

(No Model.)

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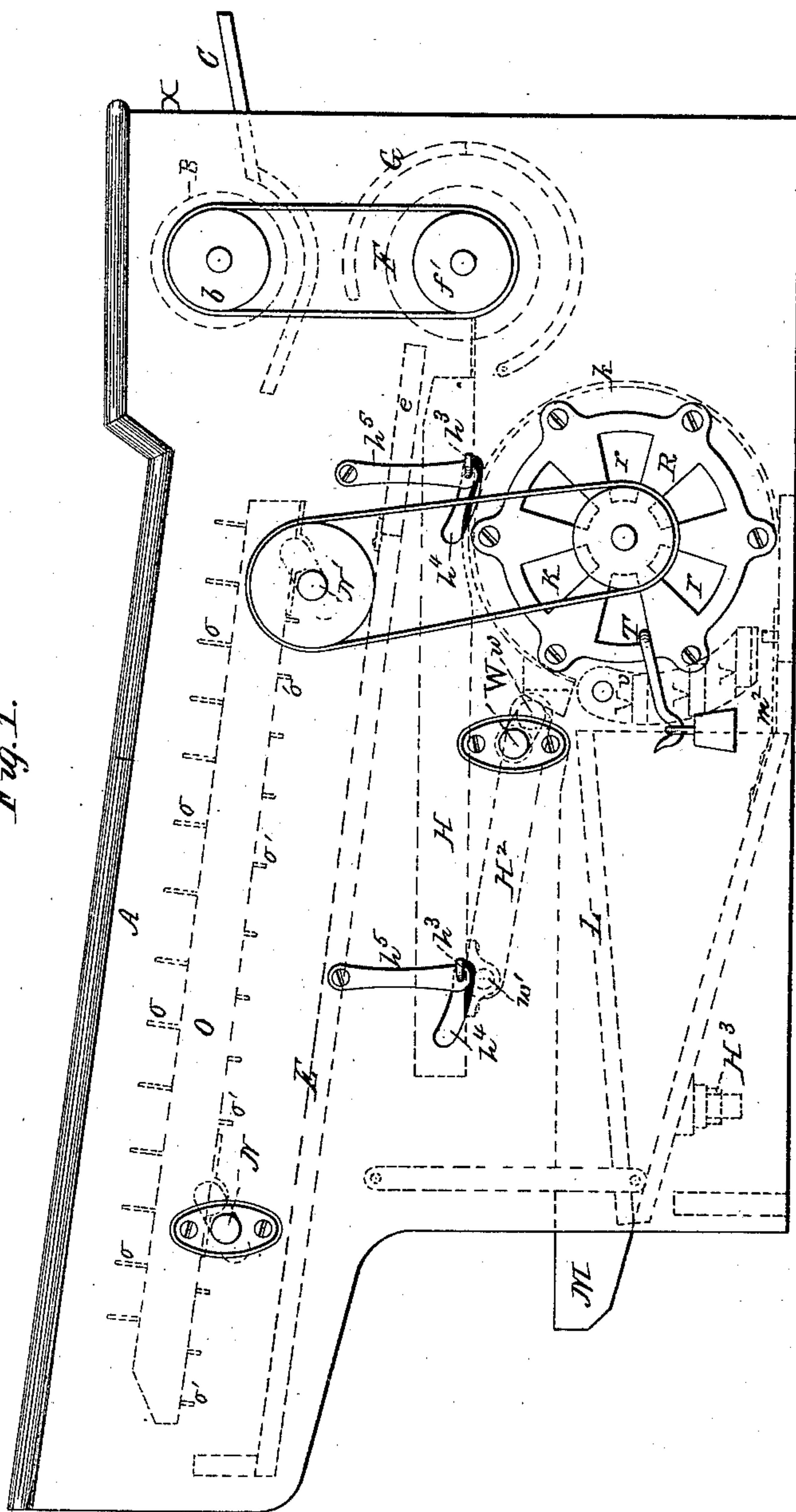
C. A. BIKLE.

CLOVER THRASHER AND HULLER.

No. 297,104.

Patented Apr. 22, 1884.

Fig. 1.



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Fred J. Blumch.

Inventor:
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by
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(No Model.)

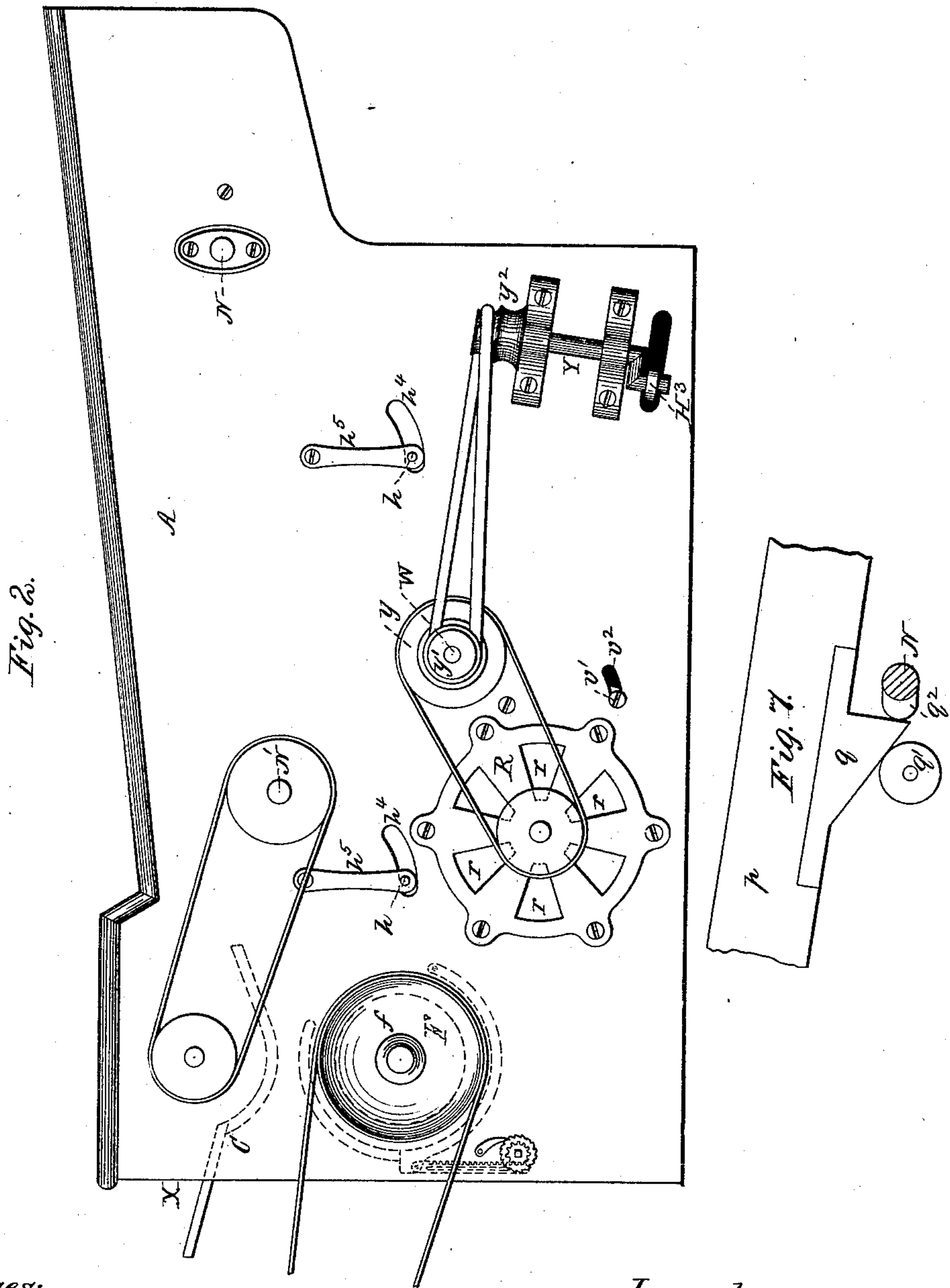
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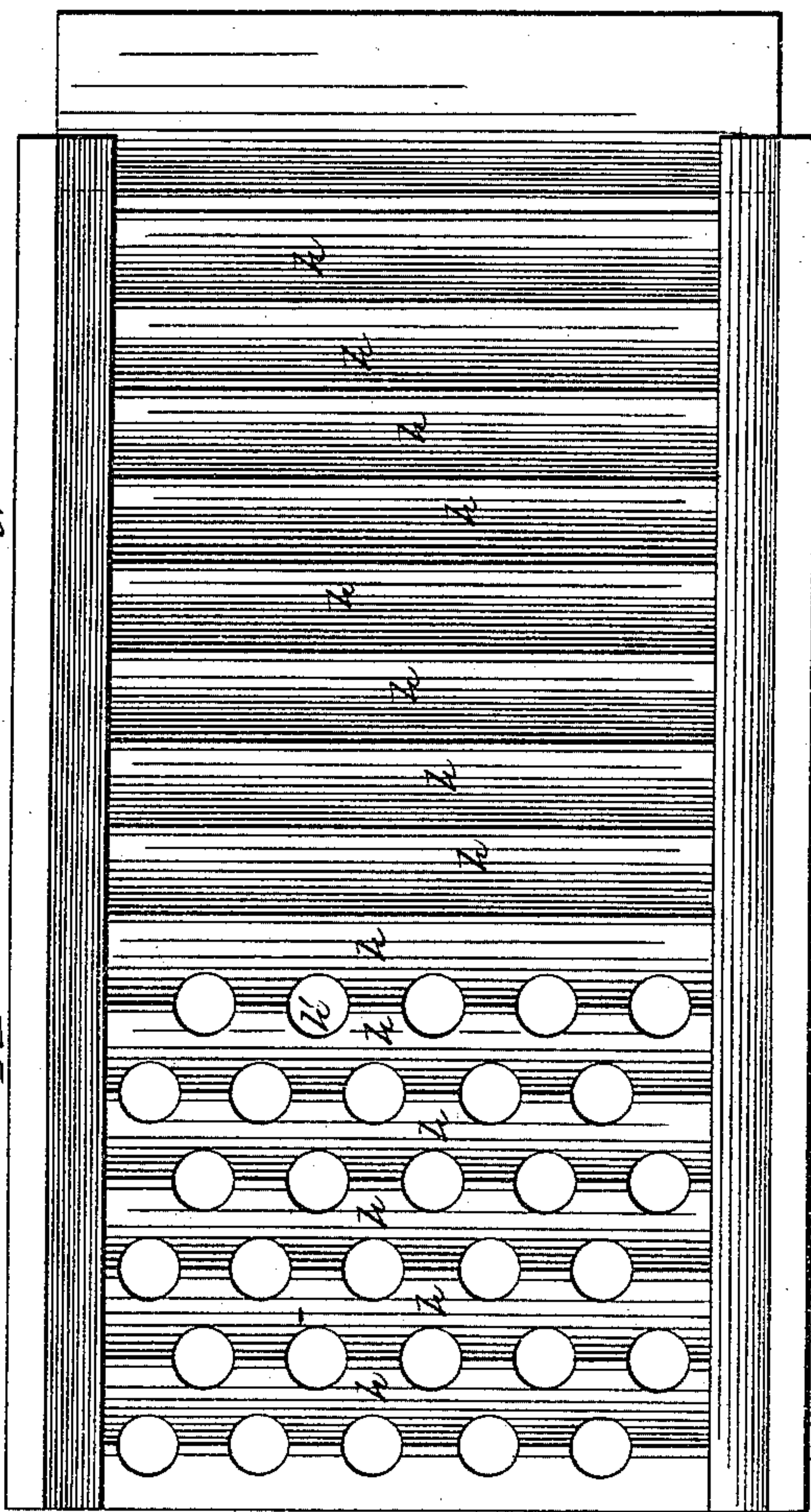
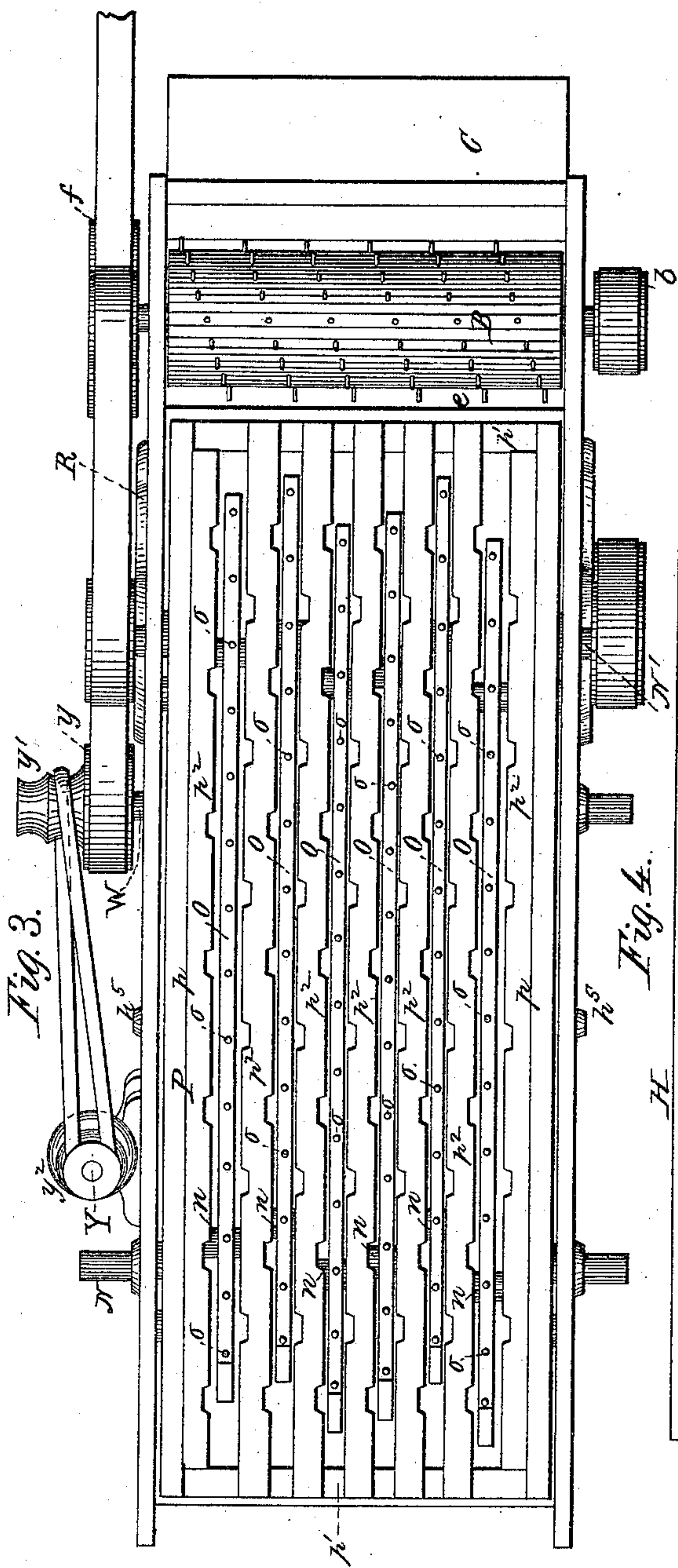
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4 Sheets—Sheet 4.

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Fig. 5.

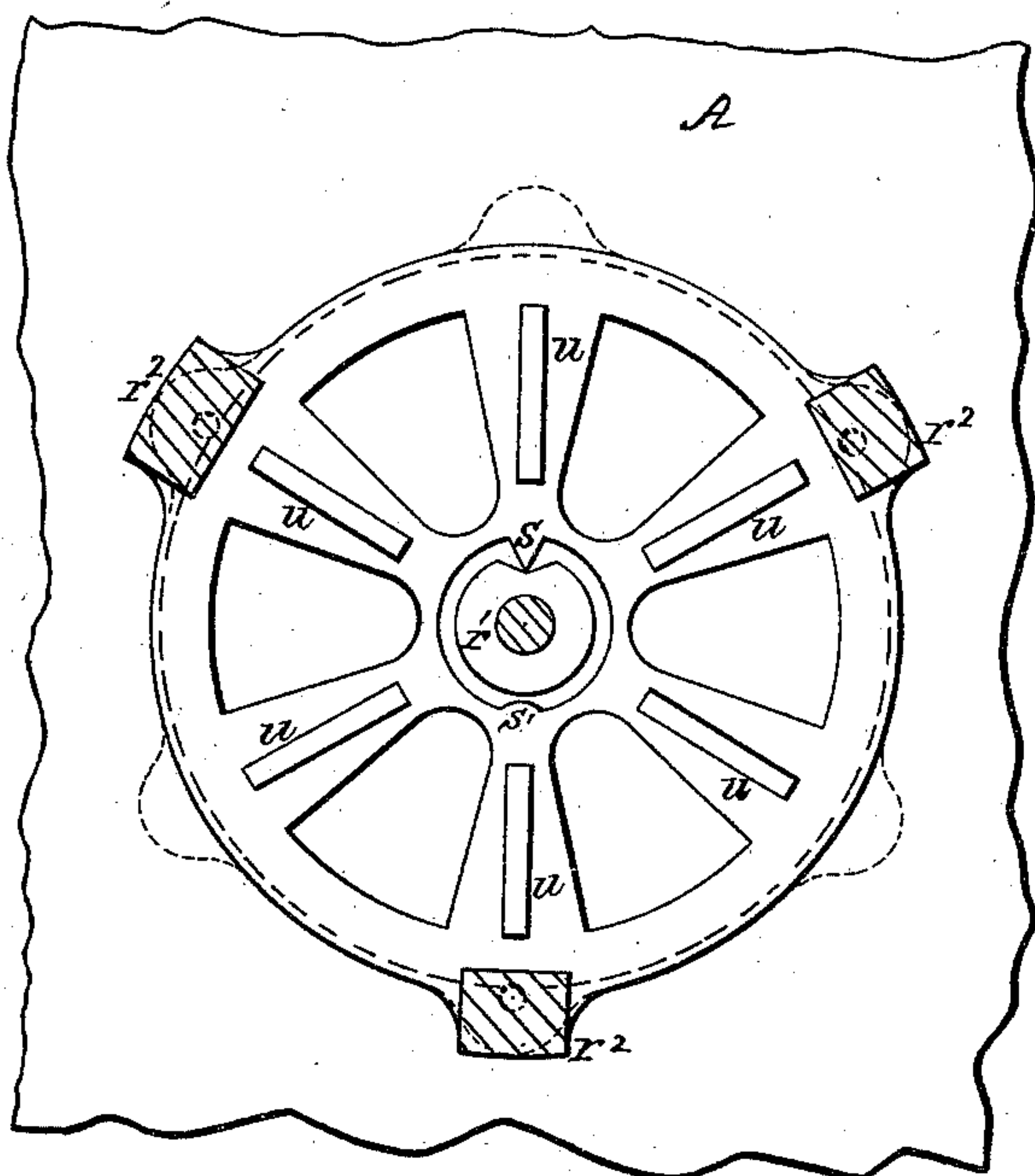


Fig. 5^a.

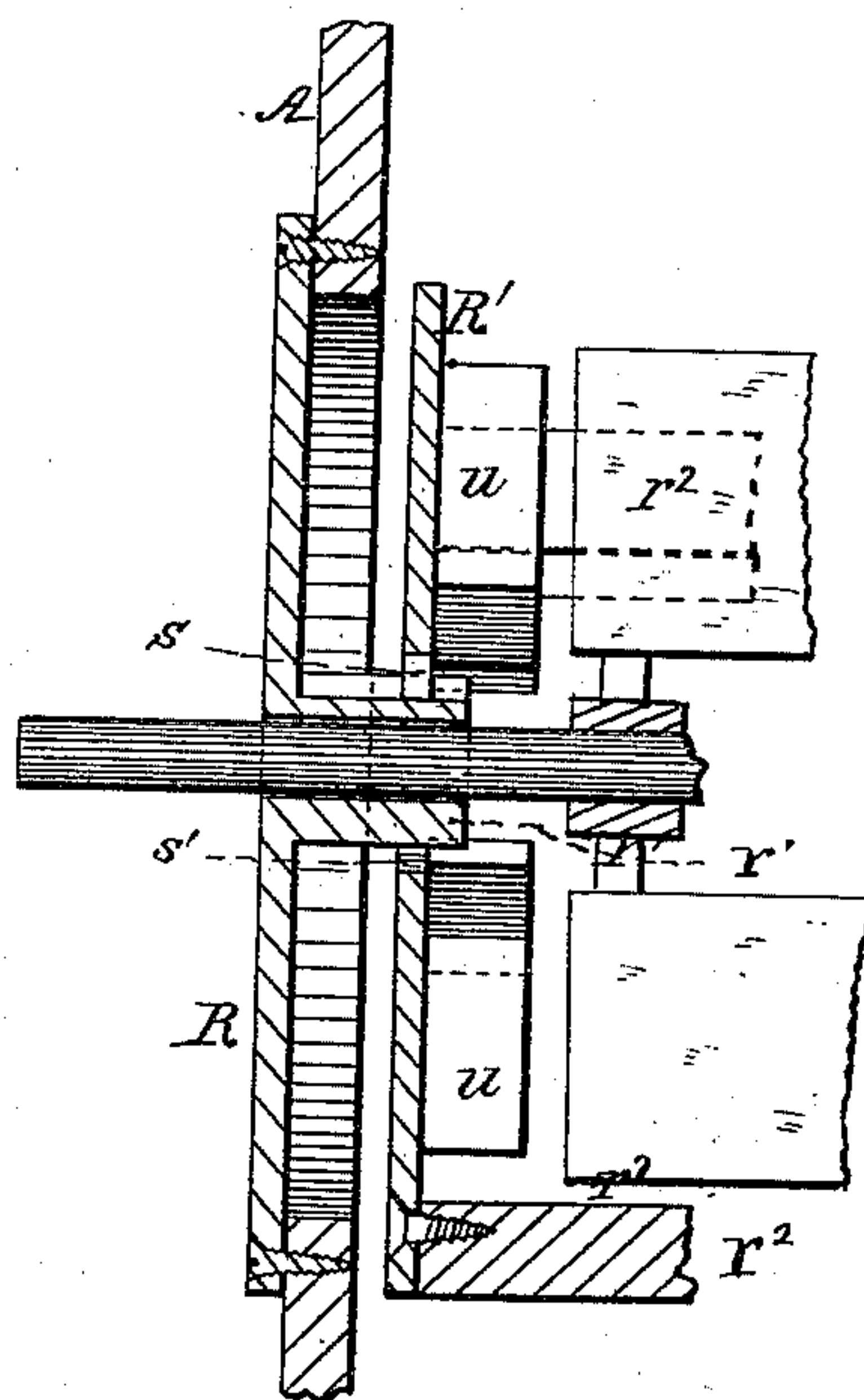
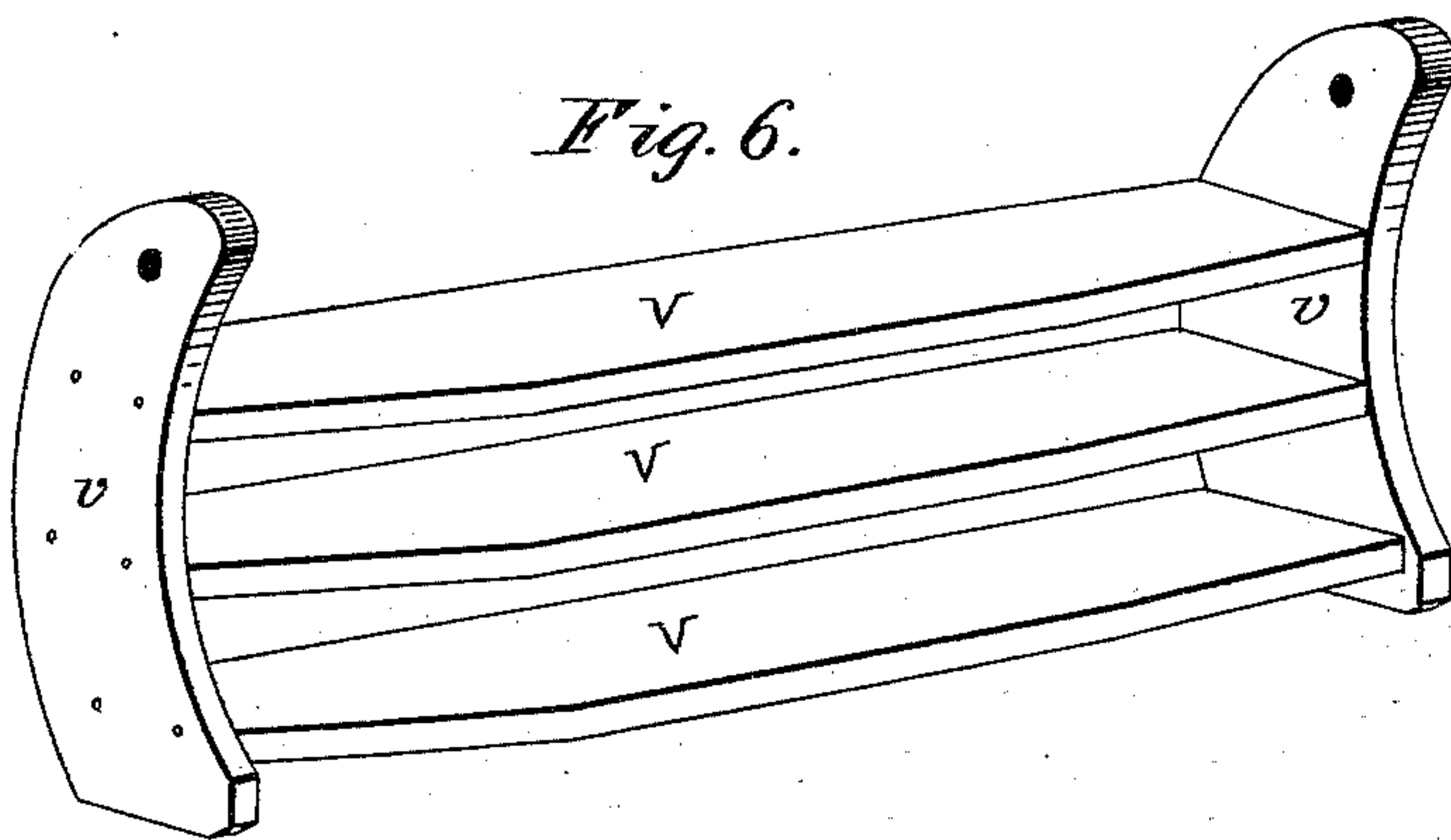


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES A. BIKLE, OF HAGERSTOWN, MARYLAND.

CLOVER THRASHER AND HULLER.

SPECIFICATION forming part of Letters Patent No. 297,104, dated April 22, 1884.

Application filed December 27, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BIKLE, of Hagerstown, in the county of Washington and State of Maryland, have invented certain new and useful Improvements in Clover-Thrashers and Hullers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

My invention relates to that class of clover thrashers, hullers, and separators in which the pods are thrashed from the hay by a thrashing-cylinder, discharged with the hay, separated therefrom by the hay-carrier, and transferred to a hulling-cylinder, whence the hulled seed and chaff are discharged together and separated by suitable means, including a fan-blast.

The objects of the invention are to effect a thorough separation of the pods from the hay and facilitate the feeding of the pods to a hulling-cylinder; to regulate the blast in such a manner as to secure a complete separation of the chaff from the seed and prevent wasting of the latter; to provide for varying the direction of the blast in accordance with the different character and conditions of the clover, and to improve the construction of the conveyer by which the mixed chaff and seed are transferred from the hulling-cylinder to the fan-blast and sieve.

With these objects in view the invention consists in certain novel constructions and combinations of devices, which will be fully understood from the following particular description, in connection with the accompanying drawings, in which—

Figures 1 and 2 are views of opposite sides of the machine, the interior parts being shown in dotted lines. Fig. 3 is a top view of the machine with the cover of the casing removed. Fig. 4 is a plan view of the combined seed and chaff conveyer and separator. Figs. 5 and 5^a are views illustrating the blast-regulator. Fig. 6 is a detached perspective view of the blast-deflector. Fig. 7 is a view of the means for shaking the frame P.

Similar letters of reference in the several figures denote the same parts.

The letter A indicates the casing of the machine.

B is the thrashing-cylinder, mounted between the walls of the casing, at its front end, and partially surrounded by a concave, C, the lower portion of which is extended rearward to guide the thrashed hay and pods to the carrier and pod-separator D, the particular construction of which latter will be presently described.

E is a partition or platform arranged below the hay-carrier and pod-separator, and inclined upwardly and rearwardly from the feed-board e, lying just behind the hulling-cylinder F, which is arranged under the concave of the thrashing-cylinder. This hulling-cylinder is nearly surrounded by a concave, G, the under portion of which is extended rearwardly to guide the hulled seed and chaff or hulls to a combined shaking conveyer and seed separator, H, which is so constructed as to convey the mixed seed and chaff rearwardly from the hulling-cylinder, and to drop the seeds and fine chaff upon the forward portion of the sieve L, while the main portion of the hulls is discharged at the rear end of the conveyer and falls in the path of the blast from a fan, K, mounted in a rearwardly-open casing, k, under the forward end of the combined conveyer and seed-separator A.

The concave G of the hulling-cylinder is made in two parts, the upper one of which is stationary, and the lower one adapted to be swung out when necessary, so as to inspect the inside, if, from any cause, the teeth of the cylinder or concave become clogged or broken. This adjustment of the concave is effected by the following means: To the outer ends of the movable portion are pivoted slotted rack-bars G', and through the slots in said bars bolts having heads are secured on the frame of the machine to guide the rack-bars in their movements. A shaft, G², extends across the machine from side to side, and upon this shaft are two gear-wheels for the purpose of engaging with the teeth on the racks. By rotating the shaft and gears in one or the other direction the concave is moved up to position or away from the cylinder. The shaft has also mounted upon it a ratchet-wheel, and a pawl, g', is adapted to engage with said ratchet-wheel to prevent the shaft from turn-

ing and the concave from being opened while the machine is in operation. The sieve L is mounted in a shaking shoe, M, open at both ends, and having its bottom *m* inclined downwardly and forwardly to a point near the lower edge of the fan-casing.

I will now describe the construction of the combined hay-carrier and pod-separator.

Just above the platform E, and near its forward and rear ends, respectively, two transverse multiple crank-shafts, N and N', are mounted in bearings in the side walls of the machine-casing. Each shaft in the present instance has six cranks extending in different directions, which are designated by the letter *n*, and upon the wrist portions of these cranks are mounted longitudinal carrier-bars O, each bar having its opposite ends mounted upon corresponding cranks of the two shafts, and each being provided with pins *o*, projecting upward from its upper edge, and similar but shorter pins, *o'*, projecting downwardly from its lower edge. Above the crank-shafts is arranged horizontally, flatwise, an open frame, P, composed of side bars, *p p*, and end bars, *p' p'*, which support longitudinal bars *p²*, which are scalloped or recessed at intervals on their side edges, and are separated by intervening spaces of sufficient width to allow the carrier-bars O to pass freely up and down, each of the frame-bars *p²* lying between two carrier-bars. From the lower edge of each of the two side bars project two lugs, *q q*, having inclined lower edges which slide upon pins having friction-rollers *q' q'*, projecting from the casing-walls, so as to bring the vertical front edges of said lugs against the crank-shafts at points near said walls. At these points the shafts are provided with cams *q²*, which, as the shafts are rotated, strike the front edges of the lugs and force them rearwardly, so that they ride up on the rollers and slide down again as the cams leave the lugs. Thus the frame is given vertically oblique reciprocating motion, the function of which will be appreciated when we come to consider the operation of the complete machine. At present I will pass to a description of the means for regulating the force of the fan-blast.

In each side wall of the machine-casing is an opening having a diameter about equal to that of the fan, and these openings are covered by plates R, having radial apertures *r*, which in the present instance increase radially in width. From the center of the inner side of each of these plates projects a boss or hub, *r'*, which is perforated centrally to form a bearing for the fan-shaft. Adjacent to the inner side of each of the plates R is a similar plate, R', having a central aperture sufficiently large to pass without touching over the boss of the plate R, and from the inner edge wall of this aperture projects a knife-edge lug, *s*, which rests in a slight notch formed in the upper edge of said boss. A slight projection, *s'*, diametrically opposite the knife-edge lug,

prevents the latter from rising from its notch. The two plates R' R', which are at opposite ends of the fan, are connected by transverse bars *r²*, so that they must swing together, and from a point at one side of the center of one of said plates an arm, T, projects outwardly through one of the apertures of the adjacent plate R, and is provided with a hook, by which may be suspended a weight on the outside of the machine-casing. The weight may, however, be omitted, and the arm alone will, by its weight, serve to cause the plates R' R' to swing by gravity to such position that their apertures will normally coincide or be in line with those of the plates R R, and thus leave open a free passage for air to the fan. The plates R' R' have between their apertures radial inwardly-projecting wings *u*, which will be struck by the blast from the fan, and when the face of the blasts acts in opposition to the force of gravity which holds the plates in their normal position said plates will be swung into such position that the solid portions between their apertures will come opposite the apertures of the plates R R to a greater or less extent, according to the force of the blast and the degree to which the plates R' R' are weighted on one side.

It will be readily understood that the weight applied to the arm T may be so adjusted that when the force of the blast exceeds a predetermined strength the plates R' R' will be turned to cut off the flow of air to the fan sufficiently to reduce the supply, so that only the desired volume can be projected by the fan. If while the fan is in operation its blast becomes weak, through the influence of external air-currents or otherwise, the air-passages will be automatically opened to admit an increased supply, and vice versa, and thus a uniform blast will be maintained. If damp heavy clover is being treated, a strong blast will obviously be required, and in such case the arm T will be weighted to hold the plates R' R' in position to leave the air-passages open for a normal supply of air much greater than would be necessary in treating the clover if it were dry and light, as will be readily understood.

It may also sometimes happen that when the clover is damp, or when clover having heavy hulls is being treated, a straight horizontal blast will not effectively carry off the chaff; and to overcome this difficulty, should it arise, I have provided my improved blast-deflector, whereby the air-current may be caused to retard the fall of the chaff, so that it will be longer under the influence of the blast force, which tends to carry it away from the seed.

In the rear of the fan is arranged a vertical series of transverse blades or plates, V, secured at their ends to two arms, having their upper ends pivoted to the side walls of the machine-casing, while from the lower end of one of said arms a headed screw, *v'*, projects through a segmental slot, *v²*, in the adjacent casing-wall. By moving the screw in the di-

resection of the length of the slot the series of blades V may be so adjusted that they will stand either in line with the blast, so that it may pass straight to the rear, or at an angle 5 suitable to deflect the air-current upward sufficiently to cause it to rise through the sieve, and also to oppose the too rapid fall of the hulls before they reach the sieve, and thus keep them suspended for such a time as will 10 permit the seed to become well separated therefrom and themselves to be carried off by the rearward force of the blast.

The combined shaking conveyer and seed-separator H consists of a platform having its 15 upper surface ratcheted, or composed of a series of rearward and upward inclines, *h*, having abrupt rear edges. The rear portion (about one-half of this platform) is perforated with transverse rows of holes, as at *h'*, the 20 holes of each row being opposite the intervals between the holes of the rows on each side. The seed and hulls from the hulling-cylinder pass rearward on this platform, and the seed falls through the holes to the sieve below, the 25 object of the peculiar arrangement of the holes being to prevent any of the seed from passing off over the rear end of the platform with the hulls, as some of it would be liable to do were the holes simply in parallel rows with imperforated spaces between them from front to rear. 30 The combined conveyer and seed-separator is suspended by means of pivot-rods *h''*, which pass through it transversely, and project out through curved slots *h'''* in the casing-walls, on the outside of which they are connected with 35 the lower ends of the loosely-swinging arms *h''''*, having their upper ends pivoted to the casing.

Under the front portion of the combined 40 conveyer and seed-separator H is a transverse shaft, W, having two crank-bends, *w w*, near its opposite ends, respectively, but inside of the casing-walls, while the ends of said shaft project outside of the casing-walls, and 45 one of them carries a belt-wheel, *y*, and a cone-pulley, *y'*. The crank-bends *w w* are connected by pitman, *H''*, with pins *w' w'*, projecting from lugs attached to opposite sides of the bottom of the conveyer.

On the outside of the casing a nearly vertical shaft, Y, is mounted in suitable brackets, and carries at its upper end a cone-pulley, *y*, and at its lower end a crank, which is connected by a pitman, H, which passes through a 55 slot in the casing-wall, with a pin projecting from the bottom of the shoe M. The rear end of this shoe is suspended by light rods, having their lower ends loosely pivoted to it, and their upper ends similarly pivoted above to the inner surfaces of the walls of the casing. To the 60 front end of the shoe is rigidly secured an arm, *m''*, which extends forward, and is pivoted to a pin rising from the rearward extension of the fan-casing.

To give motion to the various moving parts 65 of the machine, a belt-wheel, *f*, is fixed upon

one projecting end of the shaft of the hulling-cylinder F, and is to be connected by belt with a suitable motor in the usual manner. Upon 70 the opposite end of this shaft is another belt-wheel, *f'*, connected by belt with a similar wheel, *b*, on the shaft of the thrashing-cylinder B, which has on its other end a belt-wheel connected with another on the projecting end 75 of the forward multiple crank-shaft, the shaft having its other end connected similarly with one end of the fan-shaft, which in turn is at its other end connected with the shaft W, which operates the combined conveyer and seed-separator, and carries the cone-pulley *y'*, 80 which is connected with the cone-pulley *y''* on the upper end of the vertical shaft Y, the lower end of which is connected by crank and pitman with the shaking shoe M.

The direction of motion of the several belts 85 is indicated by arrows.

The operation of the machine is as follows: The clover is fed in through the feed-opening X to the thrashing-cylinder, which thrashes 90 the pods from the hay and discharges the mass of hay and pods upon the open frame of the combined hay-carrier and pod-separator. As the multiple crank-shafts are rotated by their belt-connection with the thrashing-cylinder shaft, the carrier-bars O in rapid suc- 95 cession rise and move rearward and then descend and move forward. On their upward and rearward travel their pins *o* penetrate the mass of hay and pods and carry the same, step by step, toward the rear. At each revolution 100 of the crank-shaft the cams *q' q'* operate in connection with the lugs *q q* of the open frame P and the pins upon which these lugs slide to give the said frame its vertically-oblique reciprocating motion, as before described, 105 and this motion, in connection with the loosening action of the pins of the carrier-bars, results in the separation of the pods from the hay, the former falling through the recesses or notches in the bars *p'' p''*, and between the carrier-bars to the inclined platform E, while the 110 hay is left above, and finally discharged over the rear end of the frame. The upper surface of the carrier-bars and bars *p''* of the open frame are preferably beveled or rounded to 115 facilitate the falling of the pods. The downwardly-projecting pins *o'* of the carrier-bars, on the forward motion of these bars, drag the mass of pods along on the platform E and feed them to the hulling-cylinder, which thoroughly 120 breaks up the pods and hulls out the seed, and as it turns in the direction indicated discharges the mixed mass of seed, hulls, and chaff upon the combined conveyer and seed-separator H. Through the shaft W and pitman *H''* this com- 125 bined conveyer and seed-separator is given a rapid longitudinal and slightly-vertical reciprocating motion, rising as it moves rearward and falling as it returns to the front, the result being that the mixed mass upon its upper sur- 130 face is driven rearward by the abrupt rear edges of the ratchets or inclines *h*, which slip

under the mass upon their forward movement and engage fresh portions thereof, to be in turn driven rearward. The shaking motion of the conveyer causes its load of seed, hulls, and chaff to be agitated and loosened up, so that the former, being heaviest, sinks to the bottom, and, with some of the finer chaff, fall through the holes h' , when they reach the rear portion of the platform, while the hulls are carried on and discharged over the rear end of said platform, and in falling are driven off by the fan-blast. As the seeds fall toward and upon the sieve the blast drives rearward the chaff mixed with them, and the clean seeds pass through the sieve to the bottom of the shoe M, and are by it discharged forward, being under the action of the blast while flowing down the shoe-bottom, so that no chaff or dust can settle among them.

Any suitable spout or conveyer may be arranged to receive the seed as discharged from the shoe, though in my drawings I have not deemed it necessary to show such a device.

The operation of the automatic blast-regulator and the deflector having been already described, I need not further refer to them.

Having now fully described my invention and explained the operation thereof, I wish it to be understood that I do not confine myself to the precise details of construction as set forth in my drawings and specification, but reserve to myself the right to vary the same in any manner to better carry out the principles of my improvement without departing from the true spirit and scope thereof.

I claim as my invention—

1. The combination, with the longitudinally and vertically reciprocating carrier-bars provided with the upwardly and downwardly pro-

jecting pins, of the open frame having longitudinal passages for said carrier-bars to play through, the inclined lugs q q , secured to the under side of the open frame, the friction-rollers upon which said inclined lugs rest, and the cams q^2 q^2 on the cross-shafts, for acting upon the lugs and imparting to the frame an upward and forward movement, and the platform arranged below the carrier-bars, substantially as described.

2. The combination, with the fan and the fan-casing, of the stationary plates provided with openings at the ends of said casing, and with the inwardly-projecting boss or hub, and the swinging plates mounted on the said boss or hub, and provided with openings and with projecting wings to catch the blast, substantially as described.

3. The combination, with the fan and the fan-casing, of the stationary plates provided with the openings, and with the inwardly-projecting boss or hub having the recess for the bearing of the swinging plates, and the swinging plates provided with the openings and wings, and having the knife-edge bearing for resting in the recess of the hub of the stationary plates, substantially as described.

4. The combination of the conveyer, arranged to drop seed upon the sieve, with the sieve, the fan, and the adjustable deflector, consisting of the parallel slats and swinging supports, all adapted to be simultaneously adjusted, so as to direct the blast in parallel lines, but at different angles with respect to the sieve, substantially as described.

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