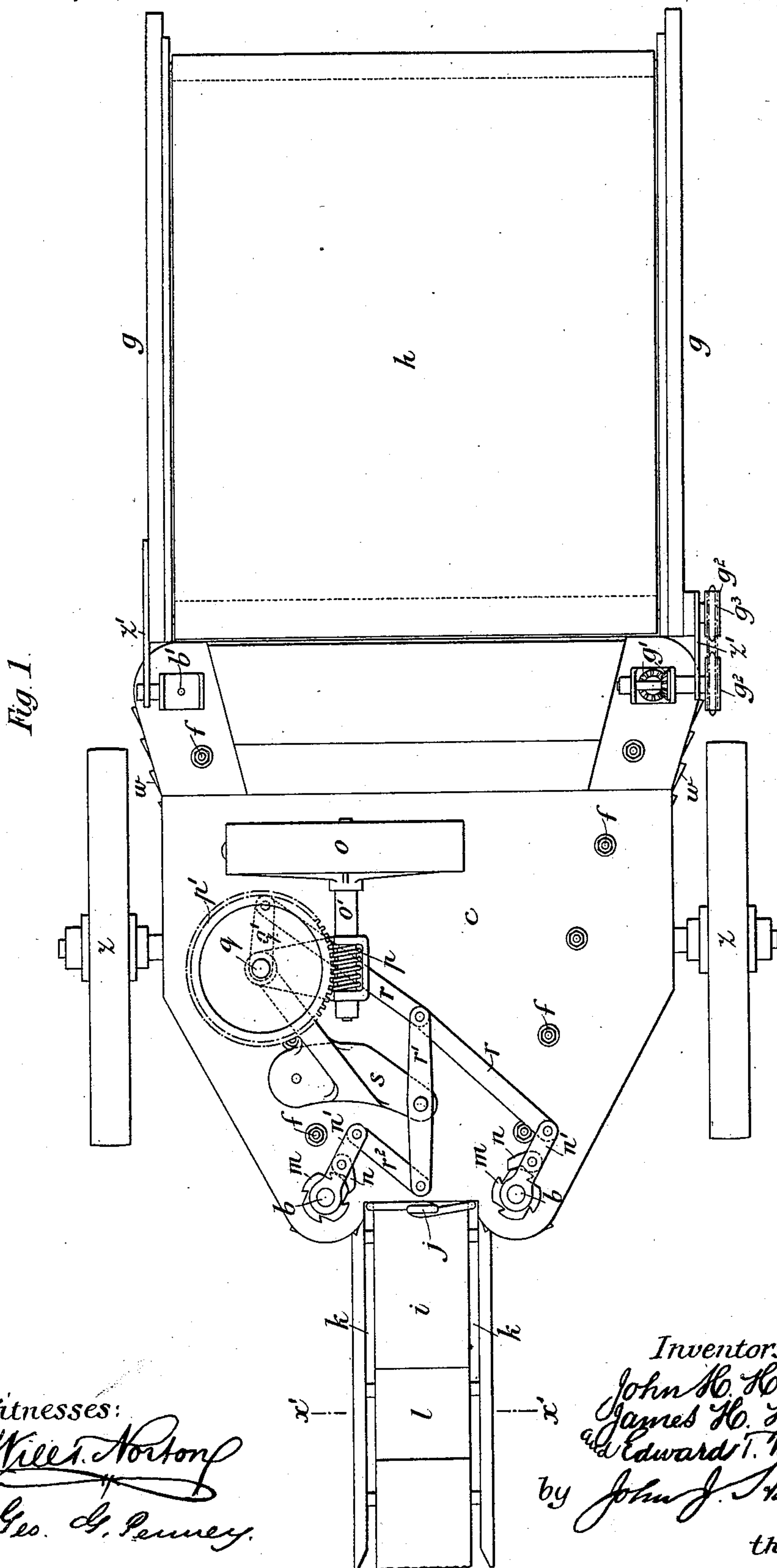


4 Sheets—Sheet 1.

No. 404,972.

Patented June 11, 1889.



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Inventors:

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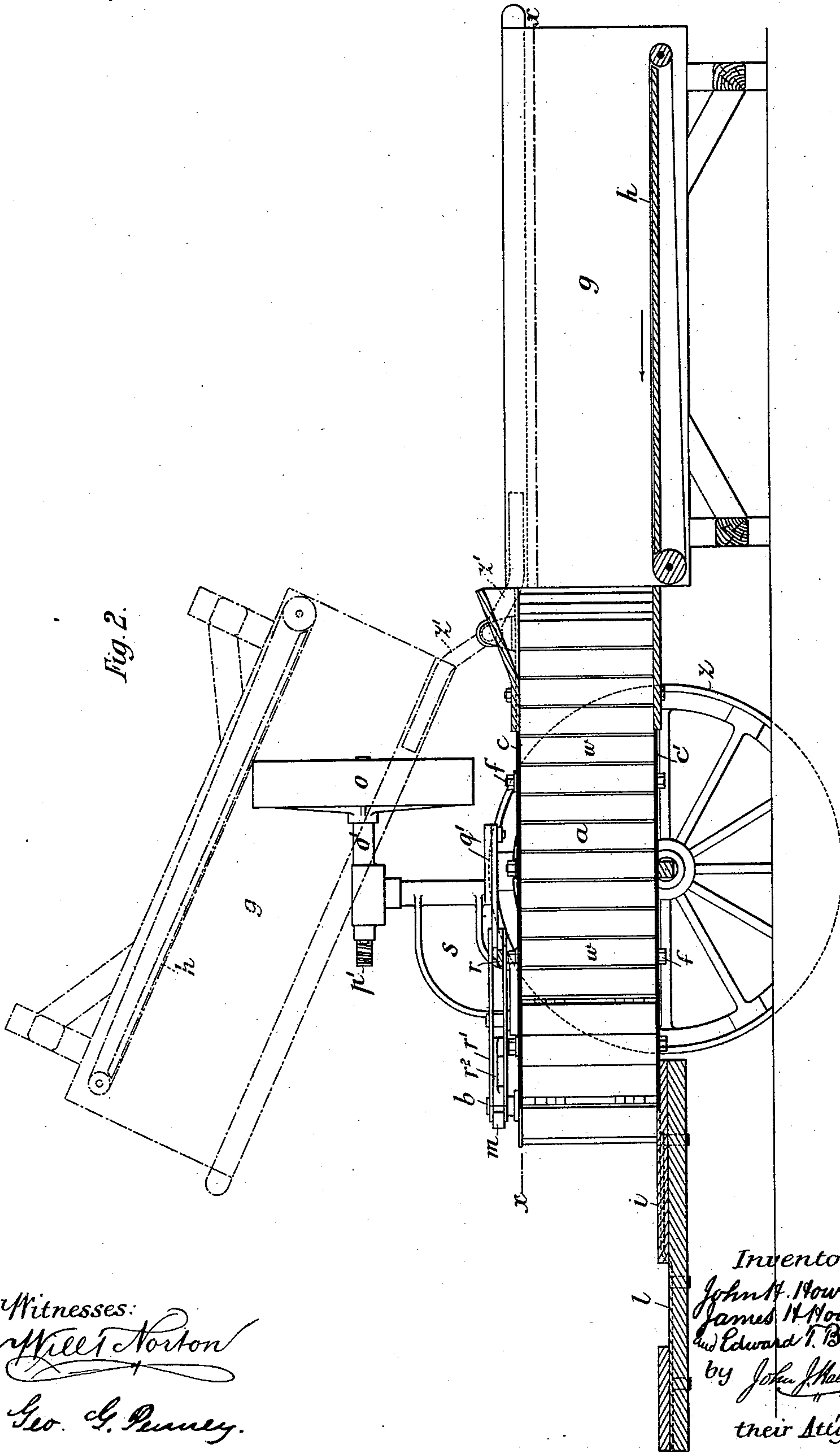
(No Model.)

4 Sheets—Sheet 2.

JOHN H. HOWARD, JAMES H. HOWARD & E. T. BOUSFIELD.
BALING PRESS.

No. 404,972.

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4 Sheets—Sheet 3.

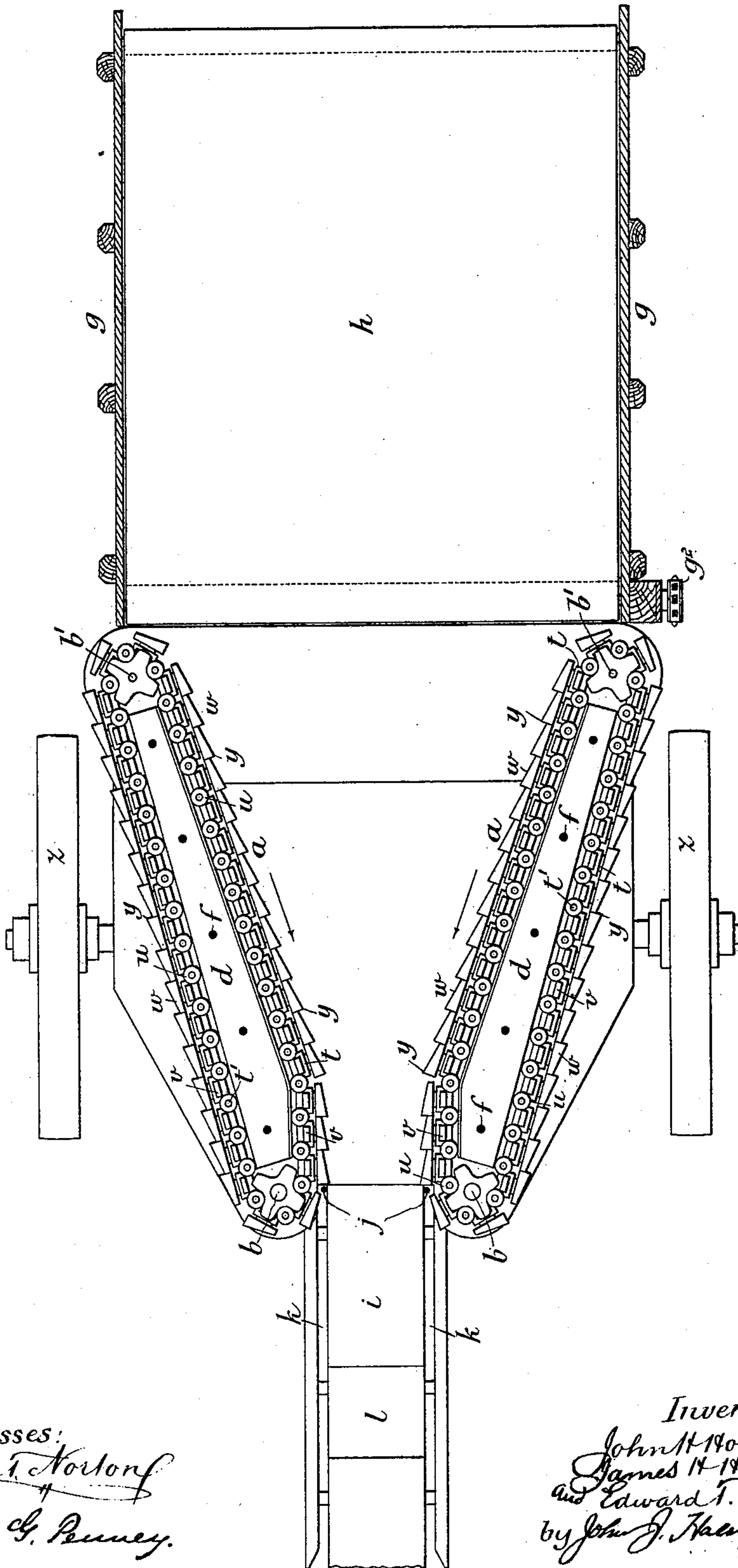
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Fig 3



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(No Model.)

4 Sheets—Sheet 4.

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BALING PRESS.

No. 404,972.

Patented June 11, 1889.

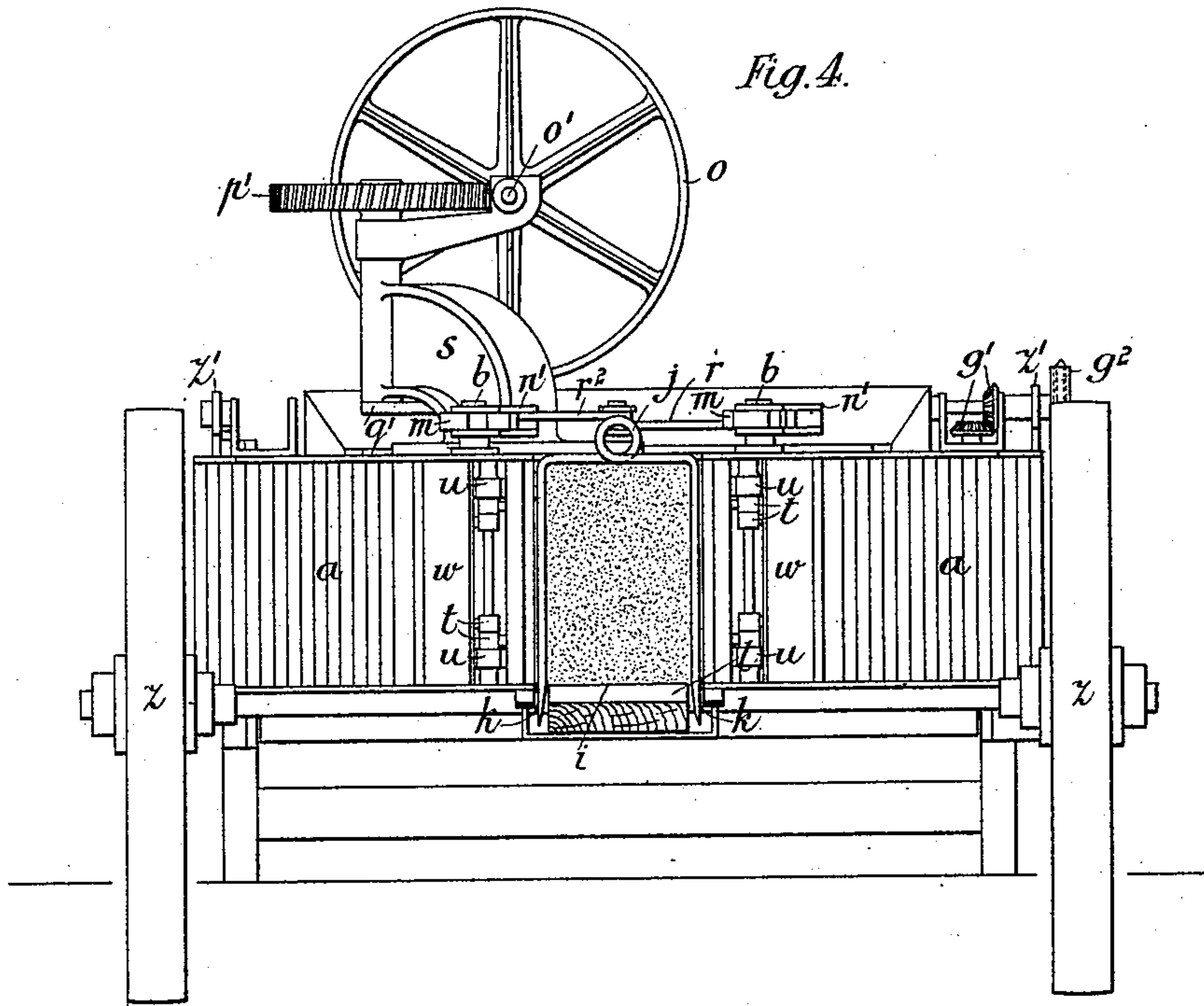


Fig. 4.

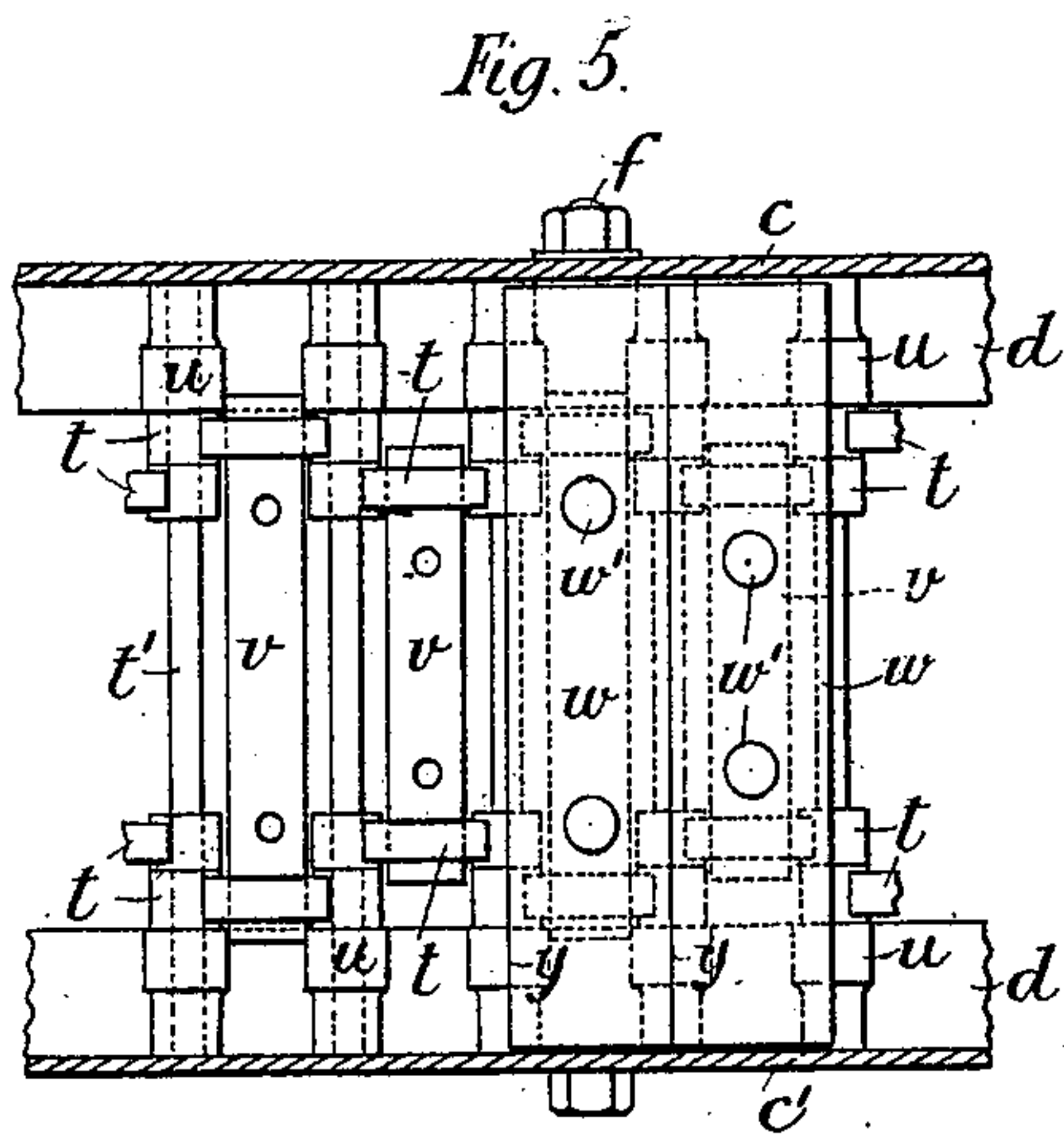


Fig. 5.

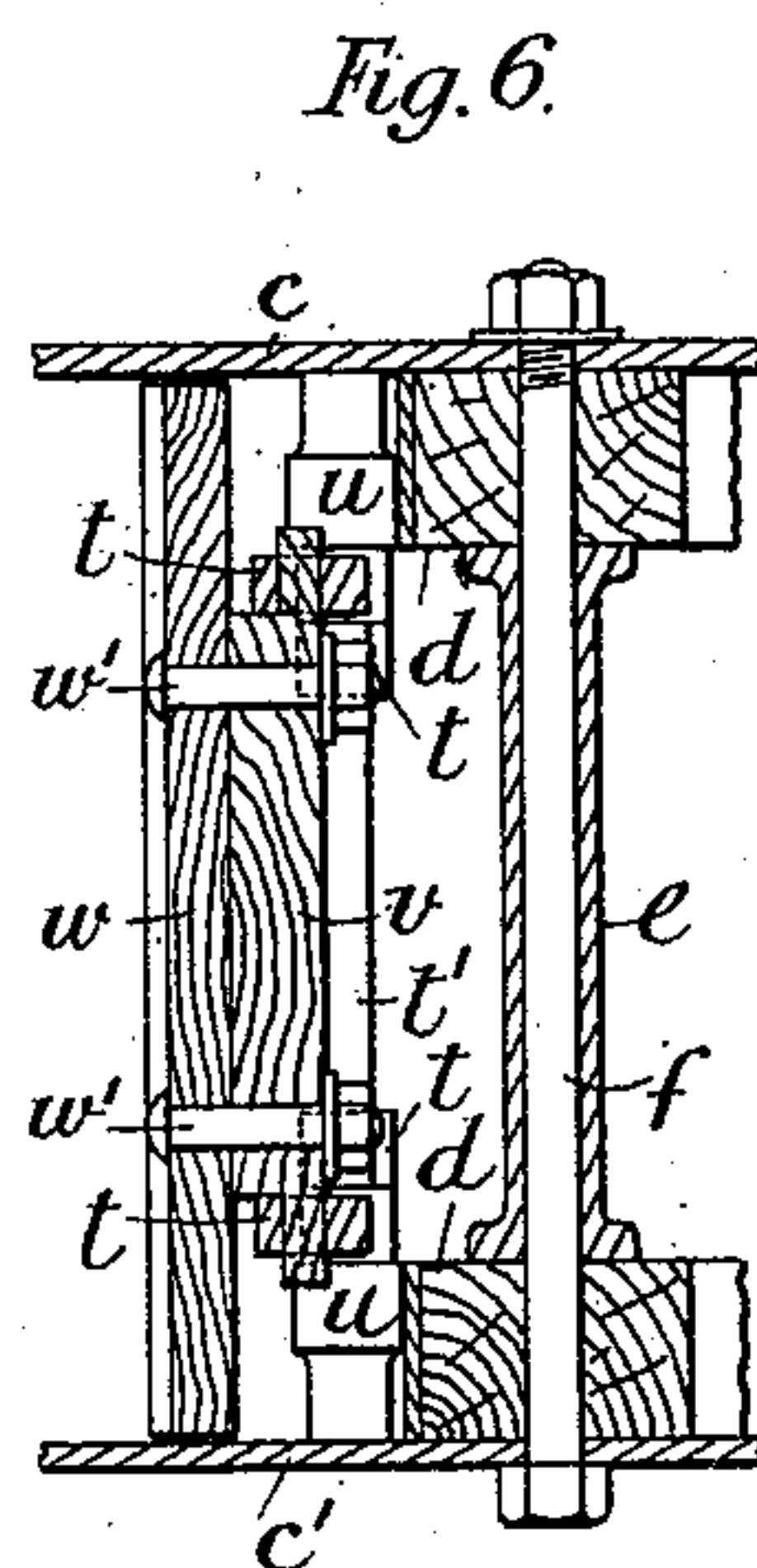


Fig. 6.

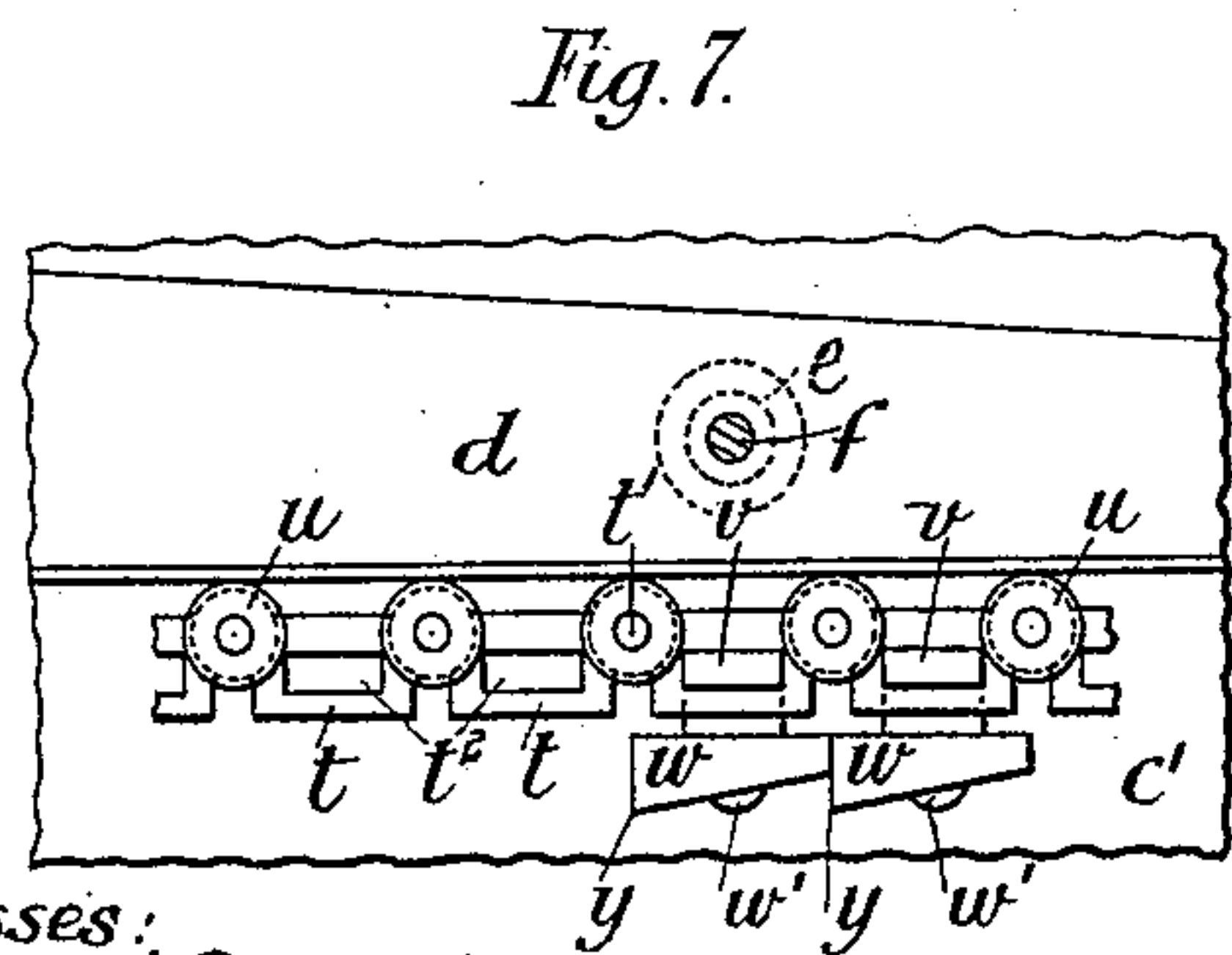


Fig. 7.

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Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHN HOWARD HOWARD, JAMES HAROLD HOWARD, AND EDWARD TENNEY
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BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 404,972, dated June 11, 1889.

Application filed July 18, 1888. Serial No. 280,267. (No model.) Patented in France July 2, 1888, No. 191,561; in Belgium July 6, 1888, No. 82,463; in New South Wales August 20, 1888, No. 879; in Italy September 30, 1888, XXII, 23,799, XLVII, 134, and in Canada October 10, 1888, No. 29,965.

To all whom it may concern:

Be it known that we, JOHN HOWARD HOWARD, JAMES HAROLD HOWARD, and EDWARD TENNEY BOUSFIELD, subjects of the Queen of Great Britain, residing at Bedford, England, have invented new and useful Improvements Relating to the Baling of Hay, Straw, and other Materials, and to Apparatus Therefor, (patented in Canada, No. 29,965, dated October 10, 1888; France, No. 191,561, dated July 2, 1888; Belgium, No. 82,463, dated July 6, 1888; New South Wales, No. 879, dated August 20, 1888; Italy, Nos. XXII, 23,799, and XLVII, 134, dated September 30, 1888,) of which the following is a specification.

Our invention relates to an improved special construction of apparatus for baling hay, straw, and other materials, which machine or apparatus is also adapted to deliver the material to be baled in a continuous strip.

By our invention we obtain the required compression, simply and expeditiously, by passing the material to be baled between endless belts (hereinafter described and termed "platens") inclined toward each other from the end where the material is fed into the apparatus to the mouth or outlet through which the compressed material is discharged or between a series of pairs of rollers, the rollers of each succeeding pair of which are closer together than the rollers of the preceding pair.

In the accompanying drawings, Figure 1 is a plan of a baling-machine constructed according to our invention. Fig. 2 is a central longitudinal vertical section of the same; and Fig. 3 is a horizontal section on the line $x x$, Fig. 2. Fig. 4 is a transverse section on the line $x' x'$, Fig. 1. Figs. 5, 6, and 7 are sectional views, drawn to an enlarged scale, illustrating the construction of the platens; and Fig. 8 is a view of a detail.

$a a$ are the two platens, which are mounted upon sprocket-wheels on the vertical shafts $b b'$, and $c c'$ are two plates which are placed immediately above and below the said platens, and which, with the latter, constitute a kind of box or chamber wherein the compression of the material is effected. The said

plates also carry or have formed in them bearings, in which the shafts $b b'$ are journaled. Each plate may be composed wholly of wood or metal; but in the drawings each is represented as being composed partly of wood and partly of metal.

$d d$ are beams or rails which serve to support the platens against the pressure within the compression-chamber, the said beams being arranged relatively to the plates $c c'$, as shown in Figs. 5 and 6. $e e$ are distance-pieces, which maintain the said rails at a proper distance apart, and $f f$ are bolts which are passed through the said distance-pieces, the rails, and the plates $c c'$, and serve to hold the same firmly together.

g is a receptacle into which the material to be baled is placed, and h is a conveyer arranged at the bottom of the said receptacle, and serving to feed the material forward to the platens. This conveyer is operated from one of the shafts b' through the medium of the bevel-wheels $g' g'$, the sprocket-wheels $g^2 g^2$, and the chain g^3 .

i is a table onto which the compressed material is delivered, and $j j$ are clamps, which are passed over the material as it issues from between the platens, the ends of the said clamps entering grooves $k k$ formed in the said table to prevent them from opening under the expansive force of the compressed material, the said clamps being removed after suitable bands have been placed around the material.

l is a gap, which is formed in the table to allow the bands to be readily passed under and around the material.

$m m$ are ratchet-wheels, which are keyed upon the shafts $b b$, for communicating motion to the platens, the said ratchet-wheels being operated by the pawls $n n$ on the levers $n' n'$ from the pulley o through the medium of the shaft o' , the worm p , the worm-wheel p' , the shaft q , the crank q' , and the jointed rod r , connected directly to one pawl-lever n' , and to the other through the pivoted lever r' and the link r^2 .

s is a bracket which supports the shafts $o' q$.

Each of the platens hereinbefore referred to comprises two series of links *t*, Fig. 8, which are united together by pins *t'* *t'*, as shown in Fig. 5, to form a chain, the said pins also serving to unite the adjacent links of each series and to carry rollers *u u*, which run upon the rails *d d*, to reduce the friction between the latter and the chains. Each link *t* is formed with an aperture *t*², so that cross-bars *v* can be arranged between the opposite links of the two series, as shown in Figs. 5 and 6.

w w are slats, which are secured to the cross-bars *v v* by bolts *w' w'*, and extend the full distance between the two plates *c c'*. These slats are thinner at one edge than at the other, as shown in Fig. 7, so that when arranged in position projecting ribs *y* are formed, which serve to grip the material and cause it to move forward.

The operation of the apparatus hereinbefore described is as follows: The material to be baled is placed in the receptacle *g* and spread over the conveyer *h*. The motion of the apparatus carries the material forward between the platens, where it is gradually compressed, owing to the movement of the said platens in the direction indicated by the arrows, Fig. 3. As the material issues from between the said platens, the retaining-clamps *j* are placed over the same, at the point indicated in Fig. 3, before the material has had an opportunity of expanding. As the compressed material is gradually pushed along the table *i*, the bands are applied thereto in the manner hereinbefore described, after which the clamps *j* are removed for reuse.

As is obvious, the material issues from the apparatus in a continuous strip. In order to form bales the strip is from time to time divided transversely at the required distances apart.

The apparatus hereinbefore described is very advantageously made portable. For this purpose it may be mounted on traveling wheels *z z*, and the receptacle *g* may be provided with pivoted arms *z' z'*, so that it can be turned back, as indicated by dotted lines in Fig. 2. Also, instead of arranging the platens to compress the material laterally they may be arranged to act vertically or in any other suitable manner.

We wish it understood that we do not limit our invention to the construction hereinbefore described, as it is obvious that the con-

struction of the endless platens and the means for feeding the material into the machines and compressing and forming it into bales can be considerably modified without departing from the nature of our invention. Also, instead of using the endless platens we may substitute therefor a series of rollers arranged in pairs, the rollers of each succeeding pair being closer together than those of the preceding pair; or we may employ one or more pairs of rollers in combination with the endless platens. When the material to be baled could not be severed, as above described, without injury, it is, previously to being passed between the platens or rollers, divided into sections by boards or other equivalent means.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is—

1. In a machine for baling hay, straw, and other materials, and having endless feeding-platens, projecting slats or ribs *y* thereon, made with their rear edges thinner than their forward gripping-edges, substantially as and for the purpose set forth.

2. In combination with the two endless converging platens having ribs thicker at their forward than at their rear edges, a box or receptacle provided with an endless feed to convey the material to said platens, substantially as shown and described.

3. In combination with the endless conveying-platens having the described ribs, the receiving-table provided with the reduced portion *l*, substantially as and for the purpose set forth.

4. The receiving-platform *i*, provided with the grooves *k* near its opposite edges, and with clamps *j*, adapted thereto and serving to span the material at its top and at both of its sides.

5. In combination, the receptacle *g*, having an endless conveyer *h* therein, the converging endless platens having the gripping-ribs *y*, and the table *i*, provided with the depression *l*, and side grooves *k*, substantially as shown and described.

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