

No. 623,280.

Patented Apr. 18, 1899.

J. H. HOOVER.
CIDER PRESS.

(Application filed May 23, 1898.)

(No Model.)

8 Sheets—Sheet 1.

Fig. 1.

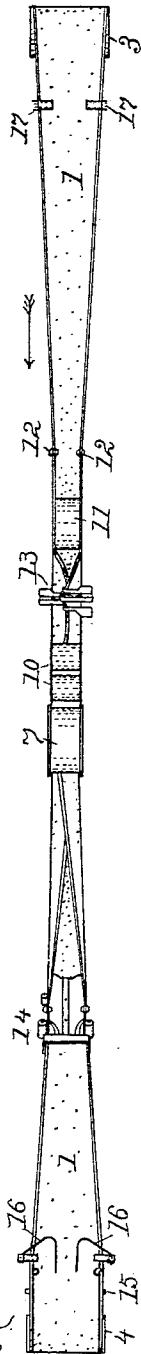
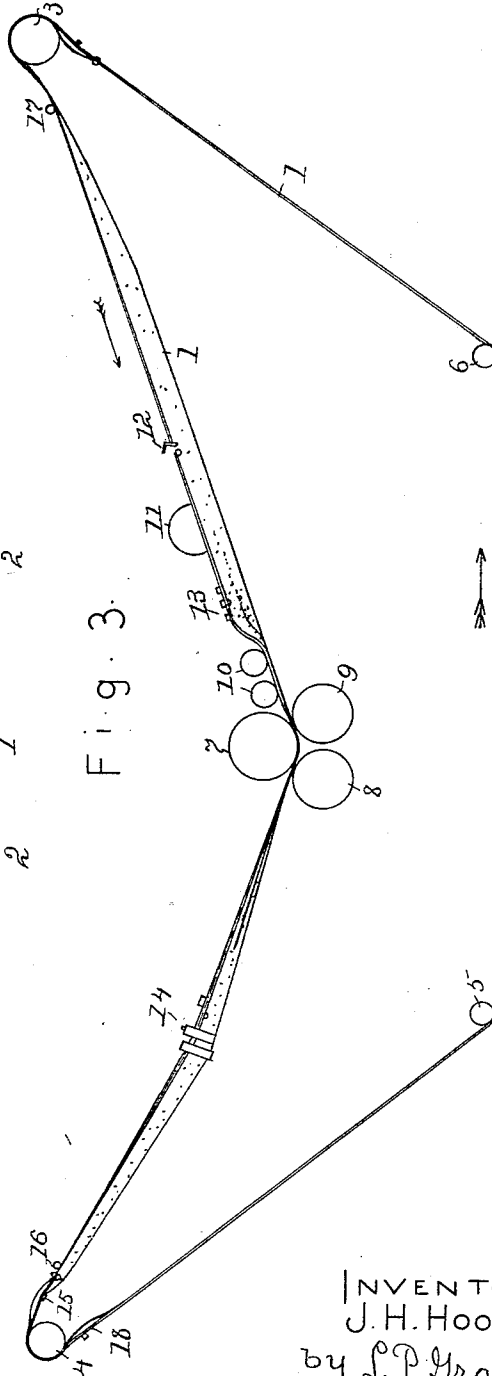


Fig. 2.



Fig. 3.



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by L. P. Graham
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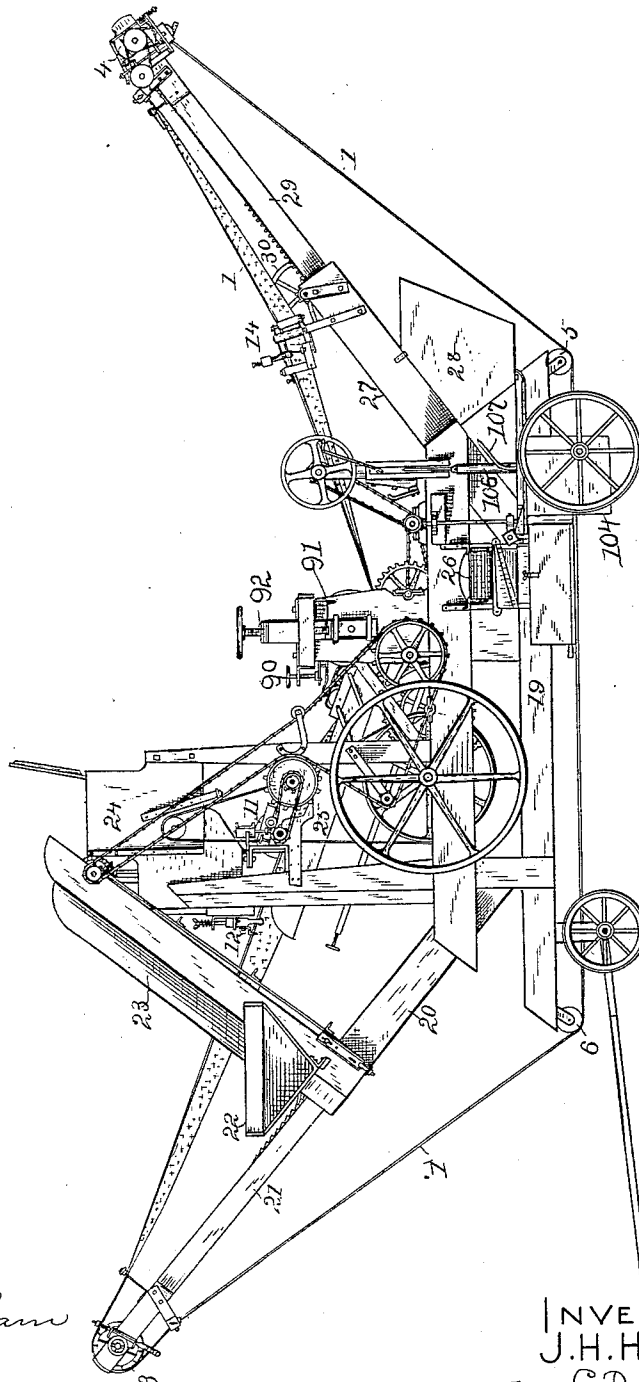
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8 Sheets—Sheet 2.

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Fig. 4.



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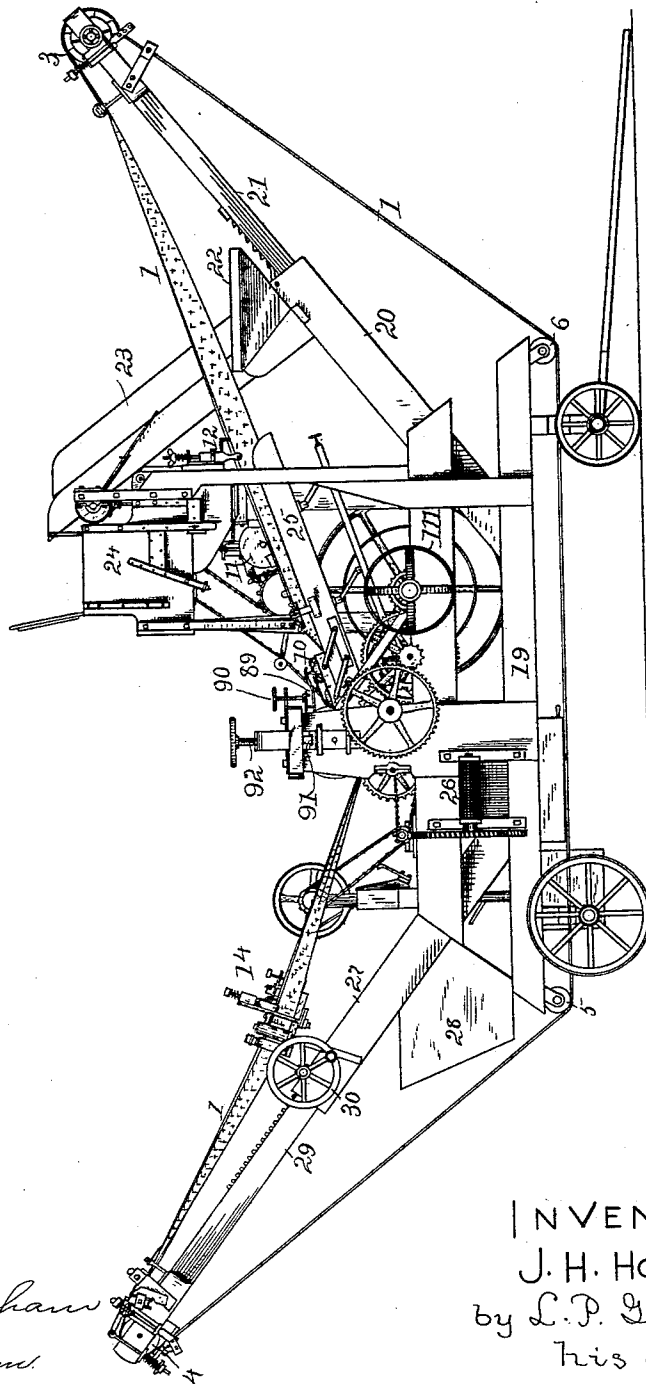
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(Application filed May 23, 1898.)

(No Model.)

8 Sheets—Sheet 3.

Fig. 5.



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Hora Graham
Ma Graham

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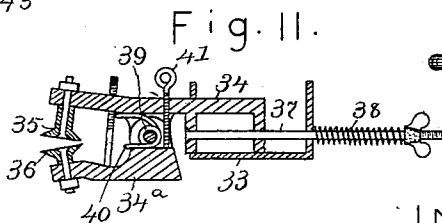
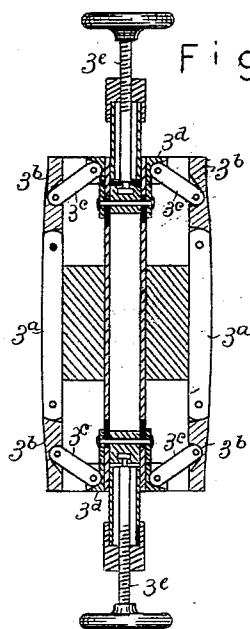
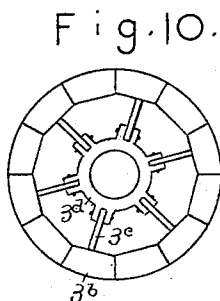
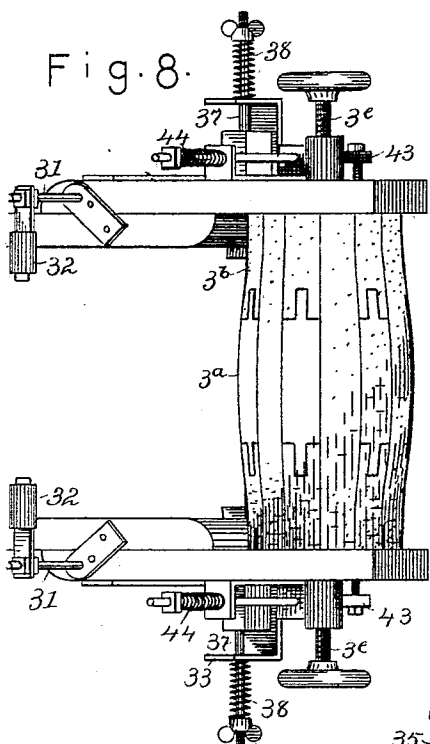
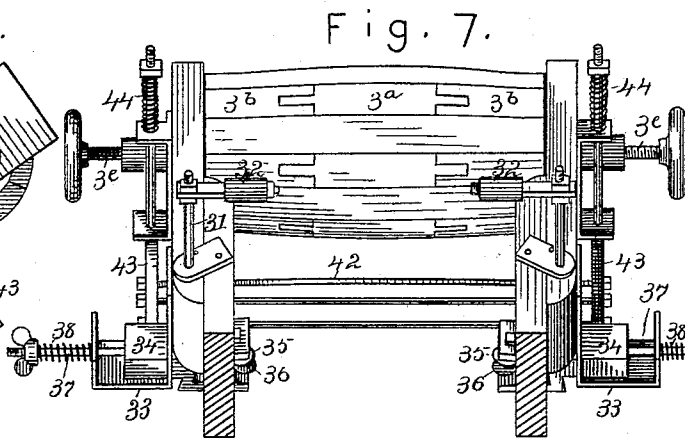
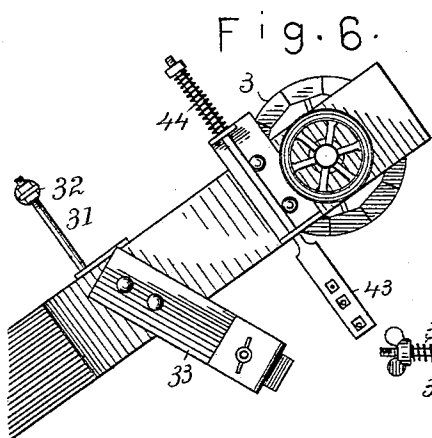
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(No Model.)

8 Sheets—Sheet 4.



ATTEST

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Fig. 12.

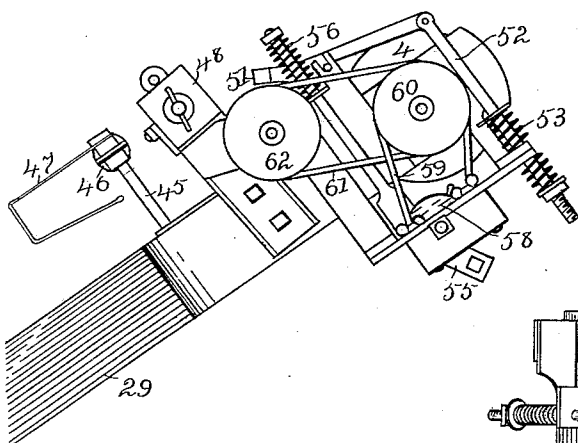


Fig. 13.

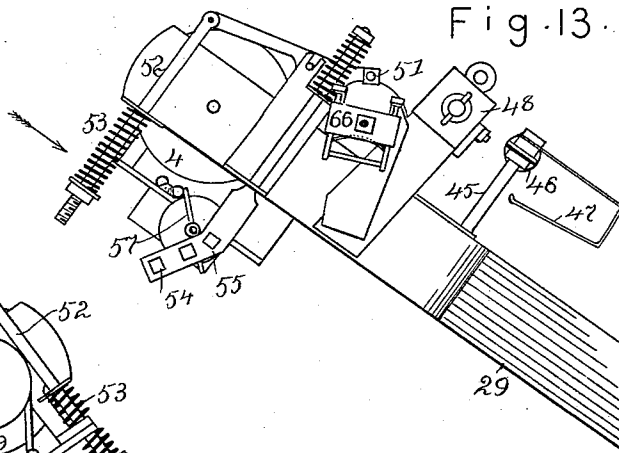


Fig. 14.

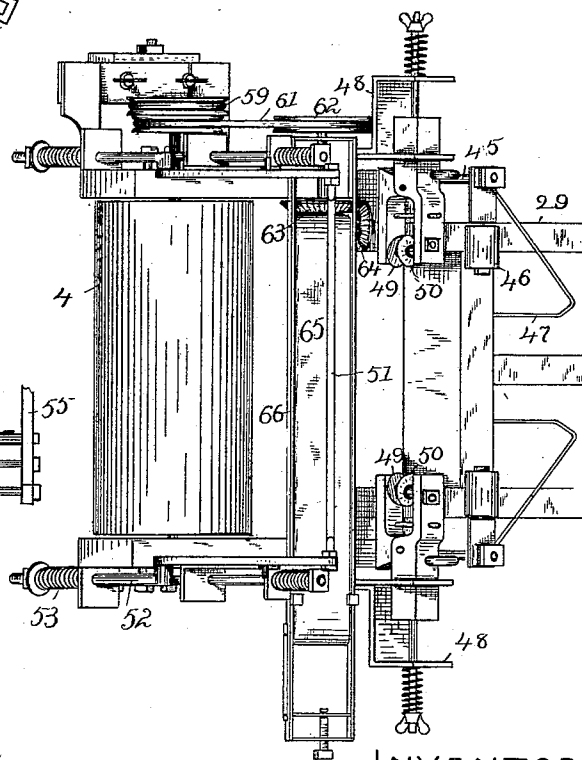
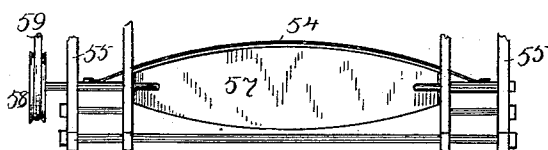


Fig. 15.



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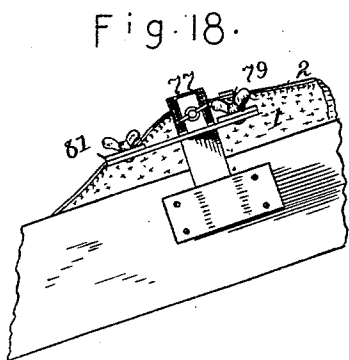
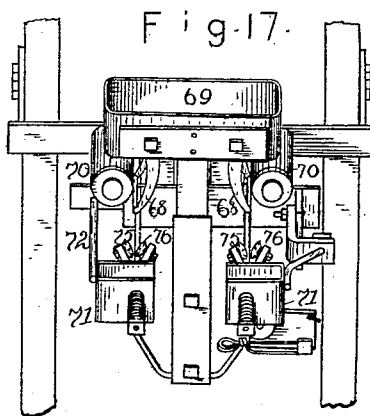
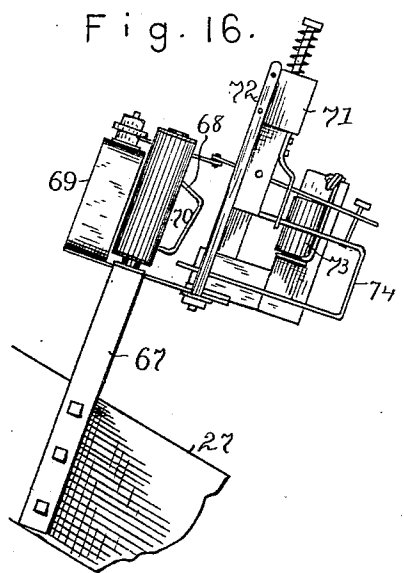


Fig. 19.

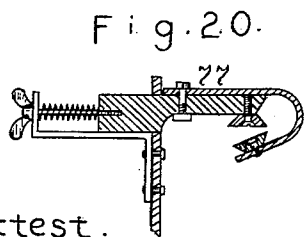
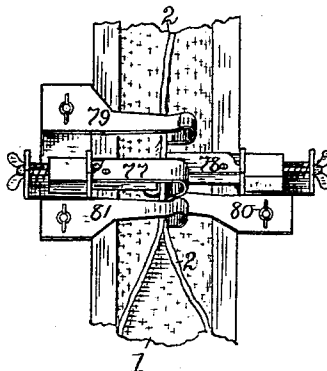
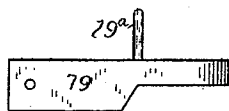


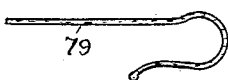
Fig. 21.



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Fig. 22.



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Fig. 23.

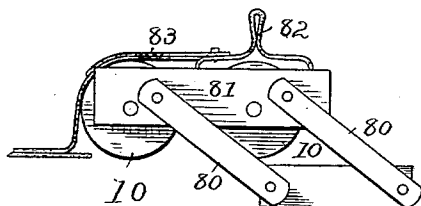


Fig. 24.

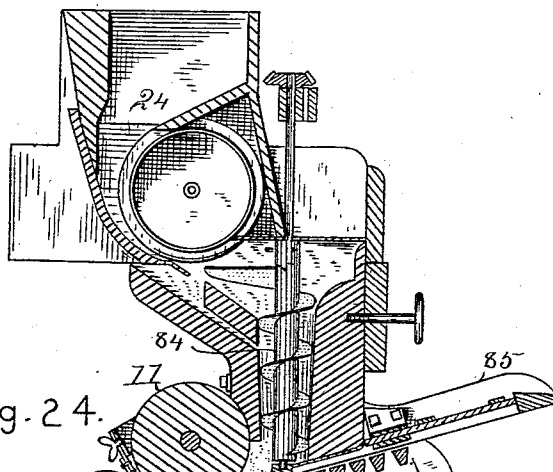


Fig. 25.

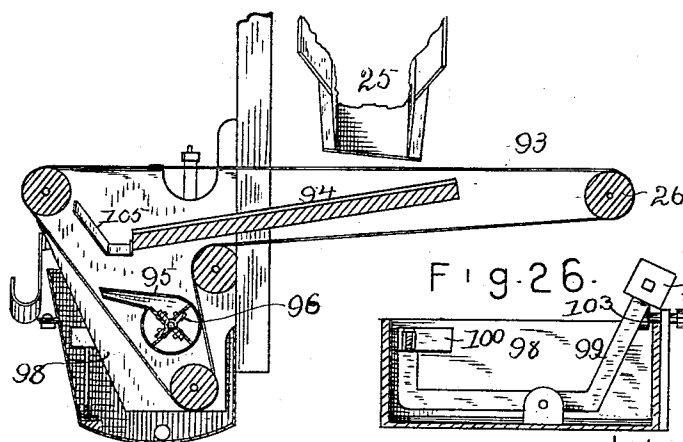
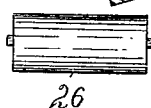
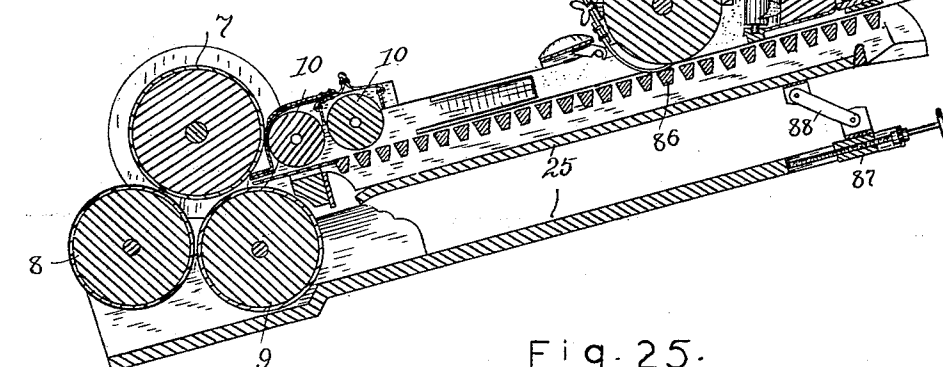
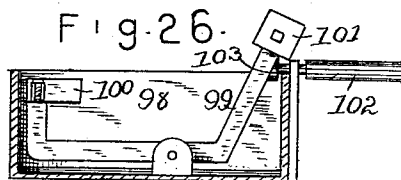


Fig. 26.



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(No Model.)

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Fig. 27.

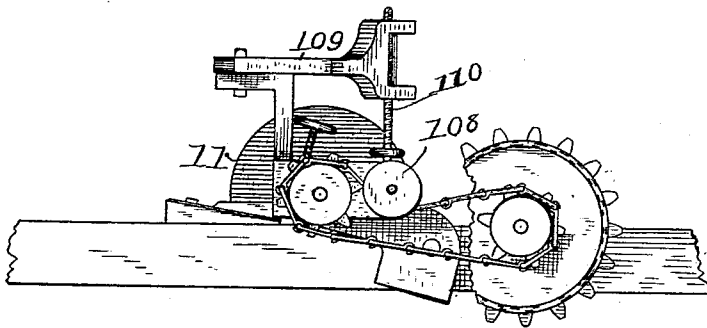
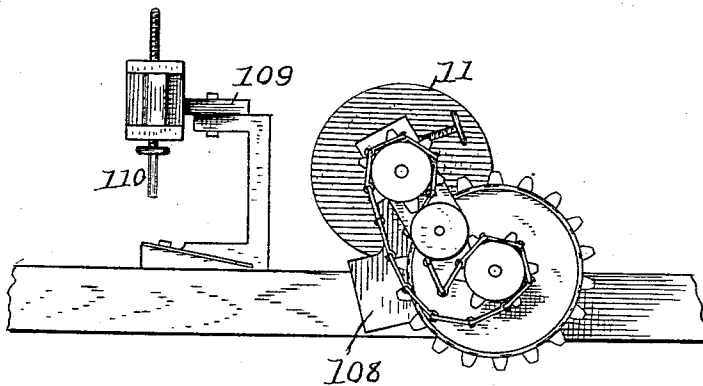


Fig. 28.



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UNITED STATES PATENT OFFICE.

JAMES H. HOOVER, OF NEAR ARGENTA, ILLINOIS.

CIDER-PRESS.

SPECIFICATION forming part of Letters Patent No. 623,280, dated April 18, 1899.

Application filed May 23, 1898. Serial No. 681,482. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. HOOVER, residing near Argenta, in the county of Macon and State of Illinois, have invented a certain new and useful Machine for Making Cider, of which the following is a specification.

This invention relates to cider-making machines in which endless belts are used to envelop the pomace. It is exemplified in the structure hereinafter described, and it is defined in the appended claims.

In the drawings forming part of this specification, Figure 1 is a diagrammatic plan illustrative of the travel and treatment of the belt. Fig. 2 is a transverse section through the belt. Fig. 3 is an elevation of the belt and immediate adjuncts shown in plan in Fig. 1. Fig. 4 is an elevation showing one side of a complete machine. Fig. 5 is an elevation showing the opposite side of the machine. Fig. 6 is a side elevation of belt-controlling mechanism at the feed end of the machine, including a roller, the ends of which may be expanded to compensate for slack in a side of the belt. Fig. 7 is an end view of Fig. 6. Fig. 8 is also a plan of Fig. 6. Fig. 9 is a section lengthwise through the expansible roller. Fig. 10 is an end view of the roller. Fig. 11 is a longitudinal section through belt-controlling mechanism. Fig. 12 is an elevation representing one side of the belt straightening and cleaning mechanism located at the discharge end of the machine. Fig. 13 is an elevation showing the opposite side of the mechanism illustrated in Fig. 12. Fig. 14 is a plan of Fig. 13. Fig. 15 is a detail of the scraper and rotary beater used to dislodge the pressed pomace from the belt as the belt travels around the pulley at the discharge end of the machine. Fig. 16 is a side elevation of belt-unfolding mechanism. Fig. 17 is a plan of Fig. 16. Fig. 18 is a side elevation of belt-folding mechanism. Fig. 19 is a plan of the belt-folding mechanism. Fig. 20 is a section through the belt guide or controller used in the folding, unfolding, and straightening devices. Figs. 21 and 22 are details of an element in the folding mechanism. Fig. 23 is a detail of preliminary press-rollers used in front of the principal press-rollers to prevent backward flow of the pomace. Fig. 24 is a section vertically through the grind-

ing and pressing mechanism. Fig. 25 is a cross-section through the straining mechanism. Fig. 26 is a detail of the strainer-cleaning mechanism. Figs. 27 and 28 represent certain details of driving-gear in two different positions.

The belt 1 is flexible and porous or perforate to permit passage of the expressed apple-juice. It is preferably reinforced or strengthened near its edges, and it is provided with overlapping bands 2 on its edges that extend inward and provide means for controlling the direction of motion of the belt by guide-rollers that engage the bands. The belt is continuous, and it runs around roller 3 at the forward or receiving end of the machine, around roller 4 at the rear or discharge end of the machine, and under rollers 5 and 6, situated under the machine. When the belt leaves pulley 3 to travel backward in the direction indicated by the arrows in Figs. 1 and 3, it is flattened out and spread to its greatest width. At 12 its edges are raised upward and its center pressed downward to form a trough for the unpressed pomace, which is supplied immediately below this point at 11. A roller is employed to feed the pomace forcibly along the trough formed by the belt. At 13 the edges of the belt are folded over the pomace, completely enveloping it. At 10 the pomace is subjected to pressure from a pair of preliminary spring-pressed rollers, which remove some of the cider and prevent back motion of the pomace when it is subjected to the more severe action of the principal compressing-rollers 7, 8, and 9. At 14 the belt is unfolded. At 16 it is spread out and its under side scraped, and at 18 its upper side is cleaned of any expressed pomace that may remain on the belt after passing over roller 4. The belt then travels under rollers 5 and 6 and up to roller 3, where the described operation is again begun, and so on continuously.

The roller 3 has a permanent central portion 3^a, to which swinging bars 3^b are hinged. Heads 3^d are shiftable in the ends of the roller by means of screws 3^e, and links 3^c connect the heads with the swinging ends of bars 3^b. By means of this provision either end of the roller may be increased or diminished in diameter. Whenever the belt becomes stretched on one side to a greater extent than on the other side,

the end of the roller over which the elongated side of the belt runs is expanded to take up the slack and make the belt run even.

Rods 31 carry rollers 32, which tend to
 5 guide the belt away from roller 3 in a spread-out condition. At 12 the center of the belt is depressed by strips, as 85, one of which is shown in Fig. 24, and its edges are raised by
 10 guide-pulleys that engage the bands 2 on the sides of the belt. The strips 85 are fastened to the lower end of the hopper or screw casing, and they extend on opposite sides of roller 11. The belt forms a trough around the strips, and into the trough thus formed unpressed
 15 pomace is forced from a mill, as 24, by screw 84 and pressed into and fed along the trough by roller 11. The edges of the belt are then folded one over the other by means of the guide-arms shown in detail in Figs. 18 and 19,
 20 in which 77 and 78 are roller-carrying guides, and 79, 80, and 81 are auxiliary hooks. Hook 79 is preferably provided with a finger 79^a, which lies along the band of the belt and aids in guiding. The strips 85 determine the internal dimensions of the trough formed by the belt, and such dimensions are therefore
 25 uniform and independent of the quantity of pomace discharged into the belt. As soon as the belt is folded over the pomace it passes under preliminary rollers 10, and from there it goes between the principal rollers 7, 8, and 9, where the pomace is completely pressed. The cider passes through the meshes of the belt into trough 25 and from there to the
 35 straining mechanism, while the pressed pomace is carried on by the belt. At 14 the mechanism shown in detail in Figs. 16 and 17 is encountered. The edges of the belt are carried upward by rollers 75 and 76 in guide-arms 71, the sides are spread apart by frame
 40 74 and scraped by bars 68, while rollers 70 hold them in position. The belt then passes through guide-loop 69 and onward to near the roller 4, where it encounters spread-rods 47 and rollers 46 on arms 45. Passing these, it is spread entirely flat by guide-rollers 49 in frames 48 and scraped clean on its under side by scraper 51. Thence it passes over roller 4,
 45 below which it encounters scraper 54 and has its upper or outer surface cleaned. A rotary beater 57 runs in close approach to the scraper 54 and removes all pomace that tends to adhere to the scraper. Force is applied to the rotary beater from roller 4 by means of pulley 60, belt 59, and pulley 58. Under upper
 50 scraper 51 is a trough 66 to receive the scrapings. This trough is supplied with an endless belt 65, which carries the scrapings to one side of the main belt. Force is imparted to the belt of the scrapings-trough from roller 4 through pulley 60, belt 61, pulley 62, and gearing 63 64. The scraper 51 is mounted on rock-arms that connect with rods 52, and the rods have springs 53, which give elasticity
 55 to the action of the scraper. The scraper 54 is mounted in rods 55, which are provided with springs 56, that hold the scraper yield-

ingly against the belt. From roller 4 the belt 1 travels under rollers 5 and 6 to near roller 3, where it is brought under the control of
 70 guide-rollers 35 36 and conveyed in a spread condition past scraper 42 to roller 3 in readiness for a repetition of the continuously proceeding operation.

The guide-pulleys 35 36 are mounted in
 75 slides 34, which are carried in frames 33, and they are placed one opposite another in jaws of the slide. The jaw 34^a is yielding, being hinged to the stiff jaw at 39 and provided with a spring 40, and the entire slide is length-
 80 wise yielding by means of bolt 37 and the spring 38 thereon. This enables the guides to adapt themselves to varying conditions of the belt and to control the same without damaging it.

The scraper 42 is fastened in bars 43, and springs 44 make the bars yielding.

The rollers 10 are journaled in a frame 81, which is swung from a block on the trough by means of links 80, and a saddle 83, with
 90 an upward extension 82, is mounted on the frame 81. (See Fig. 23.) A spring 8 (seen in Fig. 5) bears on the extension 82 of the saddle of the frame in which rollers 10 are mounted, and a screw 90 provides means for
 95 regulating the tension of the spring. A spring 91 (also seen in Fig. 5) bears on the boxings of press-roller 7, and a screw 92 engages the spring and provides means for regulating the pressure of the roller.

A false bottom in trough 25 is provided with a link 88 and with a shiftable head 87, whereby the inclination of the false bottom may be varied.

When the cider leaves trough 25, it falls
 105 on a strainer-belt 93, through the belt to incline 94, from the incline to trough 105, and through the trough to tank 104. (Shown in Fig. 4.) From the tank the cider is pumped to barrels or other receptacles through pipe
 110 107 by means of pump 106. The strainer-belt runs around roller 26, extends under the end of trough 25 in a substantially horizontal direction, is then carried downward into a water-receptacle 98, and upward and back-
 115 ward to roller 26. A centrifugal wheel 96 runs in a casing 95 in the water-receptacle, and it forces water through the meshes of the strainer-belt and cleans it as it runs. The water in the receptacle 98 is permitted
 120 to run out as fast as it becomes foul from washings of the strainer, and a fresh supply is constantly obtained from tank 28. To make the supply automatic, a float is placed in the water-receptacle and provided with a
 125 valve that closes the inlet-pipe when the supply is sufficient and opens it when the float descends beyond a certain limit. In Fig. 26 the float is represented at 100, the lever thereof at 99, the inlet-pipe at 102, a weight
 130 on the lever at 101, and the valve at 103.

It is occasionally necessary to remove the belt from the machine, and preparatory to this the roller 11 must be raised out of the

trough 25. To provide for this in a convenient manner, the roller-frame 108 is hinged as shown in Figs. 27 and 28, and a swinging arm 109 is provided with a screw 110, that engages the frame and holds it in operative position. When it is desired to raise the roller clear of the belt, the screw is loosened, the arm is swung aside, and the roller-frame is raised on its hinge without disturbing the driving-gear, as shown in Fig. 28.

The frame of the machine is preferably made somewhat as shown in Figs. 4 and 5; but this is not essential. In these figures, 19 indicates the frame in general. 20 is a forward and upward inclined beam having an extensible member 21, in the end of which roller 3 is journaled, and 27 is a rearward and upward extended beam having an extensible member 29, in the end of which roller 4 is journaled. The extensible member 21 is provided with ratchet-teeth and a pawl to hold it extended; but member 29 is preferably supplied with a rack and a pinion having a hand-wheel 30, which provides means for adjusting the member quickly, easily, and accurately.

A box 22 is provided for the apples to be ground, and elevator 23 carries them up to the hopper of the mill as fast as they are needed.

In Fig. 5 the drive-wheel is shown at 111, and power may be distributed from the shaft of this wheel to the different moving parts in the manner suggested in the two side elevations of the machine or in any other desirable manner.

The bands 2, which provide means for controlling the pomace-carrying belt, extend inward from the edges of the belt, and the guide-rollers act against the inner surfaces of the bands. The bands may be pressed ever so tight against the body of the belt without affecting their capability for forming bearings for the guide-rollers, and their flatness fits them to pass between the rollers. The screw 84 terminates near the belt, and it has a two-fold function—namely, to regulate the amount of pomace supplied to the belt, so that the trough of the belt cannot be overloaded or the pomace irregularly deposited, and it presses the pomace compactly against the belt, so that subsequent operations are expedited.

The disposition of the principal press-rollers whereby the upper one acts against the two lower ones has advantages, as follows: The pressure developed by the upper roller and the first of the lower rollers with which the belt comes in contact expresses a considerable amount of cider from the pomace and pressure is maintained to some extent on the short run of belt between the two lower rollers, giving the cider time to escape from the belt before final pressure is given by the upper roller and the last of the lower rollers.

What I claim is—

1. An endless, flexible, perforate or porous belt having bands fastened to its edges and extended loosely inward, substantially as set forth.

2. An endless, flexible, perforate or porous belt having bands fastened to its edges on both its sides and extended loosely inward, substantially as set forth.

3. In a machine for making cider, the combination of a flexible, endless, perforate or porous belt having bands fastened to its edges and extended loosely inward and guide-rollers having flanges running between the belt and the loose parts of the bands, substantially as set forth.

4. In a machine for making cider, the combination of a flexible, endless, perforate or porous belt having bands fastened to its edges on both its sides and extended loosely inward, and guide-rollers disposed in pairs and having flanges engaging the loose parts of bands between the bands and the belt, substantially as set forth.

5. In a machine for making cider, the combination of a flexible, endless, perforate or porous belt having inward-extending bands overlapping its edges, guide-arms having spring-jaws embracing the edges of the belt and rollers in the jaws engaging the bands on the edge of the belt, substantially as set forth.

6. In a machine for making cider, the combination of a flexible, endless, perforate or porous belt having inward-extending bands overlapping its edges, endwise-yielding guide-arms having spring-jaws embracing the edges of the belt and rollers in the jaws engaging the bands on the edges of the belt, substantially as set forth.

7. In a machine for making cider, the combination of an endless, perforate or porous belt, means for forming the belt into a trough to receive unpressed pomace and a feed-roller in the trough formed by the belt, substantially as set forth.

8. In a machine for making cider, the combination of an endless, perforate or porous belt, means for forming the belt into a trough to receive unpressed pomace, a feed-roller in the trough formed by the belt, mechanism to fold the belt around the pomace and rollers to press the pomace enveloped in the belt, substantially as set forth.

9. In a machine for making cider, the combination of an endless, perforate or porous belt, means for folding the belt around the pomace to be pressed, main rollers to press the pomace enveloped in the belt and preliminary spring-controlled rollers acting on the pomace in the belt in advance of the main pressing-rollers, whereby the pomace is held from backward motion in the belt when the main rollers act.

10. In a machine for making cider, the combination of an endless, perforate or porous belt, means for folding the belt around the pomace to be pressed, rollers to press the pomace enveloped in the belt, a swinging frame controlled by a spring and a pair of preliminary acting rollers journaled in the swinging frame, substantially as set forth.

11. In a machine for making cider, the com-

- 5 bination of a grinding-mill, an endless per-
forate or porous belt adapted to receive and
enfold pomace from the mill, rollers to press
the pomace in the belt and an endless strainer-
10 belt running under the pomace-belt at right
angles therewith and in an approximately
horizontal direction and extending downward
at one end of its run into a water-receptacle,
substantially as set forth.
- 15 12. In a machine for making cider, the com-
bination of a grinding-mill, an endless per-
forate or porous belt adapted to receive and
enfold pomace from the mill, rollers to press
the pomace in the belt, a strainer-belt run-
ning crosswise under the pomace-belt and dip-
ping downward at one end of its run into a
water-receptacle, and means for forcing water
through the strainer-belt, substantially as set
forth.
- 20 13. In a machine for making cider, belt-
cleaning mechanism comprising a scraper and
a rotary beater acting on the scraper, substan-
tially as set forth.
- 25 14. In a cider-machine, an endless, perfo-
rate or porous belt in which the pomace is
pressed and a roller for the belt having ex-
pansible ends, substantially as set forth.
15. In a cider-machine, an endless, perfo-

rate or porous belt in which the pomace is
pressed, and a roller for the belt having swing- 30
ing end slats, movable heads and links be-
tween the heads and slats whereby the slats
may be moved inward or outward with rela-
tion to the axis of the pulley, substantially
as set forth. 35

16. In a machine for making cider, the com-
bination with a pomace-supplying conveyer, of
strips attached to opposite sides of the con-
veyer, a belt running under the strips and
guide-rollers to fold the belt over the strips 40
and form a trough, substantially as set forth.

17. In a machine for making cider, the com-
bination with a pomace-supplying screw feed-
conveyer, of strips attached to opposite sides
of the frame of the conveyer, a belt running 45
under the strips and guide-rollers to fold the
belt over the strips and form a trough under
the end of the screw-feed, substantially as set
forth.

In testimony whereof I sign my name in the 50
presence of two subscribing witnesses.

JAMES H. HOOVER.

Witnesses:

E. S. McDONALD,
ROSA VOELCKER.