

J. H. ELWARD.
Thrashing Machine.

No. 234,971.

Patented Nov. 30, 1880.

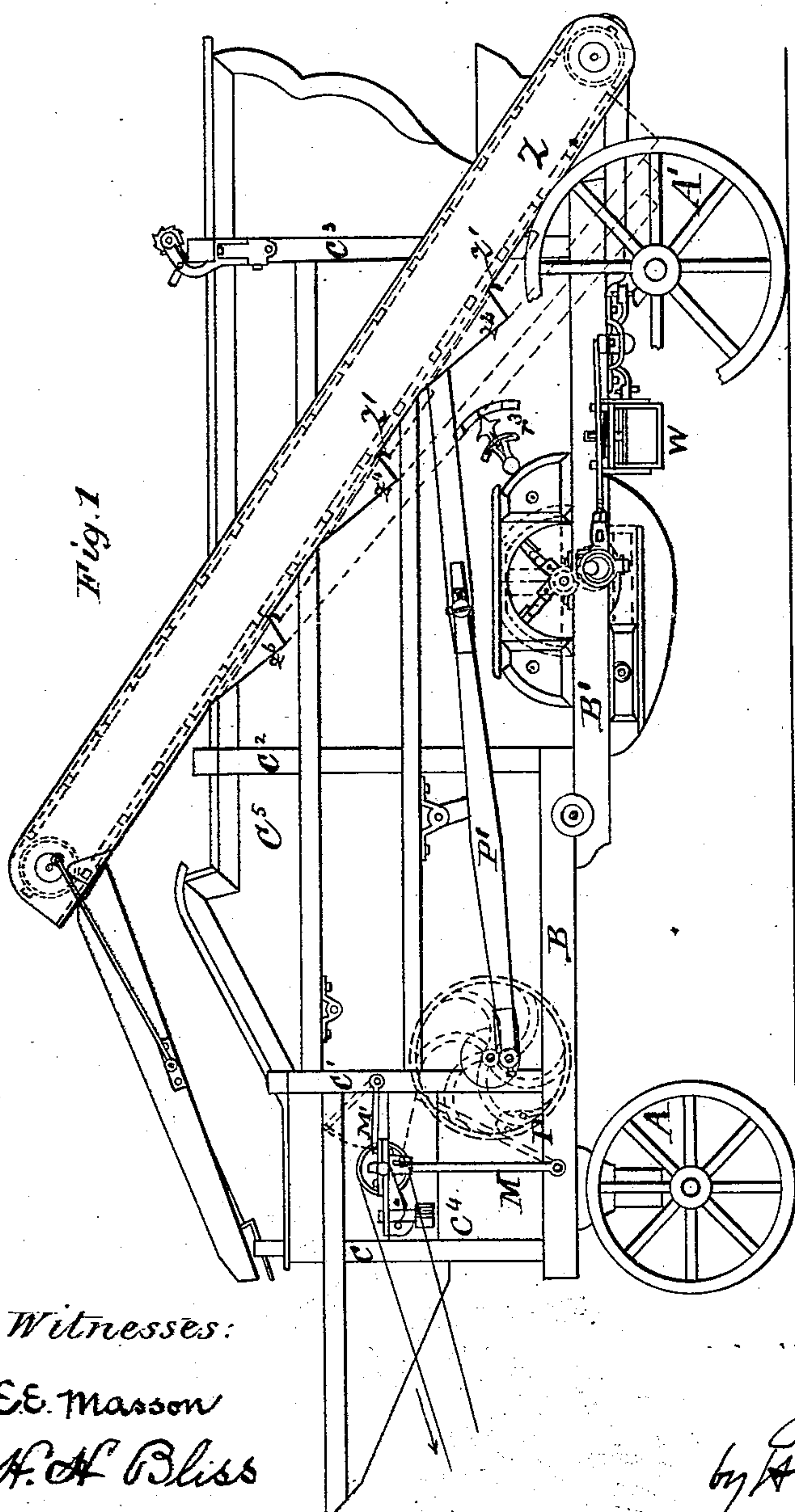


Fig. 1

Witnesses:
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Fig. 6.

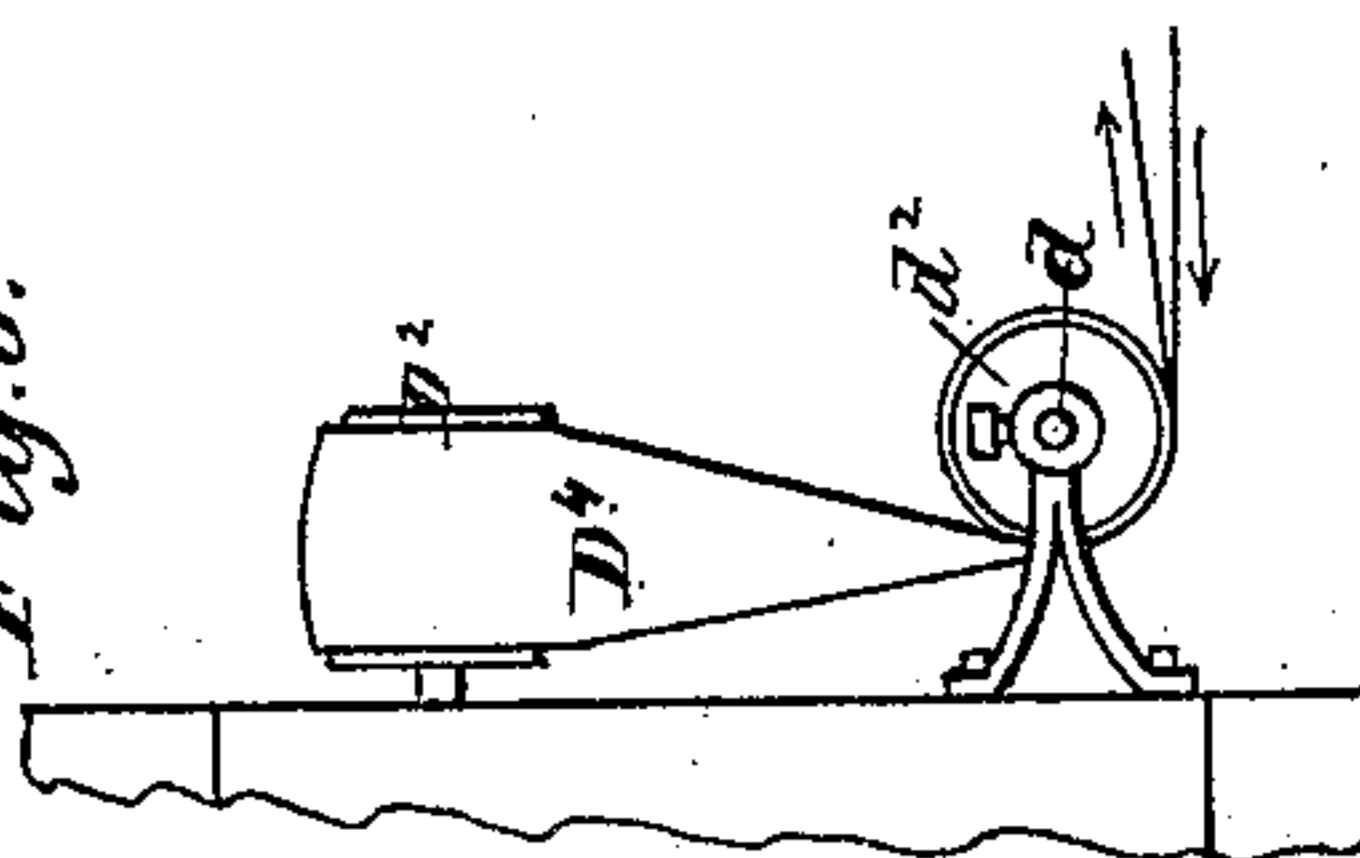


Fig. 5.

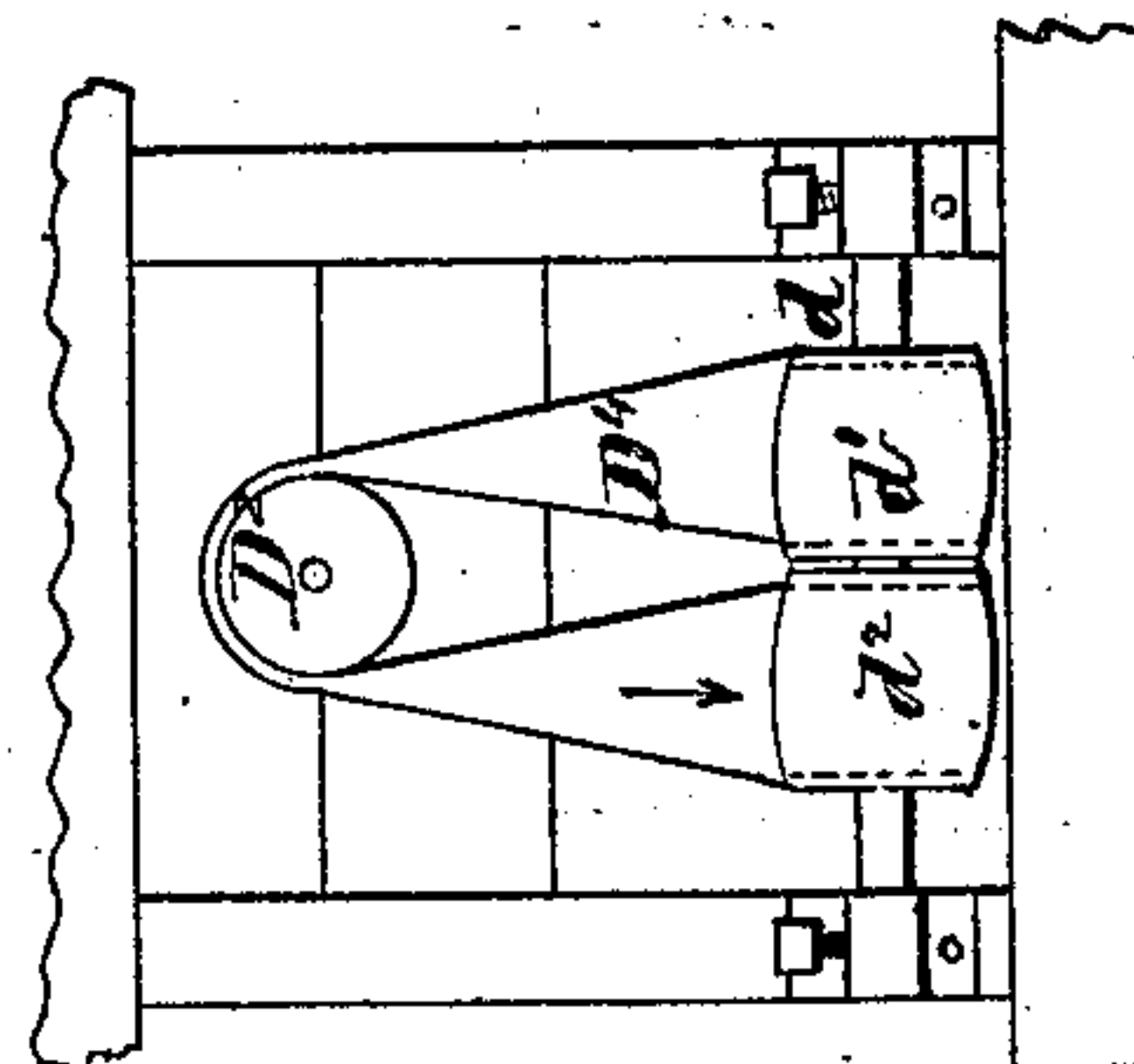
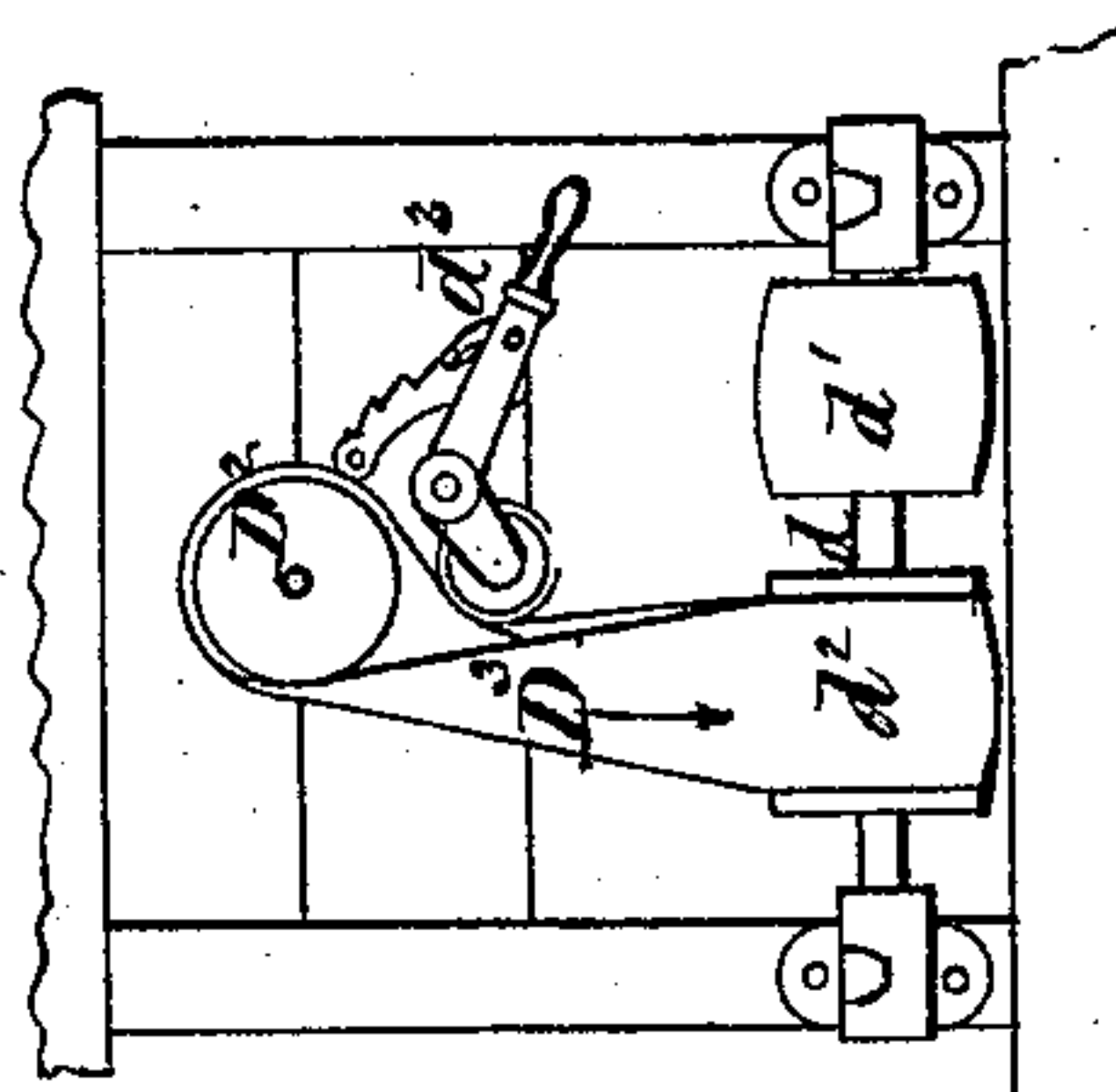


Fig. 4.



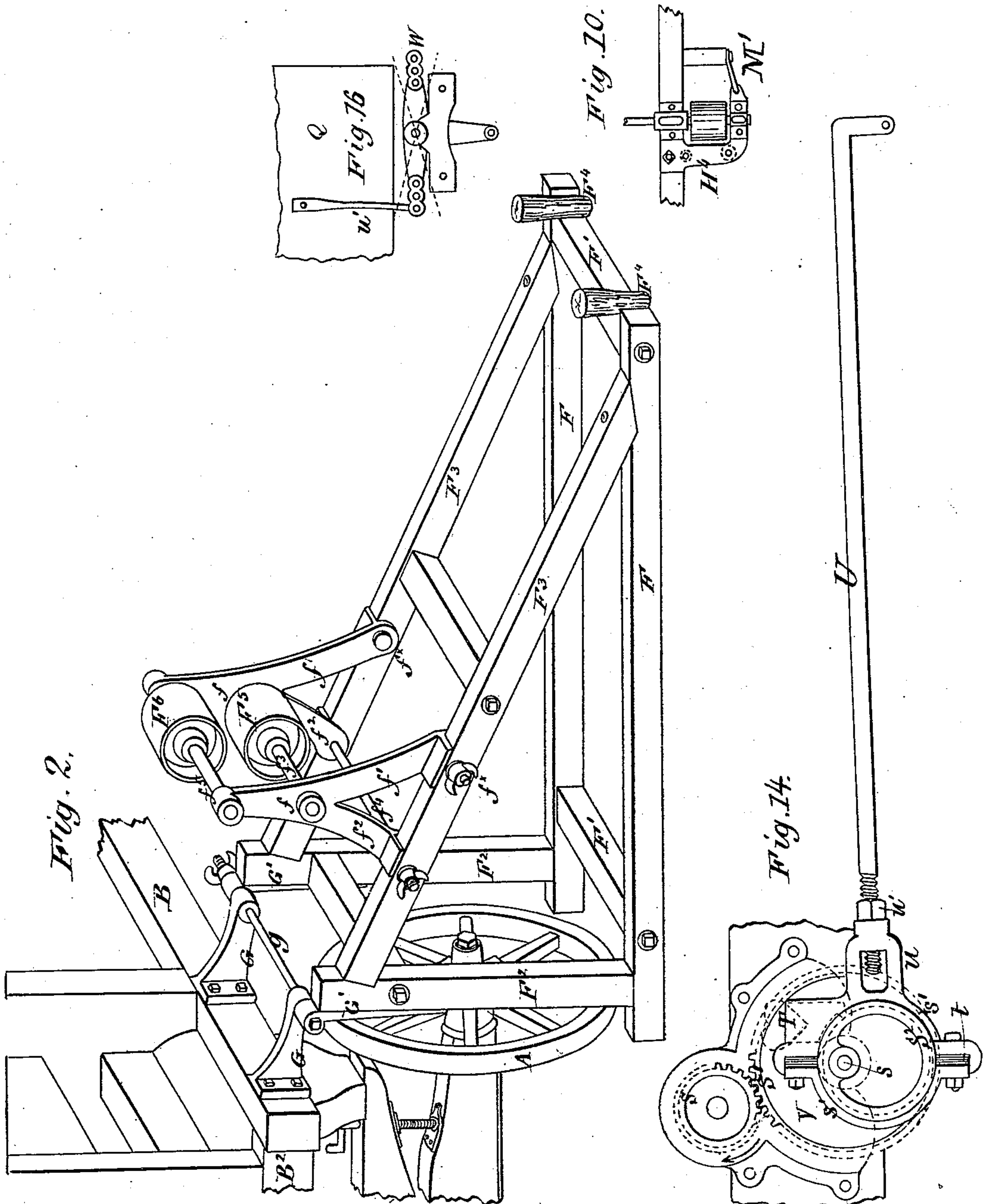
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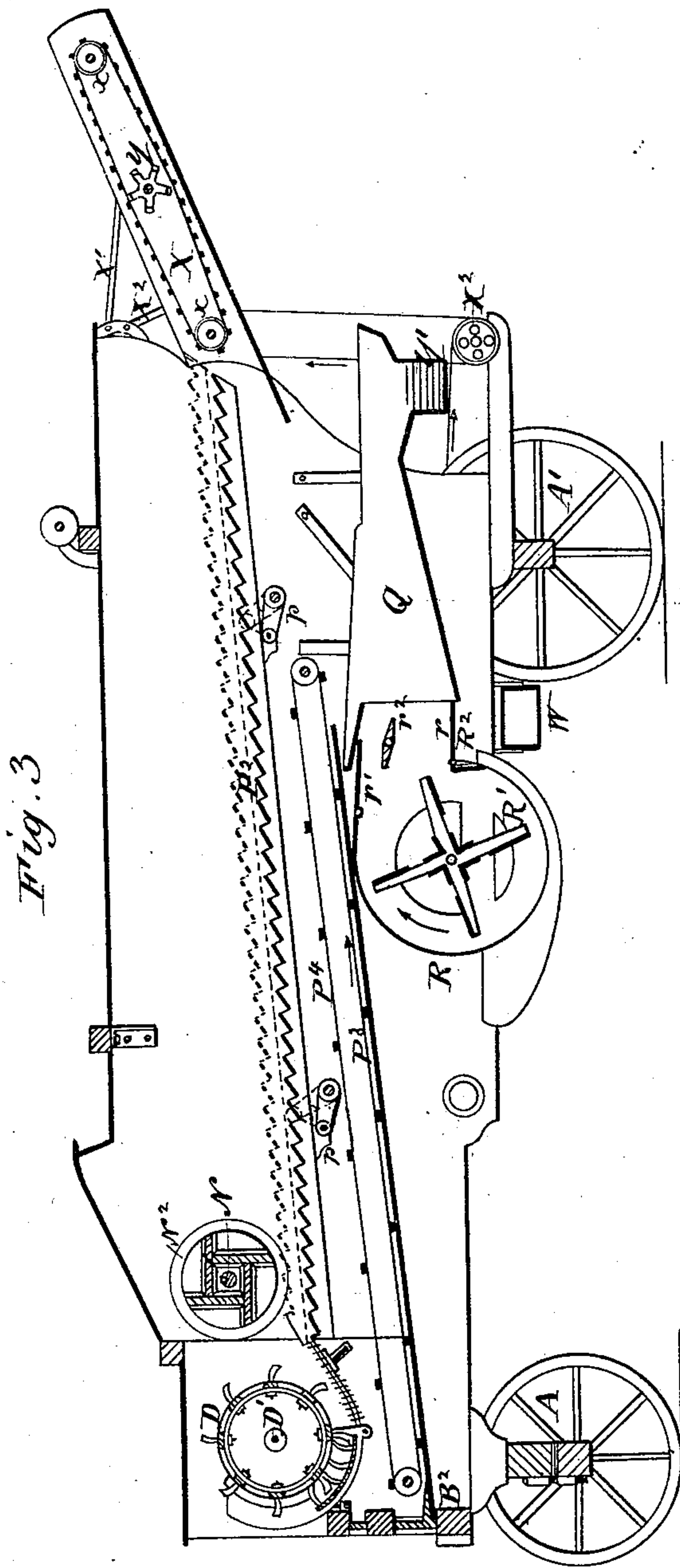
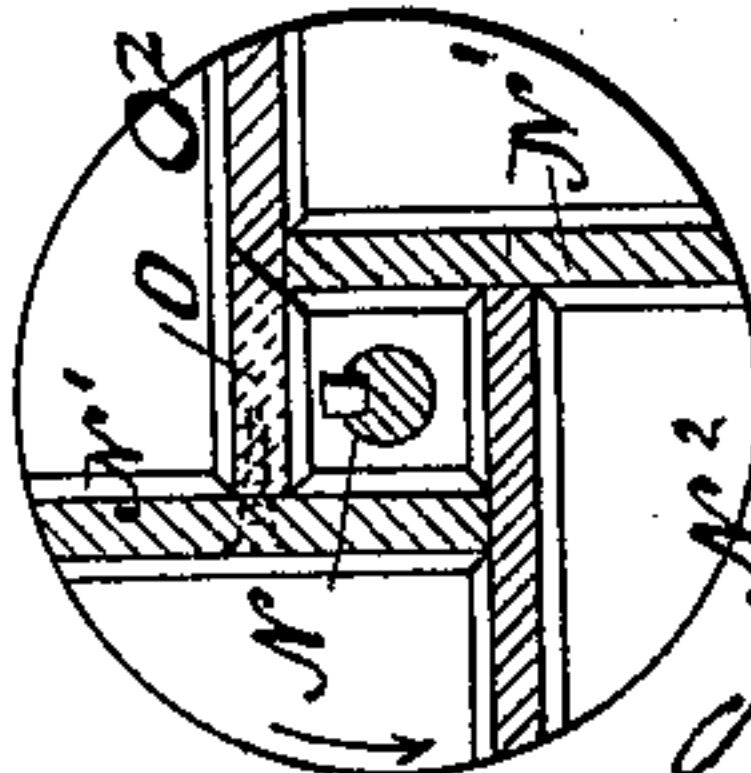


Fig. 12.



Fig. 11.



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Fig. 13.

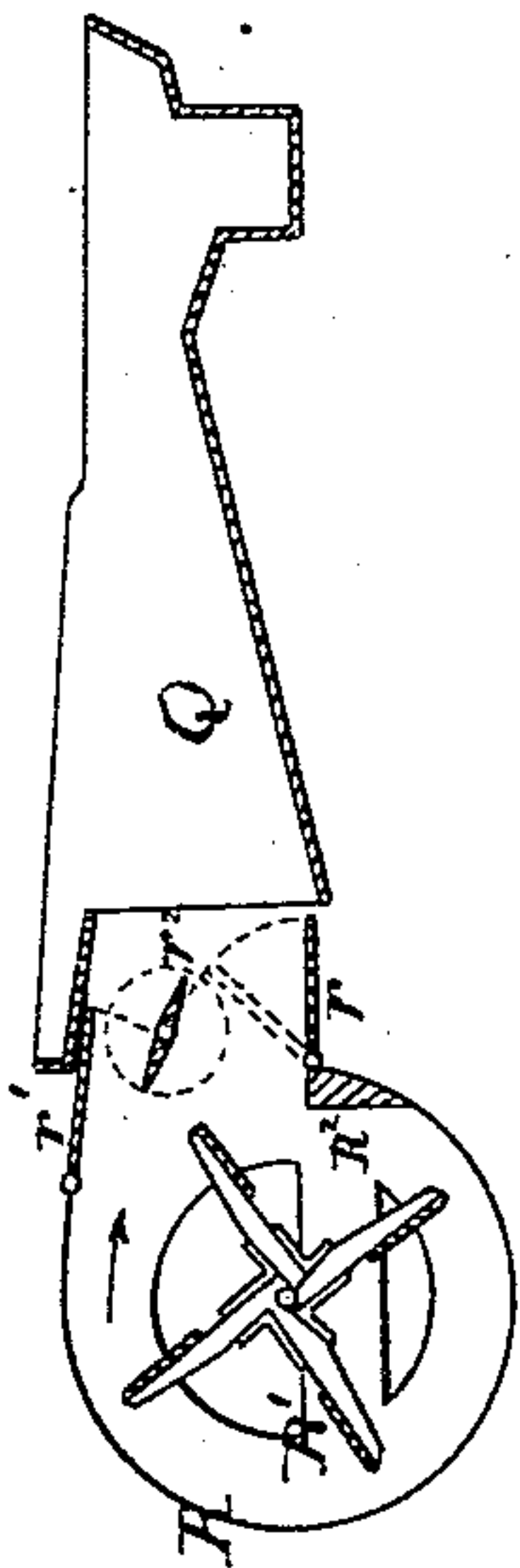


Fig. 9.

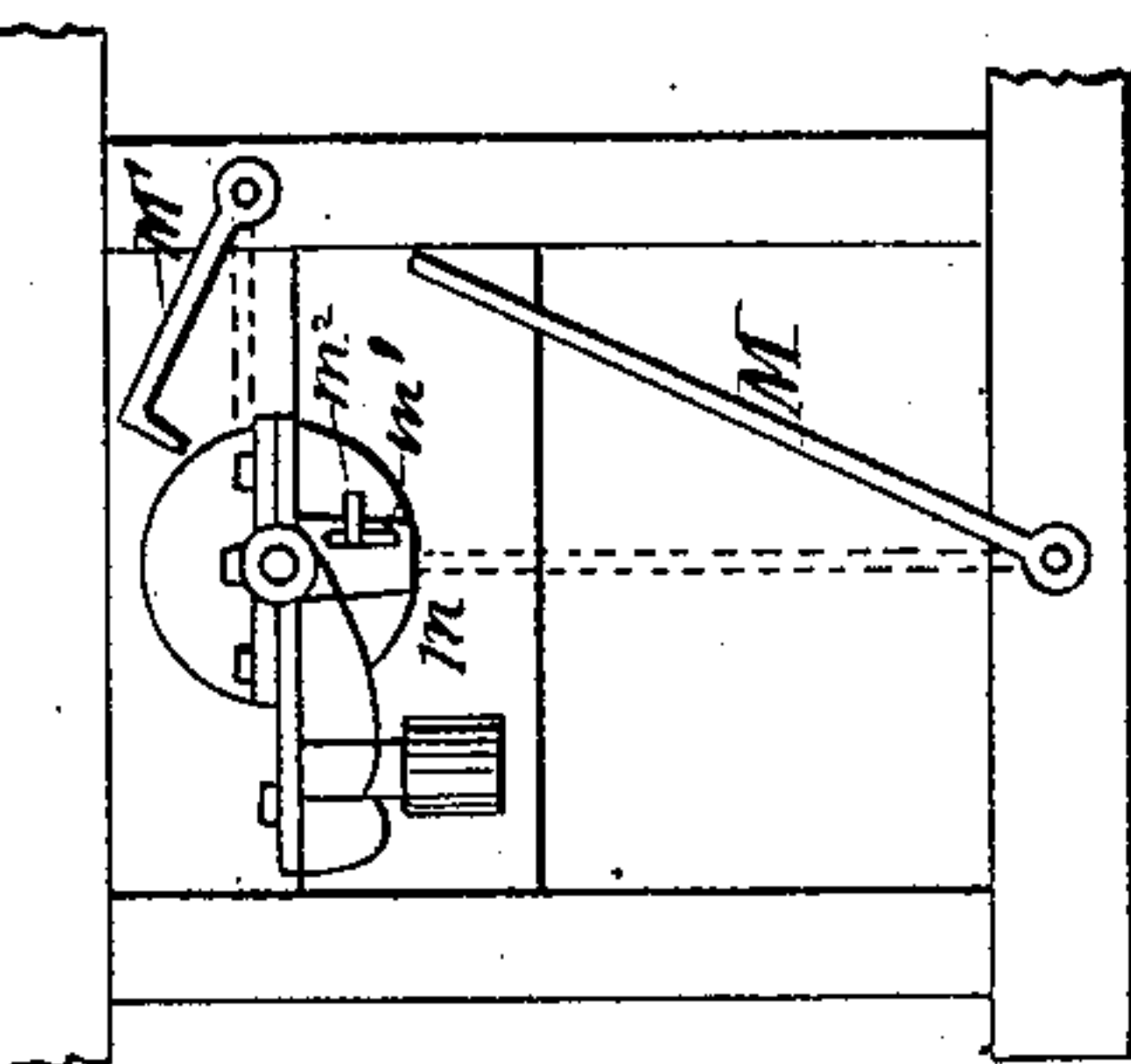


Fig. 17.

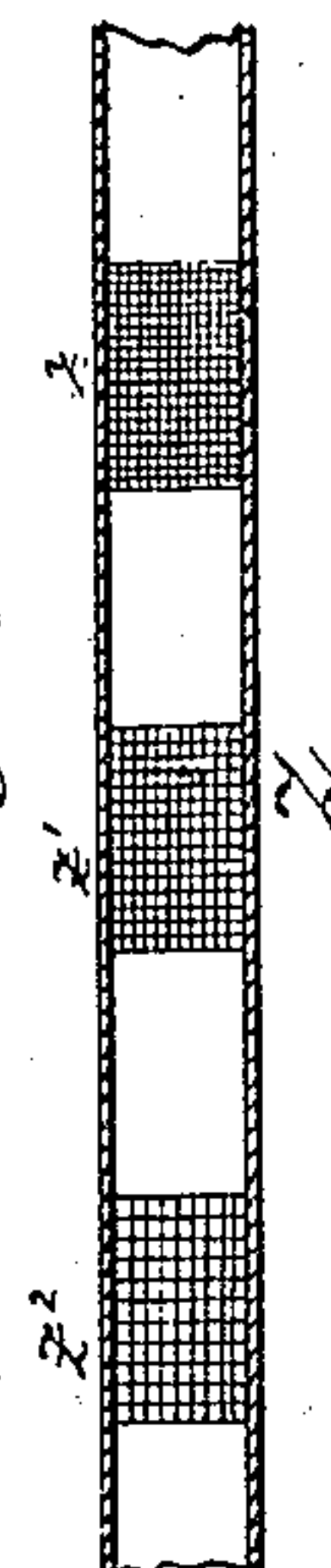


Fig. 15.

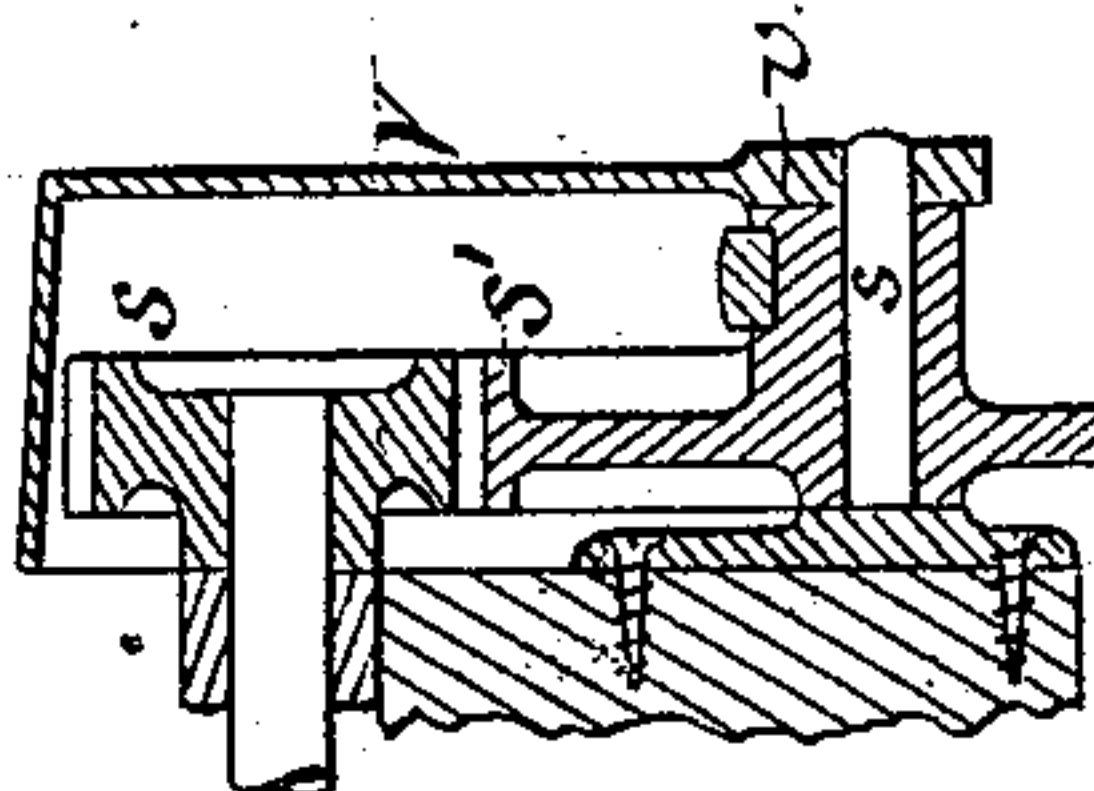


Fig. 8.

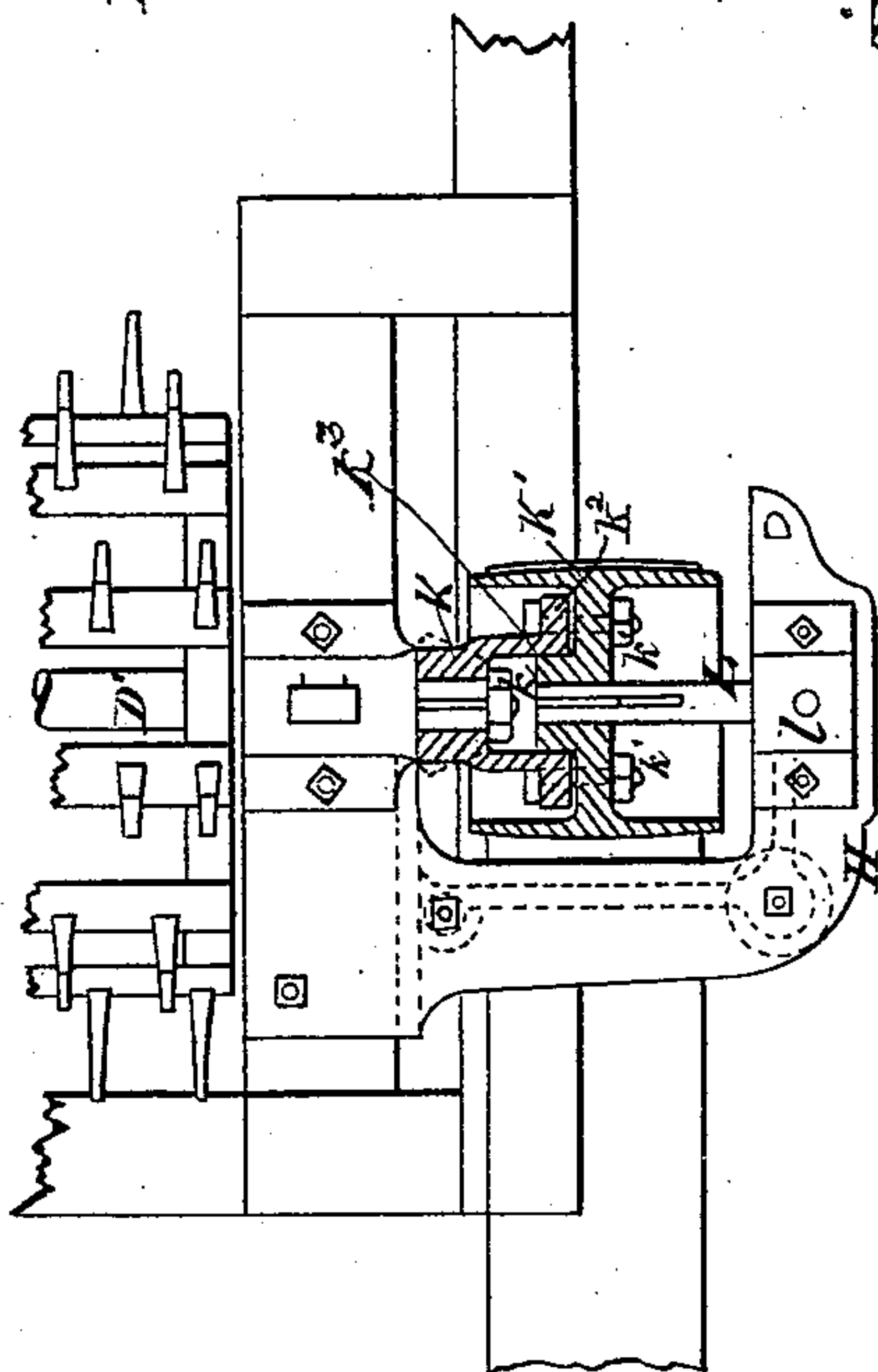
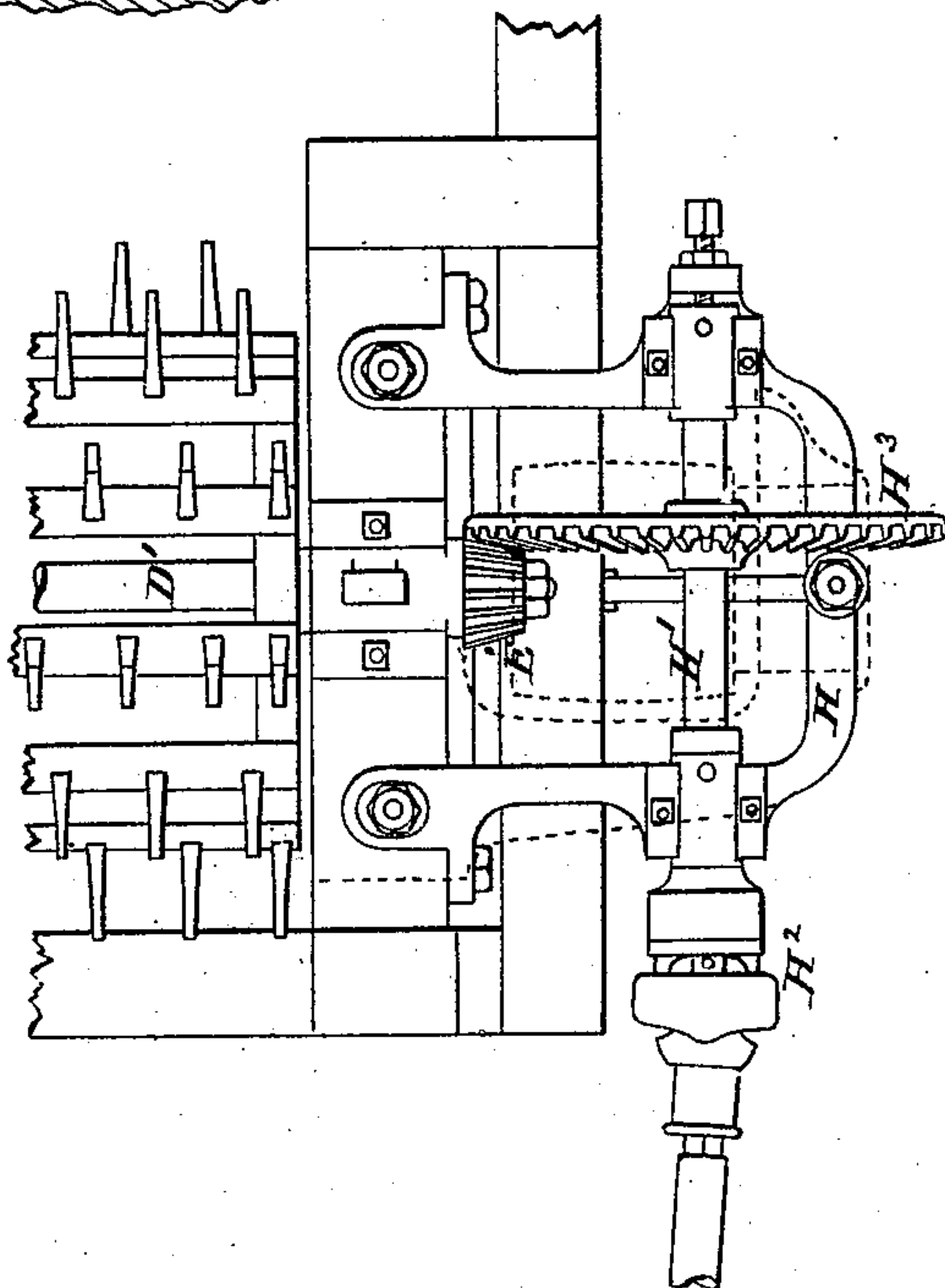


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, OF STILLWATER, MINNESOTA.

THRASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 234,971, dated November 30, 1880.

Application filed November 12, 1878.

To all whom it may concern:

Be it known that I, JOHN H. ELWARD, of the city of Stillwater, in the county of Washington and State of Minnesota, have invented certain new and useful Improvements in Grain-Separators and Thrashing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of my improved thrasher and separator. Fig. 2 is a perspective view of the supporting-jack. Fig. 3 is a vertical longitudinal section of the machine. Fig. 4 is a side elevation of the devices for transmitting power from the engine to the machine. Fig. 5 is a modification of Fig. 4. Fig. 6 is an end view of Fig. 5. Fig. 7 is a plan view of the devices for transmitting motion by means of a tumbling-rod and spur-gearing, part of the machine and cylinder being shown in broken lines. Fig. 8 is a view of the same having the beveled pinion removed from the shaft of the cylinder, and having a sleeve-coupling and a belt-pulley substituted therefor. Fig. 9 is an elevation of the devices employed to support and retain in position the outer end of the cylinder-shaft. Fig. 10 is a top view of the devices shown in Fig. 9. Fig. 11 is a vertical transverse section of the beater. Fig. 12 is a longitudinal section of the beater. Fig. 13 is a vertical section of the fan and fan-case and shoe detached. Fig. 14 is a side elevation of the devices for transmitting motion from the fan-shaft to the shoe and of the casing which surrounds said devices. Fig. 15 is a vertical transverse section of the devices shown in Fig. 14. Fig. 16 is a bottom plan view of the shaker-head of the shoe. Fig. 17 is a partial longitudinal section through the elevator-casing, showing bottom thereof.

In the drawings, A represents the front wheels and A' the rear wheels.

The main frame of the machine and the inclosing-casing are substantially the same as those ordinarily employed in the construction of thrashing and separating machines.

B B' are the longitudinal sills of the main frame, suitably joined by cross-girts B².

C C' C² C³ represent the uprights or standards of the main frame for supporting the thrasher-casing C⁴ and the separator-casing C⁵.

Referring to Figs. 3 and 4, D represents the thrashing-cylinder, constructed in any ordinary or desired manner. D' is the cylinder-shaft, and D² the band-pulley upon its outer end.

d represents a supplemental shaft mounted in suitable bearings attached to the side of the thrasher-frame at right angles to the shaft D' and below it. Upon this shaft d are mounted two belt-pulleys, d' d².

When the engine is placed at the side of the machine the driving-belt from the engine passes around the pulley d', thereby rotating the pulley d², which is connected with the cylinder-pulley D² by means of a supplemental belt, D³, to which is given a quarter-turn, so that the power is applied to the pulley in substantially the same line as it would be if the engine were located directly in front of the machine.

d³ represents a belt-tightener, of any suitable construction, placed so as to bear upon the belt D³, between the pulleys D² and d².

By means of the devices illustrated in Figs. 5 and 6 a single belt from the engine to the machine may be employed to transmit power. In this construction d' d² are idler-pulleys mounted upon shaft d in such manner that the belt D⁴ passes from the engine under the pulley d', over the pulley D², then under pulley d², and back to the engine, as is clearly shown in the aforesaid figures.

When a thrasher is driven by a belt connected to the side of the machine the belt has a tendency to pull the machine over and down on the side to which the power is applied. Hence it is necessary to provide some extra support or stay for the machine at the point where the belt is connected with it.

In Fig. 2 F F represent the sills, F' F' the cross-girts, F² F² the uprights, and F³ F³ inclined braces, of a supplemental frame or supporting-jack, which is placed upon the ground at the front end of the machine, near the cylinder-frame. It is rigidly secured in place by means of stakes F⁴ F⁴ or by other suitable means. This frame is secured to the frame of the machine by means of a hinge constructed of the brackets or hinge-pieces G G, attached

to the thrasher-frame, the corresponding hinge-pieces $G' G'$ secured to the uprights $F^2 F^2$, and the rod g connecting the hinge-pieces $G' G'$. Upon the supplemental frame are
 5 mounted standards $f f$, secured to the braces $F^3 F^3$ by means of pivots f^* passing through the forward legs, f' , of the standards, and by means of a detachable rod, f^4 , passing through the braces $F^3 F^3$ and the rear legs, f^2 , of the
 10 standards.

f^3 is a shaft mounted in the standards $f f$, and carrying an idler-pulley, F^5 . f^5 represents, also, a shaft mounted in the standards $f f$, and carrying another idler-pulley, F^6 .

15 The main drive-belt passes over the pulley F^6 from the engine to the machine, and over pulley F^5 from the machine back to the engine. The pulleys and the frame thus prevent a pulling strain upon the machine from
 20 the weight or the sagging of the belt.

The supplemental frame being rigidly braced against the machine will prevent the pulling of the machine over or down at the point to which the power is applied.

25 When the machine is being transported from place to place the supplemental supporting-frame may be folded up as follows: The rod f^4 is withdrawn from the legs f^2 , the standards $f f$ with the shafts and pulleys mounted therein are laid down upon the frame F^3 , and
 30 the whole frame is then turned up upon the hinges $G' G' g$ against the side of the machine and there secured until it becomes necessary to again support the machine.

35 It is found very desirable to be able to so change machines that were originally constructed for the application of horse-power that steam-power may readily be applied; and for this end I have invented the following de-
 40 vices:

Referring to Figs. 7 and 8, it will be seen that the beveled spur-wheel H^3 meshes with and actuates the beveled pinion E' upon the end of the cylinder-shaft D' , said wheel H^3
 45 being mounted upon the tumbling-rod shaft H' . When it is desired to remove this tumbling-rod gearing, in order to apply steam-power to the machine, the shaft H' , wheel H^3 , and pinion E' are removed, after which a sleeve-coupling, K , is placed upon the end of the cylinder-shaft and keyed and bolted there-
 50 to, as was the pinion E' . Then the belt-pulley K' , which is so constructed that its web becomes part of the coupling, as shown at k , is bolted to the outer end of the sleeve K , as
 55 shown at k' . Within the hub of the pulley a short shaft, L , is then keyed, which extends outward to the box l , upon the arm or bracket-frame H , in which it (said short shaft L) has
 60 bearing.

In order to provide a means of uniting the pulley K' to the sleeve K as securely as possible, I form upon the sleeve K an outwardly-projecting flange, k^2 , and form upon the band-
 65 pulley K' an inwardly-projecting boss, k^3 , which fits tightly within the hollow central part of sleeve K , the flange k^2 being arranged to re-

ceive the bolts k' , which are situated parallel to the axis of the pulley, as shown in Fig. 8.

By means of these devices I am enabled to
 70 readily apply steam-power to a machine which was originally constructed to be operated only by horse-power.

Hitherto, in the construction of machines of this class, it has been customary to support the
 75 outer end of the cylinder-shaft by a brace or frame, made somewhat in U shape. Both ends of this frame were bolted firmly to the frame of the machine, the center of the U frame supporting the outer end of the cylinder-shaft,
 80 there being a brace bolted to the under side of the center of the frame. With this arrangement of parts it was impossible to put on or take off the driving-belt without either unlac-
 85 ing the belt, if a laced belt were employed, or removing two or more of the bolts which retain the supporting-frame to the machine when an endless belt was employed, both of which
 methods are subject to great inconvenience and to great wear and damage of the parts,
 90 as the frequent lacing and unlacing of a belt rapidly wears out the lacings and the lacing-holes in the ends, and the insertion and re-
 moval of bolts into and from the holes in the
 95 wood so enlarge the holes that a rigidity of attachment cannot be preserved between the frame and the machine. The removal of the belt is necessitated by many causes, and espe-
 cially by danger of its being wet by rain or
 100 snow, as wetting of the belt, whether it be made of rubber or leather, causes it to stretch and be rapidly damaged. I have obviated this
 danger by providing devices which permit an
 instant attachment or detachment of the belt
 105 without either lacing or unlacing or removing bolts from their holes.

Referring to Figs. 1, 9, and 10, it will be seen that a frame or solid curved arm, H^4 , is at one end secured to the cylinder-frame.

M is a brace pivoted at its lower end to the
 110 frame of the machine, and adapted to support the outer end of the arm or frame H^4 against downward thrust.

m is a socket in the outer end of the arm H^4 . This socket is open at its lower end, and upon
 115 one side, m' , is a slot cut in the lips of the socket m , along the open side of said socket.

m^2 is a key, fitting in the slot m' , which, when the brace is pushed into place, is dropped
 120 down, as shown in Fig. 1, and locks the brace m firmly beneath the arm H^4 and the outer end of the cylinder-shaft. To prevent the key from accidentally falling out it may be bent
 125 around in such manner as to be held firmly within the slot m' .

M' is a hook pivoted to the frame of the machine and adapted to catch the outer end of the arm H^4 by means of an aperture therein. This guard-hook, when closed down, prevents
 130 the belt from flying off, and relieves the arm H^4 from lateral strain and the cylinder-shaft from binding.

In Fig. 1 I have shown the belt in the position occupied when it is at work, with the

brace M in place and the hook M' closed down. In Fig. 9 I have shown, in full lines, the brace removed and the hook raised up, for the purpose of either putting on or taking off the belt. By this means the belt may be put on or taken off in a moment without removing bolts or lacings.

N represents the shaft of the beater mounted in the separator-casing behind the cylinder and above the separating-table.

N' N' are the blades, secured to the shaft in planes tangential to a cylinder of which the shaft of the beater is the center. When the beater is revolving in the direction indicated by the arrows it will be seen that the tendency of the blades is to throw down and backward the straw with which they come in contact, and that after they have passed the perpendicular below the shaft they will not tend to elevate and wind up the straw, as they would do were they arranged radially from the center.

I prefer to attach the blades to the shaft by means of circular heads N², provided with mortises, into which the ends of the blades are inserted. These heads N² are secured to the shaft by means of keys, which are inserted between the heads and the shaft from the inside of the beater, as shown in Fig. 12.

In order to have ready access to the interior of the beater, I have provided it with peculiar doors, as shown at O O'. They are formed by making a part of one of the blades removable in the two pieces O O', which, when in place, are secured by means of screws o o'. When it is necessary to key or unkey the beater the screws and doors O O' are removed until the attaching or detaching is accomplished, after which the doors are again secured in place. Thus I am enabled to construct a beater and secure it to the shaft without the set-screws ordinarily employed, and without permitting any projections to catch and wind up the straw.

P, Fig. 1, represents a detachable counterbalancing-weight attached to the main belt-wheel of the separating-table. This weight is fastened to one of the spokes of the wheel, and can be adjusted to any desired position, so as to perfectly counterbalance the separating-table and prevent any of the jerking or jarring ordinarily experienced in operating these machines.

P' represents the pitman for operating the separating-table P². The table is suspended upon crank-arms p.

P³ is the grain-table, above which passes the grain rake or apron P⁴.

Q is the shoe, supported in the usual manner upon vibrating hangers, and receives the grain for winnowing.

R represents the fan-casing or drum, having an opening upon the side toward the shoe Q, and provided at the lower edge of said opening with an adjustable blast-board, r, and at the top with a similar adjustable blast-board, r', and having substantially in the center of the opening an adjustable blast-deflector,

r². The blades of the fan R' are made (as is shown in Figs. 3 and 13) considerably less in width than the radius of the casing R.

r³ is a pointer upon the outside of the casing of the separator-machine to indicate the position of the central deflector, r².

S is a pinion secured to the fan-shaft outside of the casing of the machine, meshing with a spur-wheel, S', mounted upon a stud-shaft, s, secured to the outside of the frame. This stud-shaft s is supported at its inner edge by a base-plate, s⁶, with which it is cast, and which is secured to the machine by screws s⁷. Upon the outer face of the spur-gear S' there is secured an eccentric, S².

s' is a strap surrounding the eccentric S², and having a large oil-cup, T, secured to it. The parts of the eccentric-strap are fastened together with bolts having wooden packings t placed between them. The object of this wooden packing is to enable the taking up of any wear that shall occur to the eccentric.

U represents the rod which connects the eccentric with the shaking-head of the shoe. This rod is attached to the eccentric-strap by means of a loop-nut, u, and a jam-nut, u'. By thus combining with the rod U and the eccentric-strap the described loop-nut and the jam-nut the motion of the shoe and the delivery-spout may be adjusted, as the character of said motion will depend upon the distance between the strap and the shaking-head of the shoe. Heretofore, when an eccentric of this nature has been employed to operate the shoe and delivery-spout, the stud-shaft upon which it was mounted has been unsupported at the outer end, making it liable to work loose or to be broken off by the jerks and jars experienced when at work. To remedy this I have made the shield V, shown in Figs 14 and 15. It is secured at both ends to the sills or outside frame of the machine, and it extends around the pinion S, spur-wheel S', and the eccentric S². It is provided with a hole, in which the outer end of the stud-shaft s has a bearing and is supported from downward thrust, the shield thus relieving the stud of all strain and at the same time holding and covering the gear. The shield V is enlarged at v to provide a bearing as strong as possible for the outer end of the stud-shaft s, as is shown in Fig. 15.

W represents the bell-crank lever or shaker-head, by means of which the shoe Q and delivery-spout W are reciprocated, receiving motion from rod U and imparting motion to the shoe through rod U'.

X represents a raddle-belt or tail-rake mounted upon pulleys or rollers x, and supported within a detachable frame, the lower end of which conforms to and is supported against the rear end of the machine, to which it is attached by means of rods X' X². This elevator-rake is actuated by means of the lower pulley, x, which is rotated by means of a belt connected to the stacker-pulley.

Y represents a spider or device having radial arms adapted to agitate the elevating-

rake X. The tailings-spout Y', at the rear end of the shoe, communicates at its lower end with the elevator Z, which returns the tailings to the thrashing-cylinder, as is customary in this class of machines.

In most grain, especially where there are many weeds, there is a great deal of foreign material, which passes to the tailings-elevator, so that it often becomes overloaded and clogged and violently stopped. To remedy this I employ an under-acting elevator—that is, an elevator in which the material is moved up along the lower side of the casing. In this under side of the elevator-box are inserted sieves, of which the first, z , is fine in mesh; the next, z' , somewhat coarser; the third, z'' , coarser still, and so on to any desired number, as shown in Fig. 17. Each of these sieves is provided with a spout running down and back to any desired distance, preferably to the rear of the machine, as shown in dotted lines, Fig. 1. The object of this construction of the elevator and sieves is to permit the withdrawal from the material which is being dragged up of the grass-seed and weed-seed, which will respectively sift through the sieves adapted to permit their passage, and will be thence conveyed down and deposited upon the ground or in suitable receptacles, the whole of which operation will be readily understood by an examination and comparison of Figs. 1 and 17.

If the material which is being operated upon by the machine is not of a character to endanger the clogging and choking of the elevator the sieves described may be closed, and the bottom of the elevator rendered tight by means of the covers or slides Z' Z'.

What I claim is—

1. The combination, with a main frame of a thrashing-machine, of a supplemental supporting-frame hinged thereto and having the horizontal beams F, the vertical beams F², and the inclined braces F³, substantially as set forth.

2. The combination, with the main frame and the cylinder of a thrashing-machine and a detachable supplemental frame hinged to the main frame, of the pulleys F⁵ F⁶, mounted in the detachable frame, substantially as set forth.

3. The combination, with the supplemental supporting-frame F F² F³ and the pulleys F⁵ F⁶, of the standard f , pivoted to the frame, and the detachable rod f^4 , substantially as set forth.

4. In combination with a cylinder-shaft, a

sleeve-coupling and a belt-pulley attached to said sleeve-coupling, substantially as set forth.

5. The combination, with the cylinder-shaft D', of the belt-pulley K', having the inwardly-projecting central boss, k^3 , and the sleeve-coupling K, formed with the laterally-projecting flange k^2 , substantially as and for the purposes set forth.

6. A support for the outer end of the cylinder-shaft, consisting of a horizontal arm secured to but one end of the machine, and having the said shaft mounted in its free end, in combination with a detachable brace pivoted beneath said arm, substantially as set forth.

7. In combination with a vertical brace pivoted beneath the cylinder-shaft, a mounting for the shaft recessed to receive and retain the upper end of said brace, substantially as set forth.

8. The combination, with the cylinder-shaft, of a pivoted hook which retains the belt and relieves the shaft from strain, substantially as set forth.

9. In combination with the drive-pulley, a two-part support for the cylinder-shaft surrounding the pulley, which is separated to permit the removal or attachment of the belt, substantially as set forth.

10. In a thrashing-machine, a revolving straw-beater formed of blades or wings which are arranged to form a closed central chamber, and of which one blade is divided longitudinally and is arranged, substantially as set forth, to be detached from the beater to permit access to said chamber.

11. A revolving straw-beater constructed of wings or blades which are arranged to form a close central chamber, and of which one is constructed with detachable beveled parts O O', substantially as set forth.

12. In a thrashing-machine, the combination, with a reciprocating separator which receives the straw from the cylinder, of an adjustable revolving counterbalancing-weight, substantially as set forth.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

JOHN H. ELWARD.

Witnesses:

H. J. CHAMBERS,
W. S. GOODHUE.