(No Model.) 2 Sheets—Sheet 1.

J. H. HOLMGREEN.

BALING PRESS.

No. 604,324. Patented May 17, 1898.

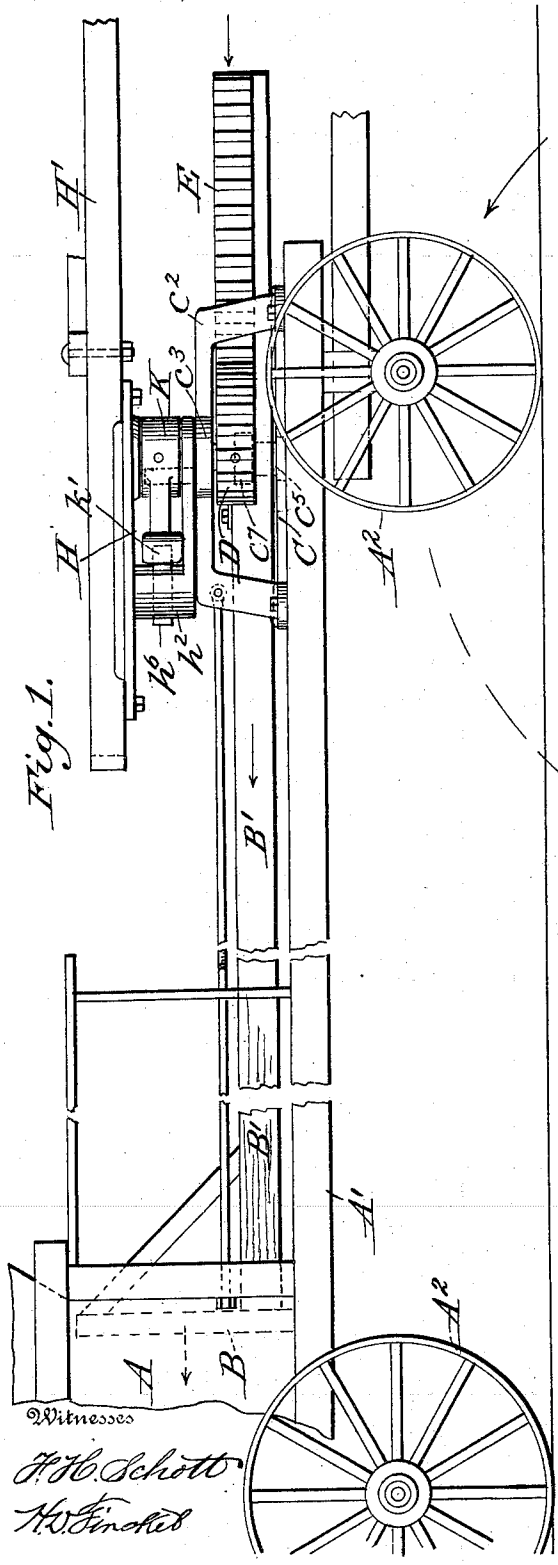


Fig. 1.

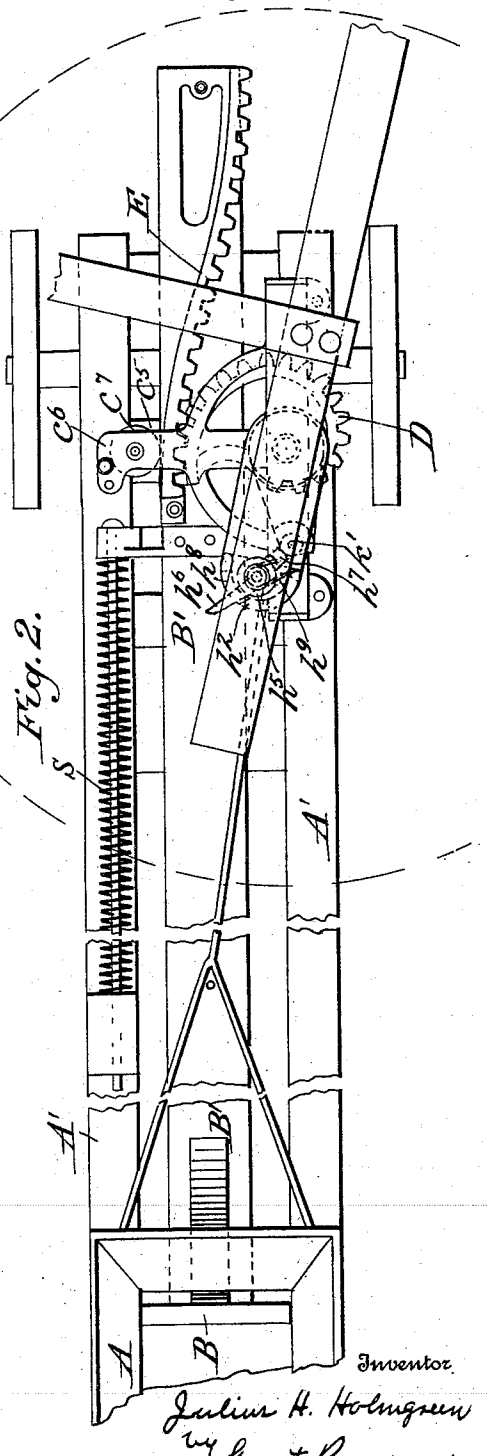


Fig. 2.

Witnesses
H. C. Schott
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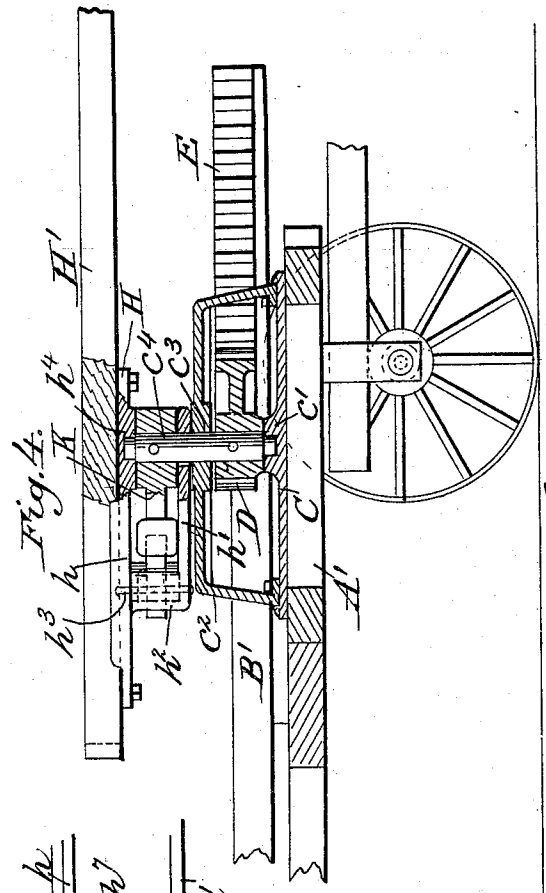
Inventor.
Julius H. Holmgreen
by Grant Burroughs
Attorney

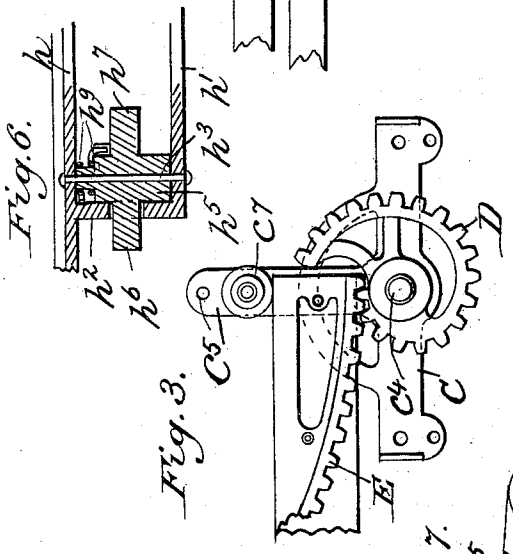
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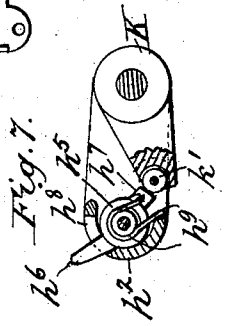
J. H. HOLMGREEN.

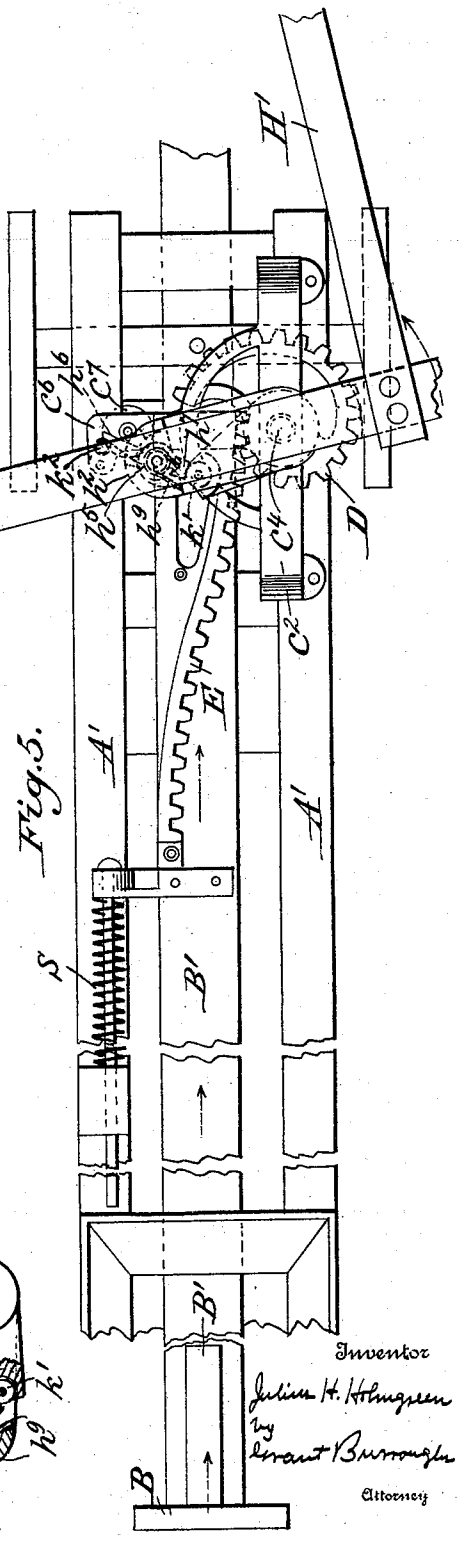
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Witnesses

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UNITED STATES PATENT OFFICE.

JULIUS H. HOLMGREEN, OF SAN ANTONIO, TEXAS.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 604,324, dated May 17, 1898.

Application filed October 4, 1897. Serial No. 654,076. (No model.)

To all whom it may concern:

Be it known that I, JULIUS H. HOLMGREEN, a citizen of the United States, residing at San Antonio, in the county of Bexar, in the State of Texas, have invented certain new and useful Improvements in Baling-Presses, of which the following is a full, clear, and exact description, such as will enable those skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to improvements in baling-presses of that class in which a platen is reciprocated back and forth in a baling-chamber into which the material to be compressed is intermittently fed between the strokes of the platen and the whole mass compressed by successive impacts.

It relates more particularly to improvements in the modulating mechanism whereby the platen is operated and by means of which the platen is moved at a gradually-decreasing rate of speed into the baling-chamber and at the same time with an increasing force.

The invention especially relates to certain improvements in the mechanism for conveying power from an operative means to the plunger carrying the platen.

The invention has for its object the provision of a gear mechanism consisting of a rack in the form of a compound curve and a spiral gear meshing with said rack, constructed so that the gear and rack will always be in engagement, and thereby avoid the breaking of teeth by improper registration, whereby the plunger can have a rigid connection with the platen and be reciprocated in a line parallel with the axis of the baling-chamber, and the provision of a mechanism whereby the driving mechanism can be continuously rotated and from which power can be transmitted to the spiral gear to rotate the latter to a limited extent and to automatically release said gear from the said operative mechanism intermittently to allow the plunger to be withdrawn from the baling-chamber.

The invention consists in the novel construction, combination, and arrangement of parts, such as will be hereinafter fully described, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the accompanying drawings, in which similar letters of reference designate corresponding parts, Figure 1 is a side elevation, broken away in parts, of a baling-press embodying the invention, showing the plunger carrying the platen at the beginning of a stroke. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged detail view showing a plan of the modulating-gear mechanism. Fig. 4 is an enlarged detail view, partly in elevation and partly in section, of the mechanism intermediate of the sweep and the plunger. Fig. 5 is a plan view of the machine, showing the positions of the several parts at the end of a stroke of the plunger. Figs. 6 and 7 are detail sectional views showing the trip-dog.

Referring to the drawings by letter, A designates the baling-chamber, mounted on the base A′, carried by the wheels A^2. As these several parts may be of any construction suitable in the premises and well known in the art, they need not be particularly described.

In the baling-chamber A is mounted the platen B, secured to the plunger B′, by which it is reciprocated back and forth. The plunger has a rigid connection with the platen and moves in a line parallel with the longitudinal axis of the baling-chamber. By having the plunger moving in this way the power is applied directly to the platen and directly against the resistance offered by the material being compressed. Furthermore, as the plunger moves back and forth in the same line there is no liability of it becoming cramped in the baling-chamber, as there would be if the plunger were in the form of a pitman hinged to the platen and provided with an operating mechanism that oscillated the same as the said mechanism moved the said plunger back and forth, and also the depth of the baling-chamber is not limited by the rigid non-oscillating plunger, as it would be if a pitman having considerable oscillation were used, for in the latter instance the pitman could be introduced so far into the baling-chamber as not to come in contact with the sides of the latter.

A mechanism is provided for reciprocating the plunger back and forth in a line parallel

with the axis of the baling-chamber. This mechanism operates to move the plunger quickly, comparatively, at the beginning of the stroke, where the resistance offered by the material being compressed is the least, and to gradually decrease the speed of the stroke as the plunger moves into the chamber and as the resistance increases and at the same time operates to gradually increase the force with which the plunger is moved.

On the end of the base A′ farthest from the baling-chamber is secured the plate C, provided with the socket or bearing c'. Mounted on the plate C and secured thereto in any suitable manner is the frame or support c^2, having a bearing c^3 immediately above and concentric with the bearing or socket c' in the said plate. A shaft c^4 is journaled in the bearing c^3 of the support c^2 and has its reduced lower end seated or journaled in the socket or bearing c' in the plate C.

A gear D is keyed on the shaft c^4 intermediate of the plate C and the support c^2. The formation of this gear is such that the distances between its teeth and its axis gradually vary, so that the said teeth form substantially a volute or spiral curve. This gear meshes with the rack E, mounted on the plunger B′. The said rack is formed on the edge of the plate, secured on the upper face of the plunger in any suitable manner. The outline of the rack is such as to mesh with the gear D and at the same time move the plunger in a straight line. The line followed by the teeth of the rack is substantially a serpentine or compound curve.

A device is provided for holding the rack in mesh with the gear. Between the projection c^5 of the plate C and the projection c^6 of the support c^2 is journaled the roller c^7. The latter bears on the side of the plunger farthest from the gear D, and thereby prevents the movement of the plunger away from said gear.

A mechanism is provided for partly rotating the shaft c^4 and through the intervening gearing for reciprocating the plunger. On the upper end of the shaft c^4 a yoke H is journaled. This yoke consists of the plate h, bolted to the under side of the sweep H′, the plate h', and the intervening casing h^2. The plates and casing are held together by the bolt h^3 passing through them. The yoke is free to rotate on the shaft c^4 and is carried around the latter by the sweep H′. The plate h' rests on the support c^2, and the plate h has formed in its under face a socket or bearing h^4, in which is journaled or seated the upper reduced end of the shaft c^4. In the casing h^2 a trip-dog is mounted and is retained therein by the bolt h^3. The trip-dog consists of the cylindrical portion h^5, from which projects the trip h^6 and the dog h^7 in opposite directions. The trip h^6 extends through an opening h^8 in the casing and projects to a considerable distance beyond the latter. The dog h^7 projects inwardly from the casing and in advance of the yoke. The trip-dog is held in its normal position by the spring h^9.

A driver K is mounted between the plates h and h' of the yoke and is keyed on the shaft c^4. The length of the driver is such to allow it to pass through the yoke. In a recess formed in the outer end of the driver a roller k' is journaled. The roller is carried in such a position by the driver as to be engaged by the dog h^7 when the yoke is moved by the sweep. To disengage the dog from the driver, a pin k^2 is mounted on the extension c^6 of the support c^2. Against this pin the trip h^6 strikes and throws the dog h^7 out of engagement with the roller k', and thereby releases the yoke from the driver.

The operation of the device is as follows: The sweep H′ is moved in the direction indicated by the arrow in Fig. 2. As the yoke H is secured to the said sweep it is rotated on the shaft c^4. In its rotation on the shaft the dog h^7, carried by the said yoke, engages with the roller k' and thereby moves the driver K with the yoke. As the driver K is keyed on the shaft c^4, the latter is also rotated. This rotation of the shaft c^4 also rotates the spiral or volute gear D, also keyed on the said shaft. As the spiral gear is rotated through its engagement with the rack E the plunger is forced into the baling-chamber. The relative arrangement of the spiral gear and the curved rack E is such that the teeth farthest from the axis of the spiral gear engage with the rack first. This engagement takes place when the plunger is at the beginning of its forward stroke and when the material in the baling-chamber is the least compressed and when the resistance to the movement of the platen is also the least. The first movement of the plunger is the quickest, comparatively, as the gear-teeth then operating move in longer arcs of circles having longer diameters than those nearer the axis of the gear. It is to be observed that the plunger has less force at the beginning of the stroke, owing to the comparatively longer leverage of the gear-teeth then in engagement. This comparatively lacking of force with which the plunger acts at the beginning of its stroke is compensated for by its comparatively quick movement. As the material offers its least resistance at the first part of the stroke, the forward movement of the platen will not be resisted to the same extent as it will be as the plunger advances into the baling-chamber. As the rotation of the spiral gear continues, the teeth, moving in arcs of gradually-decreasing lengths in circles of gradually-lessening diameters, engage with the rack. Consequently the forward movement of the plunger gradually becomes slower, and as the leverage between the gear and the rack decreases the force with which the plunger acts gradually increases. This increase of force is met by the gradual increase in the resistance offered by the material being compressed.

In this way a plunger-operating device is secured in which the resistance to the movement of the sweep is comparatively regular. As the driver K, engaged with the yoke H by the trip-dog, moves with the yoke until the plunger reaches the end of its forward stroke, the trip h^6 strikes the pin k^2 and disengages the dog h^7 from the said driver and releases the latter from the yoke. The plunger is forced back to its original position by the elasticity of the material being compressed and the spring S. As the rack always engages with the spiral gear and as the shaft on which the latter is keyed is free, the said gear will also be returned to its original position and in readiness for another forward movement of the plunger.

It is to be observed that the rack and spiral gear are always in engagement and always in their proper relative positions. This obviates the difficulty which would be involved in securing a proper registration of the two parts if they should be separated at the end of each stroke. This preserves the teeth from being broken by improper registration.

The herein-described embodiment of the invention is the preferred one, yet it can be departed from to a considerable extent without departing from the spirit of the invention.

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

1. In a baling-press, the combination of a platen, a plunger connected with said platen, a rack mounted on said plunger, a rotatable shaft, a gear fixed on said shaft and engaging with said rack, a yoke journaled at its open end on said shaft, means for rotating said yoke on said shaft, a driver fixed on said shaft between the forks of said yoke and adapted to move clear of the yoke, a dog pivoted in the bifurcation of said yoke for enaging with said driver, and a trip for disengaging said dog from said driver.

2. In a baling-press, the combination of a platen, a plunger connected with said platen, a rack mounted on said plunger, a rotatable shaft, a gear fixed on said shaft and engaging with said rack, a yoke having its forks connected by a casing journaled at its open end on said shaft, means for rotating said yoke on said shaft, a driver fixed on said shaft between the forks of said yoke and adapted to move clear of said casing, a dog pivoted in said casing and adapted to engage with said driver, and a trip for disengaging said dog from said driver.

3. In a baling-press, the combination of a platen, a plunger rigidly connected with said platen and moving in a line parallel with the axis of the baling-chamber, a rack mounted on said plunger and having its teeth following a line in the form of a compound curve, a rotatable shaft, a spiral gear secured on said shaft and in continuous engagement with said rack, a yoke journaled at its open end on said shaft, means for rotating said yoke on said shaft, a driver fixed on said shaft between the forks of said yoke and adapted to move clear of the yoke, a dog pivoted in the bifurcation of said yoke for engaging with said driver, and a trip for disengaging said dog from said driver.

4. In a baling-press, the combination of a platen, a plunger rigidly connected with said platen and moving in a line parallel with the axis of the baling-chamber, a rack mounted on said plunger and having its teeth following a line in the form of a compound curve, a rotatable shaft, a spiral gear secured on said shaft and in continuous engagement with said rack, a yoke having its forks connected by a casing and journaled at its open end on said shaft, means for rotating said yoke on said shaft, a driver fixed on said shaft between the forks of said yoke and adapted to move clear of said casing, a dog pivoted in the said casing and adapted to engage with said driver, and a trip for disengaging said dog from said driver.

5. In a baling-press, the combination of a platen, a plunger connected with said platen, a rack mounted on said plunger, a plate provided with a bearing, a shaft journaled at an end in said bearing, a gear fixed on said shaft and engaging with said rack, a roller-bearing on said plunger for holding said rack and said gear in engagement, a yoke having its forks connected by a casing and journaled at its open end on said shaft, means for rotating said yoke on said shaft, a driver fixed on said shaft between the forks of said yoke and adapted to move clear of said casing, a roller journaled in the outer end of said driver, a dog pivoted in said casing and adapted to engage with the roller carried by the driver, and a trip for disengaging said dog from said roller.

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

JULIUS H. HOLMGREEN.

Witnesses:

H. C. SCHUMACHER,

ALBERT W. BITTER.