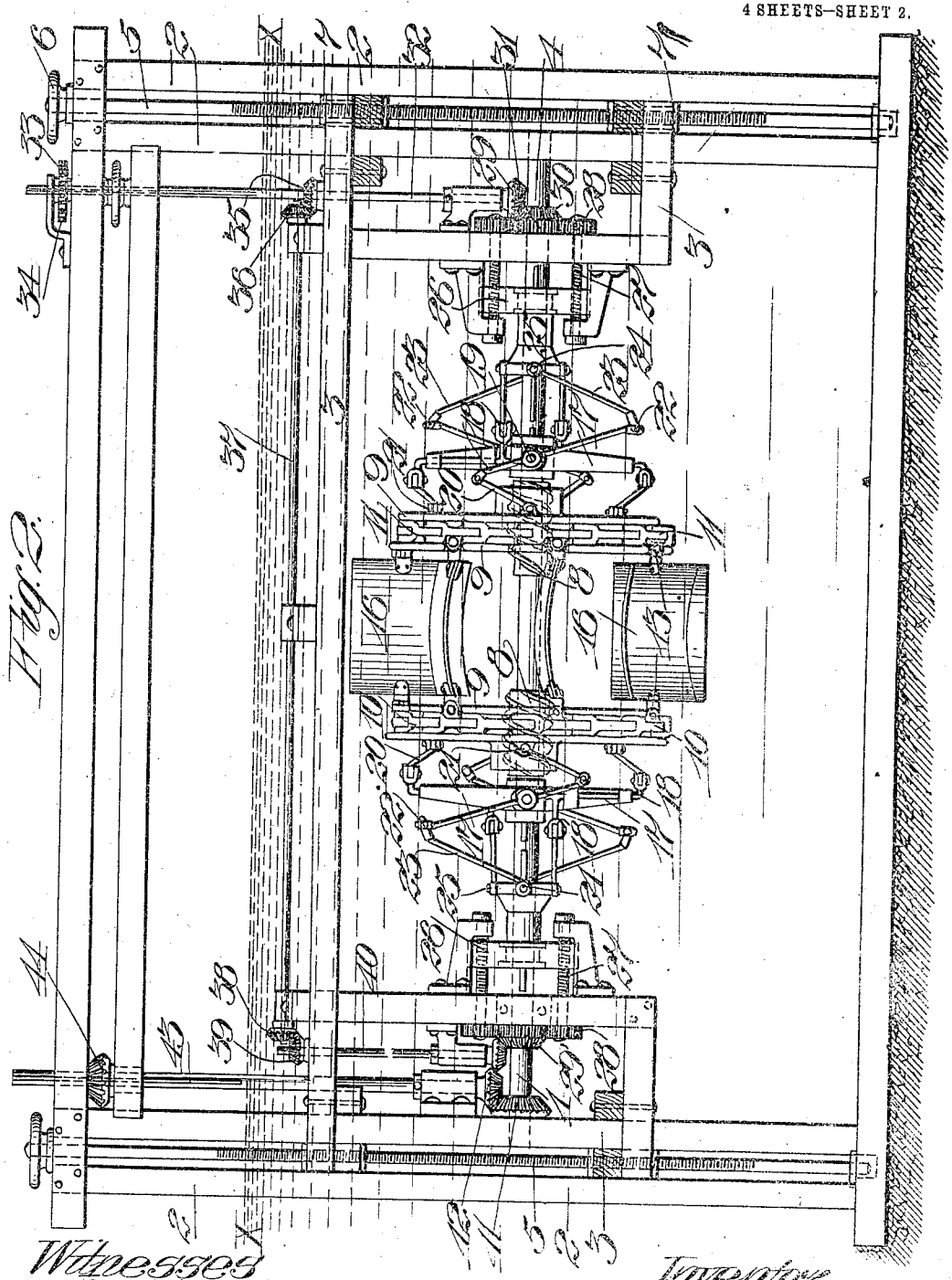

Fig. 2.

Witnesses
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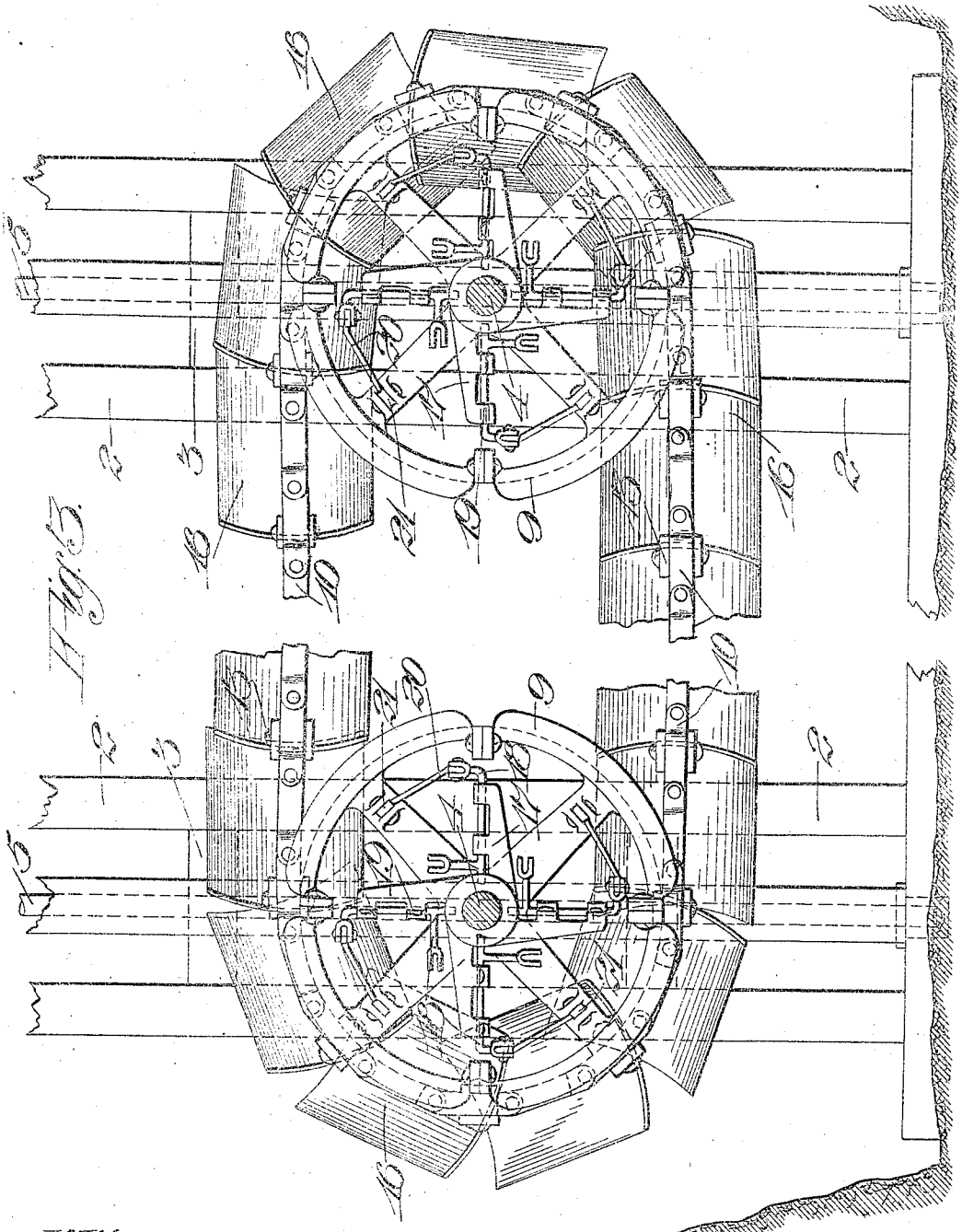
4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 1.

Fig. 4.

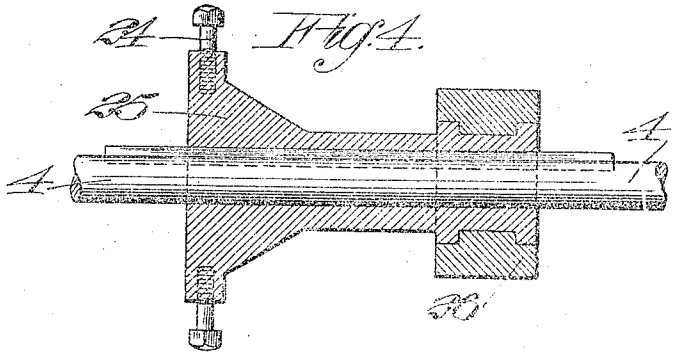
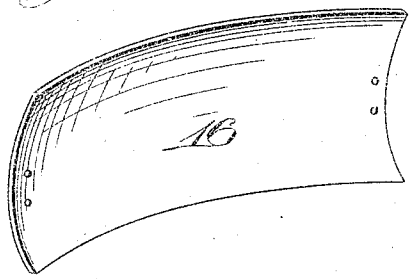


Fig. 5.



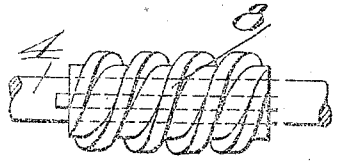
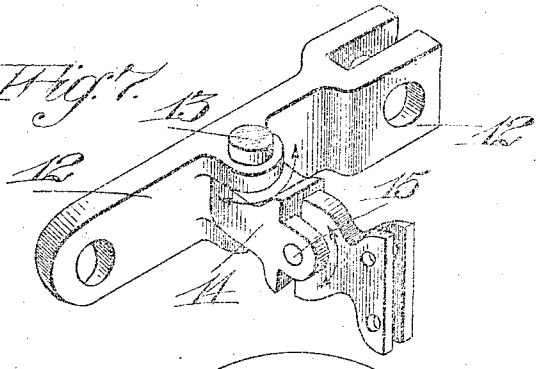


Fig. 6.

Fig. 7.



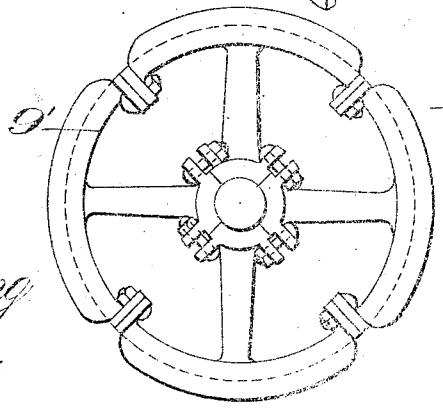


Fig. 8.

Witnesses.
Thos. Hasberg.
F. E. Maynard.

Inventor.
Henry Alles.
by H. B. Strong.
his Atty.

UNITED STATES PATENT OFFICE.

HENRY ALLES, OF SPOKANE, WASHINGTON.

CURRENT-MOTOR.

1,014,930. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed March 16, 1911. Serial No. 614,841.

To all whom it may concern:

Be it known that I, HENRY ALLES, citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented new and useful Improvements in Current-Motors, of which the following is a specification.

This invention relates to current motors.

The object of the present invention is to provide a current motor adapted to be entirely submerged in a running stream or current of water, and to present the greatest possible area to the current of water whereby the maximum degree of power obtainable from the velocity of the flowing water can be obtained; and to provide a new motor involving a plurality of endless chains carrying a series of adjustable blades against which the current of water in a stream may impinge; and to provide a novel means for adjusting the angular relation of the blades so as to increase or decrease the area of the blades against the stream or current.

The invention consists of the parts and the construction and combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a plan view in partial section taken on line X—X, Fig. 2. Fig. 2 is an end view of the motor. Fig. 3 is an enlarged view, showing in side elevation the blade structure and supports. Fig. 4 is a sectional detail of the shiftable sleeve. Fig. 5 is a perspective of one of the power blades. Fig. 6 is a detail view of one of the sprocket wheels advancing screws. Fig. 7 is a detail perspective view of a link and joint structure of a blade. Fig. 8 is a view of one of the sprocket wheels formed in sections.

One of the particular features of my present current motor is the provision of a power generating element adapted to be entirely submerged and disposed in a line transverse to the direction of the current of a stream of water, and which structure is effective, by the peculiar adjustment of its blades, to derive power from the current continuously. Maximum efficiency is obtained in this machine by reason of the fact that the planes or blades adapted to be impinged upon by the flowing stream are at all times presented when properly adjusted to the force of the current.

In accomplishing the purposes of my invention I employ a suitable rigid and substantial frame structure 2, which may be erected as the conditions require at suitable points in a stream or current of water; and upon the frame structure 2 there are adjustably mounted a pair of carriages 3 formed of a suitable system of beams. Upon each of these carriages 3 is journaled a transverse shaft 4 disposed endwise to the current of the water in the stream.

The carriages 3, with their respective shafts 4, are vertically adjustable in their respective stationary frames 2 according to the variations of the elevation of the water in the stream. Any suitable means may be employed for vertically adjusting the carriages 3, and in the present instance I have shown vertical screws 5 extending upwardly through the stationary frames 2 and provided with suitable wheels 6 at their upper portion whereby the screws may be turned to lift or depress the carriages in the ends of which the screws engage suitable threaded bearings 7. Upon each of the shafts 4 are secured threaded sleeves 8 arranged at suitable distances from each other, and upon each of the screws on the shafts 4 are mounted sprocket wheels 9 arranged in pairs upon the shafts 4. The sprocket wheels 9 on the parallel shafts 4 are so adjusted that they will properly aline with each other. Upon the alined sprocket wheels 9 there are mounted parallel sprocket chains 10 and 11, which are thus presented transversely to the flow of the stream.

The sprocket chains 10 and 11 are each composed of a plurality of links, upon suitable ones of which, as 12, are provided pivots 13, upon which are mounted suitable blocks 14 carrying pivots 15 adapted to support the shorter ends of blades 16. These blades 16 may be of any desirable number, as determined by the distance between the parallel shafts 4, and since their ends are connected, as at 13, to the parallel chains 10 and 11, the blades are first carried transversely across the stream above the plane of the shafts 4 and returned across the stream below the plane of the shafts 4, being at all times entirely submerged.

An important and particular feature of this invention is the provision of means whereby the angularity of the blades 16 may be nicely adjusted as the velocity of the flow of the water may require, and by which means the blades 16 may be brought into

parallelism with the direction of flow of the stream. This means for accomplishing the adjustment or angular position of the several blades 16 comprises a series of spiders 17, one of which is firmly secured upon the shafts 4 on the outside of each of the sprocket wheels 9, which, as before stated, are turnably supported upon their respective screws 8. Each of the spiders 17 carry a number of levers 18, fulcrumed at 19 upon the radial arms of the spiders, the shorter arms of the levers 18 being connected by links 20 to suitable pivots 21 upon the adjacent sides of the sprocket wheels 9.

The longer arms of the levers 18 are connected, as at 22, to the outer ends of links 23, which are pivoted at 24 upon the flanged end of sleeves 25 reciprocably keyed upon each shaft 4. These sleeves 25 are each provided with transverse threaded extensions 26 mounted upon parallel screws 27 journaled in convenient members of the carriages 3. The sleeves 25 are turnably mounted within the members 26 but are moved longitudinally by the same when the screws 27 are rotated by means of gears 28 fastened on their ends and which mesh with master gears 29 loosely supported adjacent the ends of the power shafts 4.

The master gears 29 may be provided upon one side, as 30, with gear teeth meshing with pinions 31 secured upon the lower ends of vertical shafts 32, having splined on their upper ends sprocket wheels 33 by which power is conveyed from one shaft 32 in one of the frames 2 to the other shaft 32 in the other frame 2 by means of a sprocket chain or equivalent means 34. Upon each of the actuating shafts 32 at one end of each carriage 3 is mounted a bevel gear 35 meshing with a corresponding gear 36 which is secured upon a transverse shaft 37, one of which is mounted upon the upper portion of each carriage 3. Upon the other end of each shaft 37 is provided a fixed gear 38 meshing with a gear 39 secured upon the upper end of short actuating shafts 40 by which power is transmitted from the actuating shaft 32 to operate the screw driving gear 29′ loosely mounted on the opposite end of the shaft on which is mounted the gear 29.

In operation when one of the vertical shafts 32 is operated, motion is transmitted to the several master gears 29 and 29′ loosely mounted adjacent the ends of the shafts 4, and these gears 29 and 29′ actuate the screws 27 which cause the advance or retraction of the transverse blocks 26 turnably engaging and reciprocably moving their respective sleeves 25. When the sleeves 25 are drawn away from each other by their screws 27, the links 23 pull on the long arms of the levers 18 and swing the shorter arms of the same toward each other so that the links 20 tend to rotate their respective sprocket wheels 9 upon their supporting screws 8, which rotation of the wheels 9 relatively to the shafts 4 cause a change of angle of the several of the blades 16 so as to present a greater portion of their area to the current of the stream. Manifestly the angular change of the position of the blades necessitates a movement of the sprocket chains 10 and 11 toward each other, and it is for this reason that the sprocket wheels 9 are turnable upon their shafts, and by reason of the screws 8 may advance toward each other to allow the blades 16 to adjust themselves angularly between the parallel sprocket chains 10 and 11. The pitch of the screws 8 is such that when the levers 18 are actuated the several sprocket wheels 9 turn upon their shafts in a reverse direction so that one of the sprocket wheels moves to advance its chain forwardly and the other sprocket wheel carries its chain rearwardly simultaneously moving the chains toward each other. When the operator has adjusted the blades 16 in such angular relation as he may determine best suits the velocity of the stream or which will produce the power desired, the entire system of traveling blades and their supporting sprockets being submerged, the power of the moving current is exerted against all of the blades irrespective of the direction of their travel by reason of the fact that all of the blades present a plane of angular resistance to the current of water which is constantly effective to drive the blades 16 in a continuous, endless orbit; thus all of the blades, when angularly disposed to the direction of the current, do work.

Power may be taken from either or both of the shafts 4 by any suitable form of transmission mechanism, and this is indicated in one form by a gear 41 meshing with a gear 42 fixed upon the lower end of a transmission shaft 43 journaled at its lower end in one of the carriages 3 and having splined upon its upper end a transmitting gear 44.

In Fig. 8 I have shown one of the sprocket wheels as being built up of a number of sections 9′. This may be any desirable form of wheel when the apparatus is erected on a very large scale or when one of the motors is going to be erected in a mountainous country and an integral sprocket wheel would be too massive for convenient transportation.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is—

1. A current motor comprising a number of angularly adjustable blades, a shaft, means mounted upon said shaft supporting the adjustable blades, and means for adjusting the angle of the blades, said means including a sleeve slidably mounted upon the shaft, a spider secured upon the shaft, levers

mounted upon the spider, links connecting said levers and said slidable sleeve and connections between said levers and the blades.

2. A current motor comprising a number of angularly adjustable blades, a shaft, means mounted upon said shaft supporting the adjustable blades, means for adjusting the angle of the blades, said means including a sleeve slidably mounted upon the shaft, a spider secured upon the shaft, levers mounted upon the spider, links connecting said levers and said slidable sleeve and connections between said levers and the blades, and means for operating said sleeve, said means including a block in which said sleeve is turnable and screws engaging said block whereby the latter may be actuated.

3. A current motor comprising a shaft, a series of blades, and a mechanism for adjusting the blades angularly relative the shaft, said means including a sleeve, a spider, levers pivoted upon said spiders, connections between the levers and the sleeve and connections between the blades and the levers whereby the blades are moved.

4. A current motor comprising a plurality of angularly adjustable blades, a pair of spaced chains connected to the ends of the blades, sprocket wheels upon which the chains are supported, a shaft carrying the sprocket wheels, and means for adjusting the angular relation of the blades to the axis of the shaft, said means including a sleeve slidably mounted upon the shaft and levers and links connecting said sleeve and one of the sprocket wheels.

5. A current motor comprising a plurality of angularly adjustable blades, a pair of spaced chains connected to the ends of the blades, sprocket wheels upon which the chains are supported, parallel shafts carrying the sprocket wheels, and means for adjusting the angular relation of the blades to the axes of the shafts, said means including sleeves slidably mounted on the shafts and levers and links connecting said sleeves and the sprocket wheels.

6. A current motor comprising a pair of parallel, spaced, flexible chains, a series of blades connected at their ends to the parallel chains, sprocket wheels carrying the chains, shafts carrying sprocket wheels, sleeves slidable lengthwise of the shafts and connected to the sprocket wheels, for reversely moving adjacent sprocket wheels upon their respective shafts for changing the angular relation of the blades to the axes of the shafts, and means for elevating or depressing said sprocket chains.

7. A current motor comprising a pair of parallel, spaced, flexible chains, a series of blades connected at their ends to the parallel chains, sprocket wheels carrying the chains, shafts carrying sprocket wheels, and means for reversely moving adjacent sprocket wheels upon their respective shafts for changing the angular relation of the blades to the axes of the shafts, said means including levers fulcrumed upon said shafts, sliding sleeves on the shafts connected to the levers and connections between said levers and the sprocket wheels.

8. A current motor comprising a pair of parallel, spaced, flexible chains, a series of blades connected at their ends to the parallel chains, sprocket wheels carrying the chains, shafts carrying sprocket wheels, means for reversely moving adjacent sprocket wheels upon their respective shafts for changing the angular relation of the blades to the axes of the shafts, said means including levers fulcrumed upon said shafts, sliding sleeves on the shafts connected to the levers and connections between said levers and the sprocket wheels, and a vertically movable structure carrying said shafts whereby the latter may be adjusted vertically.

9. A current motor comprising a pair of parallel, spaced chains, a series of blades connected at their ends to and between the chains, wheels carrying said chains, parallel shafts supporting pairs of the sprocket wheels, and means for circumferentially and axially adjusting the wheels upon their respective shafts.

10. A current motor comprising a pair of parallel, spaced chains, a series of blades connected at their ends to and between the chains, wheels carrying said chains, parallel shafts supporting pairs of the sprocket wheels, and means for circumferentially and axially adjusting the wheels upon their respective shafts, said means including screws, levers and slidable sleeves mounted upon the shafts.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY ALLES.

Witnesses:
JOHN H. HERRING,
CHARLES EDELMAN.