

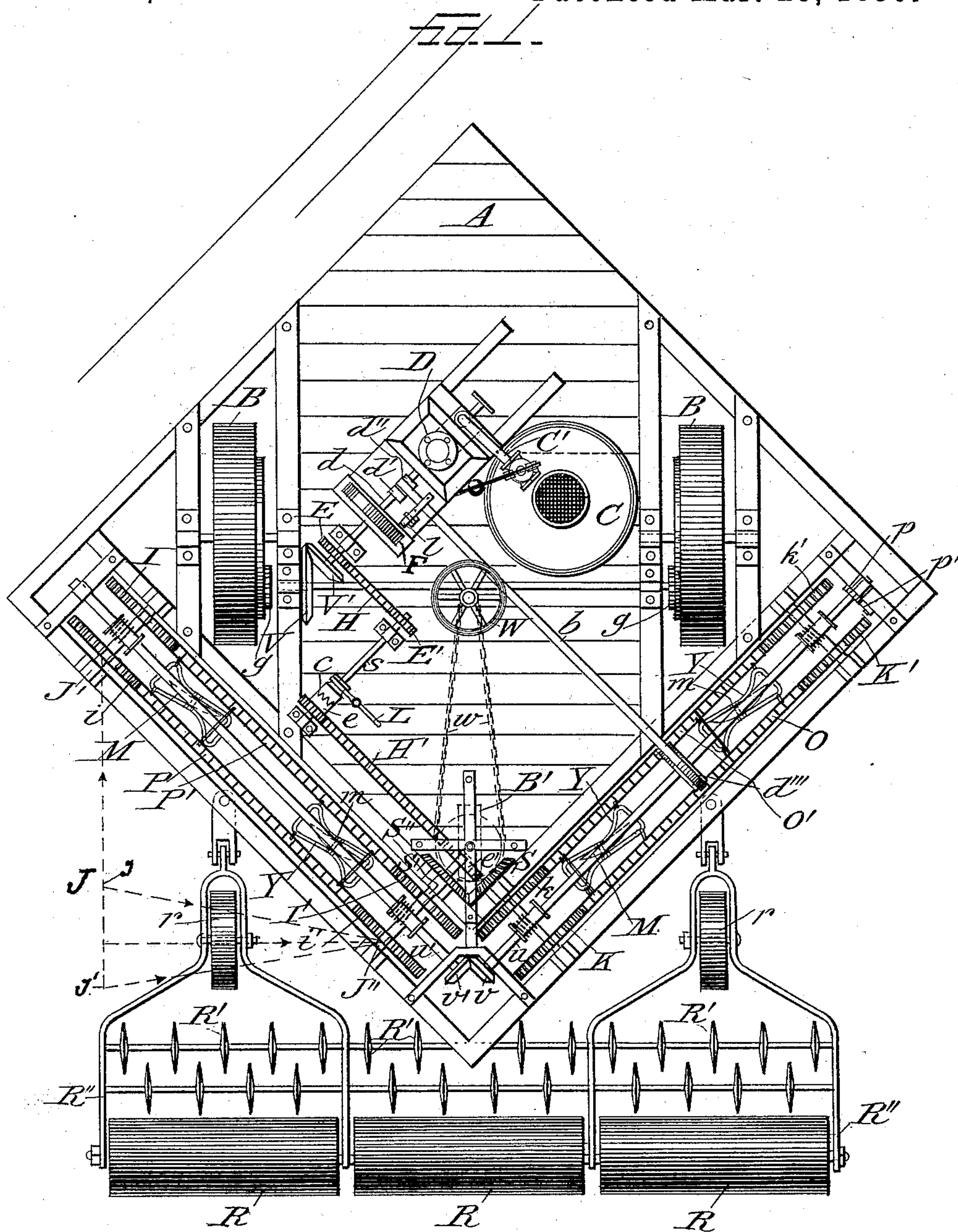
(No Model.)

3 Sheets—Sheet 1.

C. P. BROWN.
STEAM PLOW.

No. 424,265.

Patented Mar. 25, 1890.



Attest:

J. H. Schott

J. H. Brown

Inventor

Corydon P. Brown

Alg. Benf. Butternorth

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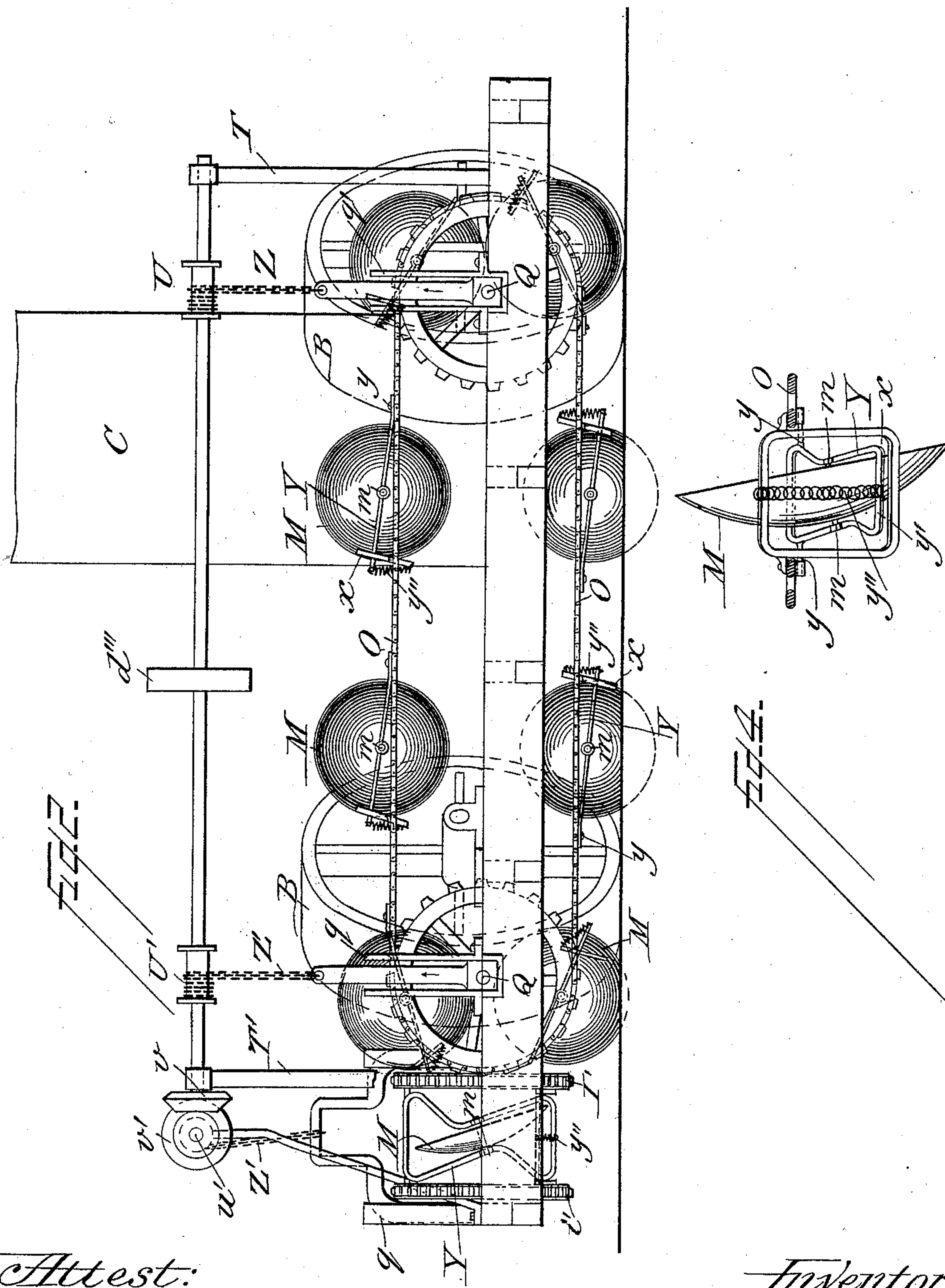
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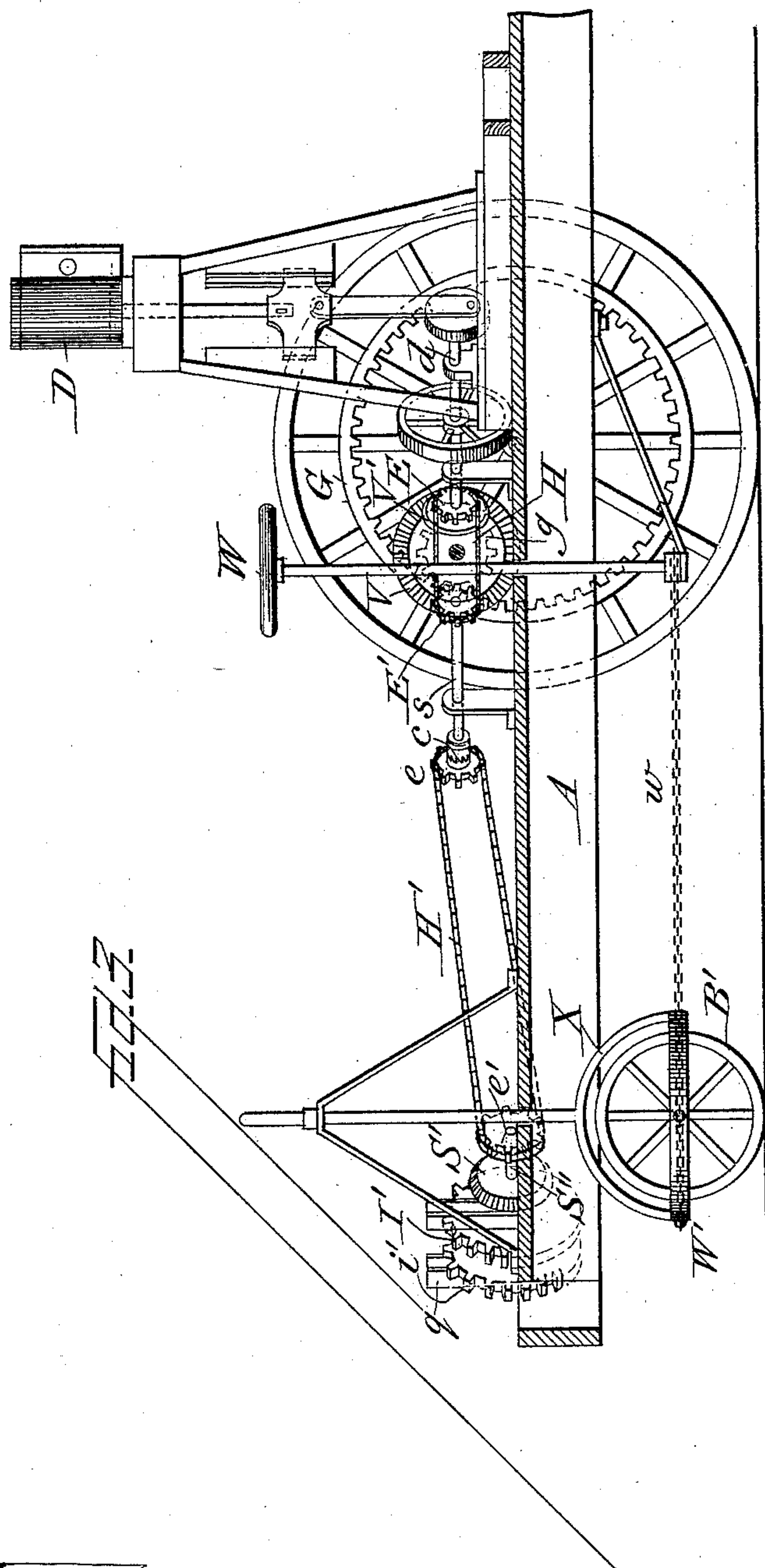
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UNITED STATES PATENT OFFICE.

CORYDON PARTLOW BROWN, OF WINNIPEG, MANITOBA, CANADA.

STEAM-PLOW.

SPECIFICATION forming part of Letters Patent No. 424,265, dated March 25, 1890.

Application filed September 28, 1889. Serial No. 325,339. (No model.)

To all whom it may concern:

Be it known that I, CORYDON PARTLOW BROWN, a subject of the Queen of Great Britain, residing at Winnipeg, Selkirk county, in the Province of Manitoba and Dominion of Canada, have invented certain new and useful Improvements in Steam-Plows; and I do hereby 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.

My invention consists of a certain improved steam-plow, hereinafter to be described and claimed.

In the drawings, Figure 1 is a plan view of my steam-plow with its attachments. Fig. 2 is a side view of the plow-frame with its supporting-wheels and the plows mounted on said frame. Fig. 3 is a vertical section through said frame, showing the gearing for driving the traction-wheels and plows. Fig. 4 is a cross-section of the chain, showing one method of attaching the plowshares.

A well-known defect in the many forms of steam gang-plows is that the side draft of the plows is so great as to materially interfere with the forward motion of the machine and to unnecessarily absorb a large amount of power. It is the object of my invention to overcome this objection and to construct an efficient form of plow by having two sets or gangs of plows traveling in lines inclined at equal angles to the line of travel of the plow-frame and upon opposite sides of said line. By this arrangement the side draft of each set of or gang of plows is neutralized by that of the other set or gang, and the plow moves forward under the application of power to the traction or driving wheels without any of the dragging and unevenness of motion produced where there is a strong unbalanced side draft tending to draw the machine to one side and interfering with its forward progress.

A is any suitable frame, which is mounted on a pair of driving and traction wheels B B and a steering-wheel B'. This steering-wheel is mounted in a pivoted frame X and is controlled by means of the chain *w*, which passes around a circular portion W' on the frame X and is wound upon the vertical rod to which the hand-wheel W is attached.

A boiler C, with safety-valve and steam-pipe C', furnishes steam for the vertical engine D, which turns the shaft *d*, and by means of the bevel-wheels V V' and the pinion *g* and internal gear-wheel G conveys motion to the traction-wheels B B and drives the plow forward.

On the opposite sides of the plow-frame, and arranged at angles inclined by equal amounts from the line of forward motion of the plow-frame, are the sets of parallel sprocket-chains P P' and O O', running over the sprocket-wheels *i i'*, I I', K K', and *k k'*. These sprocket-chains carry between them suitable yokes Y, as best shown in Fig. 1, which have mounted in them suitable concave disks or plowshares, which turn freely upon their journals *m*, which have bearings in the yokes Y. These disks are inclined at a considerable angle to the line of the sprocket-chain. These two sets of sprocket-chains are geared together by means of the bevel-wheels S S', which are mounted on the same shafts as the sprocket-wheels I' K, &c. On the shaft S'', on which the bevel-wheel S' is mounted, is also keyed a sprocket-wheel *e'*, which is driven by the sprocket-chain H', running over the sprocket-wheel *e*, mounted on the shaft *s*. This shaft *s* is driven by the sprocket-chain H, running over the sprocket-wheel E on the shaft *d*, which is driven by the motor or engine D, and conveys motion to the sprocket-wheel E' on the shaft *s*. The clutch *c*, operated by the lever L, throws the sprocket-wheel *e* into and out of gear with the shaft *s*, and thereby permits the sets or gangs of plows to be thrown out of gear and remain stationary while the machine is being moved from place to place.

Provision is made for raising and lowering the sets or gangs of plows to adjust them to different depths of furrow or to lift them entirely out of the furrow during the transportation of the machine by the following mechanism: The shafts of the sprocket-wheels I K, &c., are mounted in suitable bearings Q Q', Fig. 2, which are vertically adjustable in the guides *q q'*. These journal-bearings may be lifted or lowered by the chains Z Z', wound upon the windlasses U U' on the shaft *u*, which is supported in standards T T'. The two shafts *u* and *u'* are geared together so

as to revolve simultaneously by means of the bevel gear-wheels $v v'$. It is evident, therefore, by turning either of the shafts $u u'$ by means of a crank or otherwise all the sprocket-wheels on which the gangs of plows are mounted will be simultaneously raised or lowered. This may also be accomplished by any power-connection from the motor—such, for instance, as is illustrated in Fig. 1, where the belt b runs over the pulley d''' on the shaft u , and can be shifted by the shifting-lever l from the fast pulley d' to the loose pulley d'' and back again, as it may be necessary, in order to give the shaft u the necessary number of revolutions to procure the desired adjustment and to allow it to remain in that position which gives the necessary adjustment to the plows. The pulley d' is keyed to the shaft d , while the pulley d'' runs idly thereon. The ratchet-wheel p and the pawl p' preserve the system at any particular point of adjustment.

In order to give the disks or plowshares M the necessary capability of self-adjustment in case they strike a rock or root or other obstruction in passing through the furrow, I give one end y of the yoke Y a flexible attachment to the chain O , while the other end y' is allowed to play up and down in the guide x . The flexible attachment on the end y of the yoke may be by a hinge or otherwise; but I find that the flexibility to the chain O is sufficient of itself to give the necessary play if the yoke Y is simply riveted to one of the links of said chain. The weight of the disk M and the yoke Y may be sufficient to force it down into the furrow; or a spring y'' may be employed to assist in this operation by normally tending to force the said disk deeper into the furrow.

I have shown a number of rolls R attached to and following the plow in order to smooth the surface of the ground. I have also shown mounted in the frames R'' , in which said rolls are journaled, certain disks $R' R'$, which will serve to break up any lumps which remain and otherwise even the surface of the ground over which they pass. Wheels $r r$ support the forward ends of the frames R'' , which are attached to the plow-frame, as shown.

The mode of operation of my invention is evident. When steam is turned on to the engine or motor D , the traction-wheels B and the sprocket-chains $P O$, &c., are caused to revolve. The relative rate of speed at which these two sets of apparatus revolve will depend on the proportions of the parts of the gearing conveying motion to them from the driving-shaft d , which revolves under the driving-power of the motor and the fly-wheel F . If the plow-frame were to stand still and the sprocket-chains P , &c., be caused to revolve, the disks or plowshares would evidently move in lines parallel to the said sprocket-chains, as shown in Fig. 1. If the sprocket-chains were to remain stationary, by throwing the clutch c out of connection and

the plow-frame be driven forward, the said plowshares would move in lines parallel to the forward motion of the plow-frame. If the sprocket-chains P , &c., are given a rotary motion at the same time the plow-frame is given a forward motion, the actual line of travel of each particular disk or plowshare with reference to the ground over which they are moving will evidently be a resultant of these two components of motion, and the direction of that resultant will be dependent on the relative speeds of the forward motion of the plow-frame and the diagonal motion derived from the sprocket-chains. If the gearing is rightly designed, the resultant motion of the plowshare and the direction of the furrow which it will cut will be at right angles to the line of motion of the plow-frame, and thus the plowed field will be marked out in parallel furrows. The power furnished by the motor will be divided according to the necessities of the case between the traction-wheels and the plowing mechanism, and as the plowshares move through the furrow those on one side of the machine will counteract the tendency of those on the other side of the frame to pull the machine to one side or the other, and the driving and traction wheels will be left free to draw the machine forward without any side draft tending to drag them in one direction or the other. Moreover, whatever component of force may be exercised by the said plowshares which is parallel to the line of motion of the plow-frame will be fully realized in assisting in and accelerating the forward motion of the entire plow.

When it is desired to change the direction of travel of the plow, a turning of the wheel W will swing the pivoted wheel B' to one side or the other and cause the plow to deviate from its course. Whenever it is desired to raise or lower the plowing mechanism, the belt b can be thrown onto the pulley d' by means of the lever l , and the shafts $u u'$ will be given a necessary number or fraction of revolutions.

The advantages of my improved plow are, its adjustability to different depths of furrow, its capability of overriding obstructions without breaking the plowshares, its steadiness of motion due to the absence of any side draft, and its complete and effective realization of all the power developed by the motor by which it is driven.

Referring to the resultant motion of each particular disk or plowshare M with reference to the ground over which the plow is passing, it is evident that if the gearing is so proportioned that during the interval between the time when any disk enters the furrow under shaft J' (see Fig. 1) and the time when it leaves the furrow under shaft J'' the plow-frame A shall have moved forward a distance equal to the dotted line $J J'$, the furrow cut by the disk will be dotted line $J J''$. If the gearing be differently proportioned, so that

the plow-frame A goes ahead faster and travels a distance $j' J'$ during this interval of time while any one disk is in the furrow, then the furrow will be cut along the line $j' J''$. If, on the contrary, the speed of the plow-frame is less and it only traverses the distance $j J'$ during a similar interval, the furrow cut will be along the line $j J''$. In the latter case the action of the gangs of plows will help to drive the whole machine forward, aiding the traction-wheels B B, and this is my preferred arrangement.

Referring to Fig. 3, it will be seen that the vertical adjustment of the system of sprocket-chains and plowshares will not interfere with the gearing by which they are driven, inasmuch as the sprocket-wheel e' may be raised and lowered through a considerable distance without materially lengthening or shortening the chain H'.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. The combination, with a steam-plow frame mounted on wheels, of two sets or gangs of plowshares which are mounted upon continuous sprocket-chains, the sprocket-wheels over which said chains run being mounted rigidly in the frame at such points that the lines of travel of the chains are inclined to the line of travel of the plow at equal acute angles, a prime mover mounted on the plow-frame, and gearing which transmits motion to the driving-wheels of the sprocket-chains and to the driving-wheels of the plow-frame, substantially as described.

2. The combination, with a steam-plow frame, of two sets or gangs of freely-revoluble disks or plowshares, which are mounted upon sprocket-chains, which sprocket-chains move in lines inclined at equal angles to the line of motion of the plow-frame and upon opposite sides of said line, substantially as described.

3. The combination, with a steam-plow frame, of sprocket-chains running on sprocket-wheels mounted in said frame, yokes supported between a set of parallel sprocket-chains, and freely-revoluble disks mounted in said yokes, substantially as described.

4. The combination, with a steam-plow frame, of sprocket-chains running on sprocket-wheels mounted in said frame, yokes supported between a set of parallel sprocket-

chains, and freely-revoluble disks mounted in said yokes, together with mechanism for producing simultaneous vertical adjustment of all the bearings of said sprocket-wheels, substantially as described.

5. The combination, with two parallel revolving sprocket-chains, of yokes supported upon said sprocket-chains, so that one end of each yoke is capable of vertical adjustment, and freely-revoluble concave disks or plowshares mounted in the said yokes, substantially as described.

6. The combination, with two parallel revolving sprocket-chains, of yokes supported upon said sprocket-chains, so that one end of each yoke is capable of vertical adjustment, and freely-revoluble concave disks or plowshares mounted in said yokes, together with springs which normally tend to force the ends of said yokes downward into the furrow, substantially as described.

7. The combination, with a steam-plow frame, of two sets or gangs of freely-revoluble disks or plowshares mounted on sprocket-chains, which sprocket-chains move in lines inclined at equal angles to the line of motion of the plow-frame and upon opposite sides of said line, together with traction-wheels upon which said frame is mounted, a motor on said frame, a train of gearing which communicates motion to said traction-wheels from the motor, and a second train of gearing which communicates motion from the motor to said sprocket-chains, substantially as described.

8. The combination, with a steam-plow frame, of sprocket-chains running on sprocket-wheels mounted in said frame, yokes supported between a set of parallel sprocket-chains, and freely-revoluble disks mounted in said yokes, together with mechanism for producing simultaneous vertical adjustment of all the bearings of said sprocket-wheels, a motor which drives the said sprocket-chains, and gearing by which power may be transmitted from the motor to the before-mentioned adjusting mechanism, substantially as described.

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

CORYDON PARTLOW BROWN.

Witnesses:

J. G. HARVEY,

E. J. COYLE.