

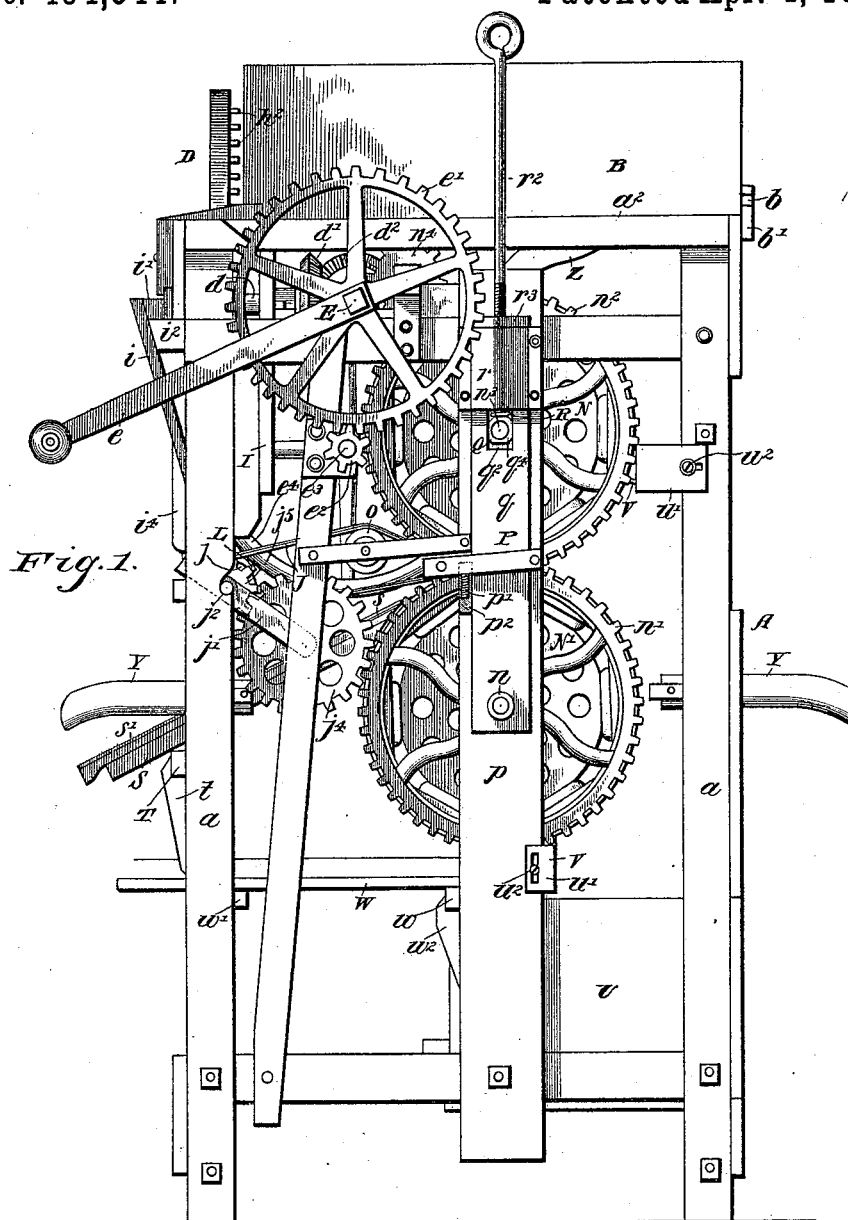
(No Model.)

5 Sheets—Sheet 1.

J. BOWEN.
CIDER MILL.

No. 494,544.

Patented Apr. 4, 1893.



Witnesses;

Mr. Withers
D. P. Kalhauer

Inventör

Jesse Bowen,

By *his* Attorneys,

Chas. Snow

5 Sheets—Sheet 2.

No. 494,544.

Patented Apr. 4, 1893.



Witnesses;

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D. P. Wolcott

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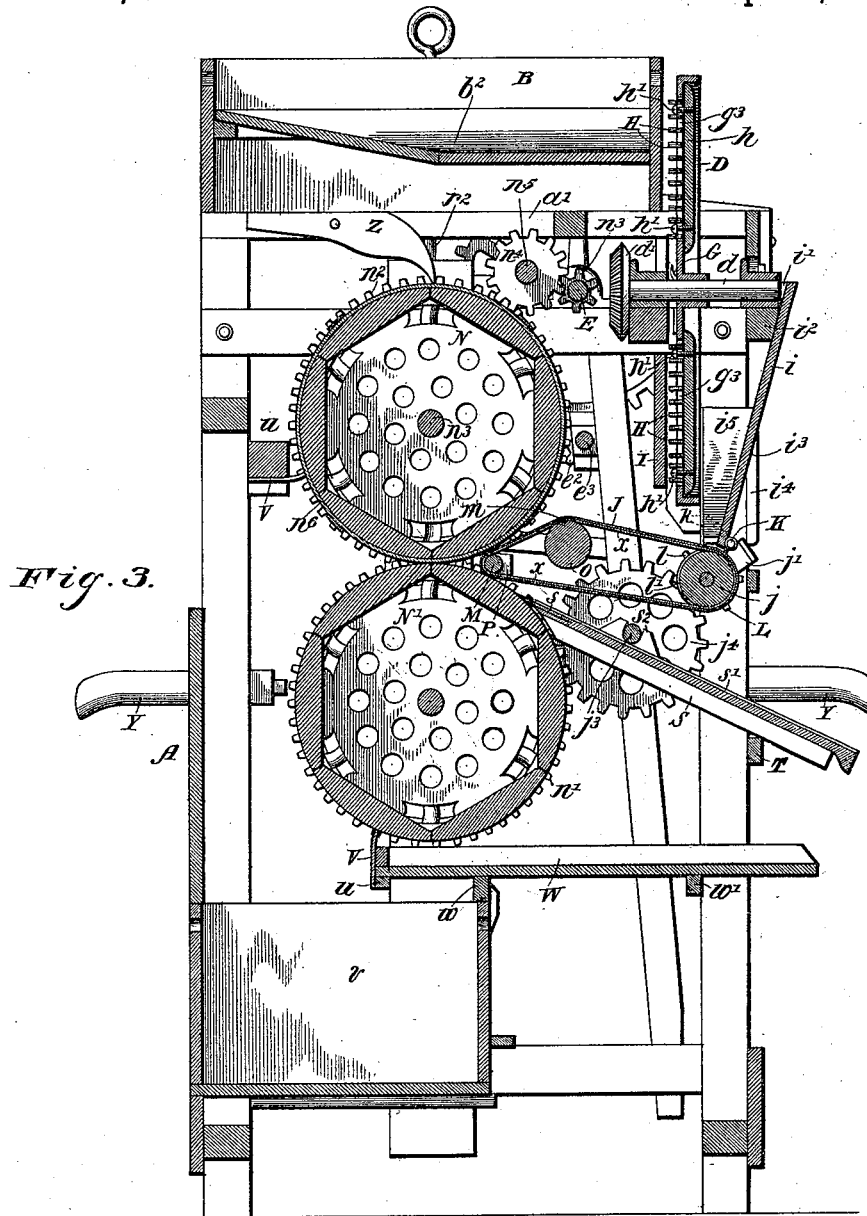
(No Model.)

5 Sheets—Sheet 3.

J. BOWEN.
CIDER MILL.

No. 494,544.

Patented Apr. 4, 1893.



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CIDER MILL.

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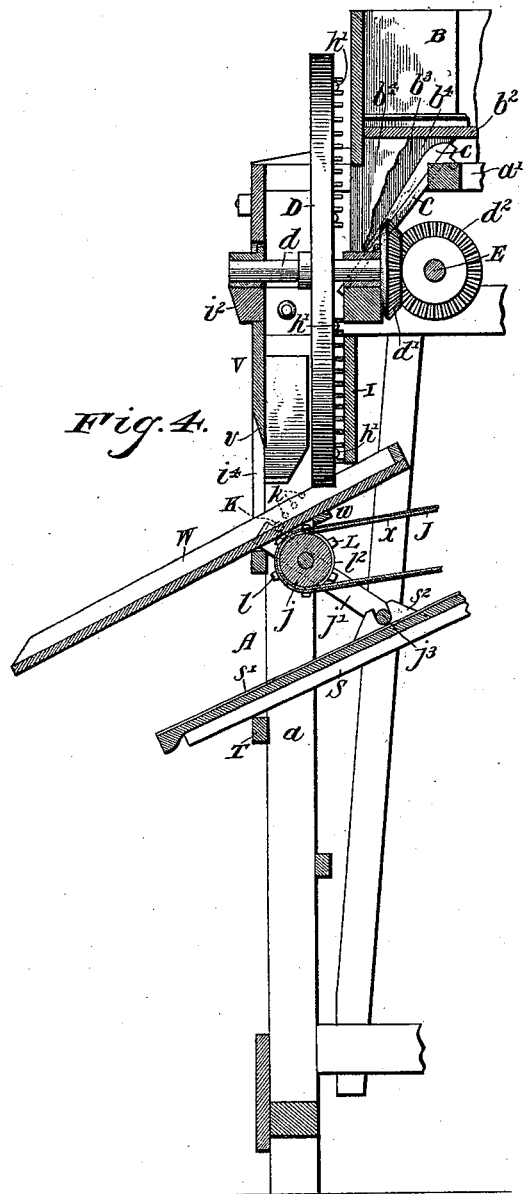


Fig. 4.

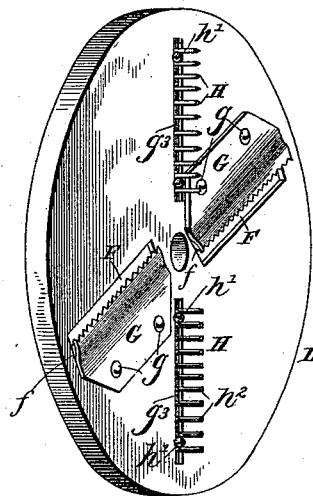


Fig. 6.

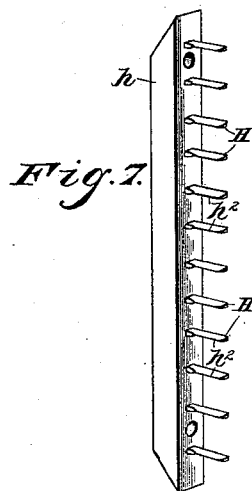


Fig. 7.

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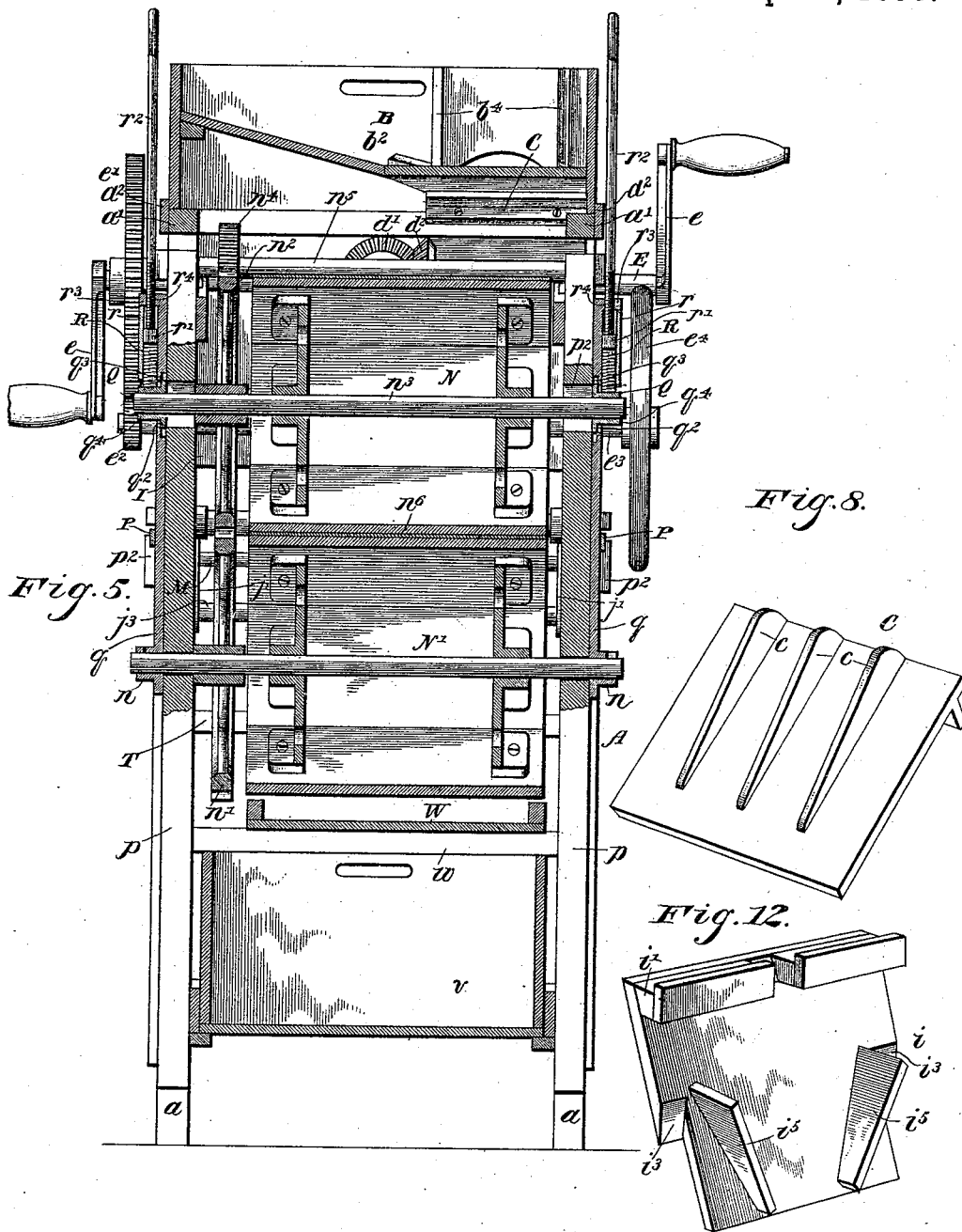
(No Model.)

5 Sheets—Sheet 5.

J. BOWEN.
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No. 494,544.

Patented Apr. 4, 1893.



Witnesses;

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UNITED STATES PATENT OFFICE.

JESSE BOWEN, OF LANCASTER, OHIO, ASSIGNOR OF ONE-HALF TO FRANK E. SHUE, OF SAME PLACE.

CIDER-MILL.

SPECIFICATION forming part of Letters Patent No. 494,544, dated April 4, 1893.

Application filed June 20, 1892. Serial No. 437,406. (No model.)

To all whom it may concern:

Be it known that I, JESSE BOWEN, a citizen of the United States, residing at Lancaster, in the county of Fairfield and State of Ohio; 5 have invented a new and useful Cider-Mill, of which the following is a specification.

This invention relates to cider mills; and it has for its object to provide an improved mill of this character adapted for milling the 10 fruit and subsequently extracting the juice therefrom in a simple and effective manner, while at the same time means are provided whereby the mill only may be employed for cutting and slicing vegetables of any character whatever. 15

To this end it is the main and primary object of the present invention to provide a machine constructed with special reference to simplicity, ease of manipulation and effectiveness in its uses, while at the same time 20 a machine possessing superior advantages over similar mills in use, in which a thorough extraction of the juice from the pomace is not always obtainable and in which the cider 25 is liable to waste, whereas the present machine avoids these objections.

With these and many other objects in view which will readily appear to those skilled in the art, the invention consists in the novel 30 construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the drawings:—Figure 1 is a side elevation of a cider mill constructed in accordance 35 with this invention. Fig. 2 is a front elevation of the same with the front cant board removed. Fig. 3 is a vertical longitudinal sectional view. Fig. 4 is a similar view through the front end thereof when the machine is employed for milling purposes. Fig. 5 is a vertical transverse sectional view. Fig. 6 is a detail in perspective of the cutting wheel. Fig. 7 is a similar view of the splitting lances. Fig. 8 is a similar view of the flanged feeding 45 board. Fig. 9 is a detail plan view of the hopper. Fig. 10 is a detail in perspective of the front end of the carrier belt or apron. Fig. 11 is a detail sectional view of the cutting wheel on the line $x-x$ of Fig. 2. Fig. 12 50 is a detail view of the front cant board.

Referring to the drawings:—A represents

an open rectangular frame comprising the corner posts a , connected at their upper ends by the horizontal side and end pieces a' , the said side pieces being further provided with 55 the projecting flanges a^2 within which are inclosed the top hopper box B. The said hopper box B removably rests upon the top of said frame and is provided at its rear side with the lug e , which is engaged by the notched 60 turn-buckle b' , pivoted to the rear end of the frame.

The hopper box is of a size so that its front wall is in rear of the front end of the frame, and is provided with the slanting bottom b^2 65 sloping to the front discharge opening b^3 , located in the front wall and the bottom back of the wall at one side of the center of the frame. The discharge opening b^3 , is inclosed by the depending sides b^4 extending from the 70 top of the hopper inside of the same, to a point below the hopper so as to fit over the opposite edges of the inclined flat feed board or plate C. The said feed board or plate is set at an angle within the top of said frame and the 75 discharge opening of the hopper, to direct the fruit or vegetables to the cutting devices of the cutting wheel D, located in front of the same, and said plate or board is provided with the raised parallel tapered feeding flanges c , 80 which flanges are tapered from the upper end of the plate to a point nearly flush with the same near its lower end in front of the wheel, so that channels are formed in the plate which cause the material to pass directly to the 85 knives without clogging and which also serve to hold the fruit or vegetable to its position until completely cut, a space being left below the lower terminals of the flanges for the fruit to spread out the entire width of the plate or board. Now it has been found that in first 90 grinding or rasping the fruit before extracting the juice from the same, not only is considerable of the juice lost, but also some of the fruit, and that better results are secured 95 by employing devices for splitting and slicing the fruit before the same is subjected to pressure between the pressure rollers, so with this in view I employ the cutting wheel D previously noted. The cutting wheel D is located 100 directly in front of the front wall of the hopper between the same and the front of the

casing, and is mounted upon the short horizontal shaft d journaled in suitable bearings in the front upper end of the frame, so as to support the wheel in vertical position in front of the hopper and allow the inner face thereof to travel in close proximity to the front discharge opening of the hopper. The shaft d carries upon one end thereof within the casing the bevel pinion or gear d' , meshing with a similar pinion or gear d'' , keyed on the horizontal drive shaft E, which shaft is mounted in bearings at each side of the frame, and is provided at both ends with operating crank handles e , while on one end the same carries the gear wheel e' . A pinion e'' meshes with the gear wheel e' , and communicates motion to the horizontal balance wheel shaft e^3 , journaled within the frame below the drive shaft E and carrying said pinion, while the opposite end thereof is provided with the large balance wheel e^4 to lighten the gearing and render the machine easy to manipulate.

The cutting wheel D is provided with a series of two or more rectangular slots F, which are beveled as at f , to direct the split and sliced fruit or vegetables through the wheel and into the conveying devices arranged below the same, and to form a continuation of the bevel of the cutting or slicing knives or blades G. The knives G are made of spring metal and are secured at one edge to rear face of the wheel D back of the openings therein by means of the screws g , which allow the knives to be easily removed and replaced when necessary, while the opposite edges of the knives or blades project beyond the beveled edges of the slots so as to slice the fruit as the said projecting edges pass in front of the discharge opening of the hopper and said feeding board. The projecting edges of the knives or blades are beveled and fluted on one side as at g' , so as to form a series of cutting teeth which easily penetrate the article being cut, while edged valleys are formed between each tooth, thus providing a knife having the beveled cutting edge, but which at the same time is so constructed as to possess all the qualities of a straight edge, while also to particularly provide an edge which will easily pass through tough and fibrous fruit such as lemons or oranges, which a straight edge will not easily cut without sawing the same there-through. The cutting edges of the knives or blades are adjusted to cut any desired thickness of slices by means of the adjusting screws g^3 , passing through threaded perforations in the wheel from the front of the same and having their inner ends working against the blades to adjust the same with respect to the opposite edge of the slots facing the same, according to the width of slice desired.

Intermediate of the main rectangular slots F, the cutting wheel D is further provided with the intermediate smaller slots g^3 , through which are designed to project the series of splitting lances or knives H which are secured in the removable knife blocks or strips h , re-

movably secured to the front face of the wheel by means of the securing screws h' , passing through said slots and engaging the inner faces of the blocks or strips. The lances or knives H are provided with beveled cutting edges h^2 , and are arranged at equal distances apart from each other on their blocks or strips, so that as the same pass through the fruit, the same is split up into a number of equal sections to the depth of the lance or knife, while the cutting blades following, slice the split portion of the fruit. It will be readily seen that owing to the disposition of the splitting lances between the slicing blades or knives that, as already stated, the said lances first split the fruit, which is subsequently sliced by the next blade following, and a number of small sections of the fruit pass through the main blade openings in the wheel, and between the same and the front of the frame, thus providing a perfect milling of the articles, preparatory to pressing the same as contemplated by this invention, or using the split and sliced portions, where vegetables only are milled.

Extending across the frame below the lower end of the feed board and directly back of the lower half of the cutting wheel, is the rear chute board I, forming the rear wall of a mill chute inclosed at the front end of the machine by the front cant or inclined chute board or wall i . The said cant board or chute wall is provided at its upper end with the supporting flanges i' , set at an angle to the board and resting on one of the upper frame pieces or supporting ledge i^2 projecting from the front end of the frame and supporting the board so that the same is supported at an angle, and its lower edge projects within the frame below and toward the lower edge of the rear chute board and the cutting wheel. The cant board or chute wall i is further provided with the beveled side tongues i^3 , resting upon the back of the opposite supporting cleats i^4 , secured to the front opposite corner upright frame pieces or posts a , thereby providing means for easily removing the board when a shorter one is employed as will be hereinafter described, and said board is further provided with the short opposite downwardly converging guard flanges i^5 , arranged to inclose the opposite lower edges of the cutting wheel and prevent the milled fruit or vegetables from scattering in passing through the chute. Now it will be seen that the split and sliced fruit passing through the vertically arranged cutting wheel, necessarily passes through the mill chute just described, and is directed by the cant board or chute wall i and the flanges thereof upon the front portion of the endless carrier apron or belt J, arranged within the frame and below said chute. The front portion of the carrier or apron projects beyond the chute and works over the front belt or apron roller j , having the journal ends or spindles thereof journaled in the opposite swinging adjusting and bearing arms j' , and pro-

jecting through the same, are adapted to rest or play in the notches j^2 in the front corner posts of the frame. Said adjusting arms j' are loosely mounted at their lower ends over each end of the gear shaft j^3 , journaled in opposite sides of the frame and carrying the gear wheel j^4 , meshing with the pinion j^5 , mounted upon one end of said roller to communicate motion to the apron. The arms j' extend to the front of the frame above the plane of the lower gear shaft j^3 and work against opposite corner posts, and are adjusted to any set position by means of the adjusting pins K, engaging any one of a series of perforations k in said posts, according to the tension of the apron desired. It will be seen that the arms j' , are axially adjustable with respect to the gear shaft over which they swing, and thus provide means, whereby the operating pinion thereof is always in mesh with the gear wheel just noted.

Secured to each end of the front apron roller are the opposite sprocket wheels L, having inwardly beveled tongues l , which engage the slots in the sprocket belts l' , which belts are so secured along the opposite edges of the endless apron as to always hold the same in position upon the said roller, and owing to the bevel of the sprocket tongues, to correct any disposition of the apron to slide off, while the apron is further held to the center of the roller by means of the auxiliary belt x secured around the center of the apron and working in the central annular guide groove l^2 in said front roller. The rear or inner traveling portion of the endless carrier or apron passes over the small rear belt roller M, which holds the belt or at least leads the same to a point between the upper and lower pressure rollers N and N', respectively, as near as possible to the point where the rollers contact with each other, and a portion of the belt as at m , is held up in close proximity to the lower portion of the upper pressure roller N, by means of the intermediate guide roller O journaled in opposite sides of the frame in front of the upper pressure roller and adjacent to the same, said guide roller being in a higher plane than the front or rear belt roller thus holding the top of the apron near the pressure rollers up into position noted. The rear apron roller is journaled at each end in one end of the horizontal spring supported bearing arms P, pivoted at their other ends to the intermediate vertical frame pieces p , and resting near their moving ends upon the supporting springs p' , which springs are seated in the notched brackets p^2 also secured to said vertical frame pieces, while the elevated portion of the apron is held in sufficiently close proximity to the upper pressure roller to allow the same to grasp the fruit before it reaches the lower roller, and at the same time the spring support for such end of the apron provides means whereby the same will readily yield to an extra large piece of fruit, and permit the same to pass on between the rollers

after the fruit has been milled and drops onto the front portion of the apron, as already described. The apron carries the fruit up to the elevated portion m , first under the upper pressure roller N. The pressure roller N bites the fruit in the apron before it reaches the lower roller, and, with the apron, carries the same to said lower roller which it strikes at the very moment it leaves the apron, so that all the fruit must necessarily pass between the rollers, which completely extracts the cider therefrom and directs the same toward the front of the machine and deposits the pomace at the rear end as will be noted.

The lower pressure roller is constructed of either wood or iron as desired and is fixedly mounted in suitable bearings n , at each side of the frame, and the same carries the large gear wheel n' , meshing with the intermediate gear wheel j^4 , which communicates motion to the endless apron as described, while the lower roller receives its motion from the gear n^2 mounted upon the upper roller shaft. The upper roller is driven, to communicate motion to the rest of the mill, as outlined, from the drive shaft, by the pinion n^3 mounted on said shaft and meshing with the adjacent intermediate gear n^4 , upon the supplemental gear shaft n^5 , and which in turn engages the gear wheel n^2 . The upper pressure roller is mounted so as to be in contact with the lower pressure roller and directly above so that all the cider will pass to the front of both rollers, which will be quite apparent, and the same is constructed of any suitable material, preferably having a cloth facing n^6 in order to allow the upper roller to be adjusted tight or loose upon the lower roller. The shaft n^3 of said upper roller has the ends thereof project through the side slots p^2 , in the intermediate frame pieces p^3 and journaled in the vertically adjustable bearing blocks Q, working in front of the slots on said frame pieces and within the side plates q , which are provided at their lower ends with the lower bearing sleeves or boxes n' for the lower fixed pressure roller. The said side plates are secured to the vertical frame pieces p , and are further provided with the adjustment slots q^2 , registering with the slots p^2 , and allowing the journal ends of the upper roller shaft to play therein, and also with the guide recesses q^3 in the back of the plates to allow the bearing plates or blocks Q to freely move between the slots in the frame pieces and side plates. Said bearing plates or blocks are provided with the bearing sleeves q^4 projecting through the slots in the side plates, and which receive the lower ends of the springs R, resting thereon and inclosed within the tubular spring housings r , embracing the side plates above the sleeves q^4 and secured to the frame of the machine. The housings r also accommodate the sliding blocks r' , working therein upon the upper ends of said springs and adjusted by means of the adjusting rods or screws r^2 , having lower threaded ends passing through

the flanges r^3 , at the upper ends of the side plates and provided with threaded perforations r^4 , to receive said rods or screws, so it will be readily seen that novel and efficient means are provided for the ready adjustment of the tension of the upper pressure roller to obtain the requisite pressure.

As the juice is pressed from the fruit the same passes from the lower roller below the rear end of the apron over the trough board S and out at the front of the mill. The said trough board is provided at one end with a projecting sheet metal collecting strip s , which being held tightly against the lower roller collects all the cider and directs the same upon the board, which is further provided with the conveying trough strips s' which direct the juice to a suitable vessel placed at the front of the machine for its reception. The said board is further provided with the notched fulcrum lugs s^2 , which bears under the gear shaft j^3 , and when the outer end of the board is raised causes the collecting strip to bear tightly against the lower roller. The outer end of the trough board is held firmly in its fulcrumed position by means of the supporting bar T, pivoted at one end to one of the frame posts and adapted to be swung under the outer end of said board, and have its other end removably rest in the notched supporting block t secured to the opposite post.

The pomace is scraped from the rear sides of the pressure rollers, by means of the adjustable scrapers V arranged against each roller, and drops into the drawer or box v , removably fitted within the rear lower end of the frame. Each of the scrapers V is secured to the adjustable blocks u , having at their ends the slotted securing flanges u' resting against the adjacent frame pieces and engaged by the adjusting screws u^2 , passing through the slots in said flanges, and providing means for adjusting the scrapers to and from the rollers as desired or found necessary.

In the event of using the mill independently of the press devices to operate the same as a vegetable cutter, I then dispense with the cant board or front chute wall i , and employ a shorter wall V' provided with the beveled side tongues v' corresponding to the side tongues i^3 of the main front wall i of the chute and adapted to removably rest in the cleats i^4 previously described, and said short wall V' corresponding in all other details with said cant board. Now instead of directing the split and sliced fruit onto the apron, the same drops onto the board W arranged under the chute of the mill lying over the front receiving end of the apron. The said board W extends at an angle to the front of the machine and is provided near its inner end with the projecting side arms w , adapted to rest back of the front corner posts and support the board in position; said board being inclined, of course assumes the function of a conveyer to carry away the milled product,

the same as the endless apron. When not used in this capacity the inclined conveyer board W may be supported horizontally beneath the trough board upon the front supporting bar w' , and the opposite notched blocks w^3 secured to the opposite intermediate frame pieces, to receive said arms W, and in this position may serve to catch any drip or waste from the trough above.

Each of the corner posts a is provided with the squared openings X in which are placed the lifting handles Y to lift the machine from place to place, and which when not in use may be slid within said openings and out of the way.

A weighted stop pawl Z, is pivotally secured within the frame of the machine and engages the large gear wheel of the upper pressure roller, and while allowing the upper and lower pressure rollers to revolve in opposite directions to pass the pomace into the box or drawer at the back end of the machine, the said pawl at the same time prevents the machine from running backward and reversing the correct movement of the various parts of the mill.

It is thought that the construction, operation and many advantages of the herein described cider mill are now apparent without further description.

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

1. In a cider mill, the combination of a frame having flanged side pieces, a hopper box removably seated inside of the flanges of said side pieces and provided with a slanting bottom and a front discharge opening at the lowest point of said bottom and at one side of the center of the frame, depending sides arranged inside of the hopper to inclose said front opening, and projecting below the plane of the bottom, a flat inclined feed board arranged under the lower ends of said depending sides and provided with a parallel series of raised tapered flanges forming intermediate feeding channels, said flanges being tapered from the upper end of the feed board to a point flush with the same near its lower end to leave a spreading space, a cutting wheel mounted to rotate in close proximity to the lower end of said feed board, and conveying devices arranged under the wheel, substantially as set forth.

2. In a machine of the class described, the combination with the frame and the hopper, having an opening in its front wall at one side of the center of the frame; of a vertical cutting wheel mounted to rotate in front of the hopper opening and provided with a series of enlarged rectangular slots, fluted spring metal cutting or slicing blades secured at one end to the body of the wheel and having their cutting edges projecting beyond one edge of said enlarged slots, means for adjusting the cutting edges with respect to the slots, and a series of intermediate beveled splitting

lances removably clamped to the body of the wheel between the cutting blades and adapted to travel in advance thereof, substantially as set forth.

5 3. In a machine of the class described, the combination with the hopper, of the vertical cutting wheel mounted to rotate in front of said hopper and provided with an alternate series of large and small rectangular slots,
10 blocks or strips removably secured to the face of the wheel and provided with a series of regularly spaced splitting lances projecting through said smaller slots, a series of fluted spring slicing blades secured to the wheel and
15 projecting beyond the edges of the larger slots, and adjusting screws passing through the wheel and bearing against said blades, substantially as set forth.

4. In a machine of the class described, the
20 frame the removable hopper box mounted at the top of said frame and provided with a discharge opening in its front wall, a vertical cutting wheel mounted on the frame and adapted to rotate in front of said hopper dis-
25 charge, a removable inclined chute wall, removably supported on the frame to inclose the lower half or portion of the wheel, and a conveyer arranged under said chute wall, substantially as set forth.

30 5. In a machine of the class described, the frame having notched supporting cleats, at its front end and a horizontal supporting ledge above said cleats, a vertical cutting wheel mounted within said frame, a remov-
35 able chute wall inclosing the lower portion of said wheel and provided at its upper end with a supporting flange adapted to rest upon said supporting ledge and beveled side tongues removably resting in said cleats, and a con-
40 veyer arranged beneath said chute wall, substantially as set forth.

6. In a machine of the class described, the frame having supporting cleats at its front end provided with upper beveled ends and
45 a supporting ledge above said cleats, the fixed rear chute wall depending within said frame, the vertical cutting wheel mounted within the frame in front of said wall, the removable front chute wall located in front
50 of said wheel and provided with a supporting flange adapted to rest on said ledge, beveled side tongues resting in upper ends of said cleats and the oppositely downwardly convergent guard flanges arranged to inclose the
55 opposite lower edges of the cutting wheel, and a conveyer located below said chute wall, substantially as set forth.

7. In a cider mill, the combination with the frame, the milling devices located at the top and at one end of said frame, and the pressure rollers; of the endless carrier apron mounted within the frame under said milling devices, and having an inner elevated inclined portion leading to the inner extremity of its
65 travel so as to dispose the extreme inner portion thereof between the pressure rollers at a point near the point of contact of the same,

said inner elevated inclined portion being arranged to travel in close proximity to the lower portion of the upper pressure roller, substan-
70 tially as set forth.

8. In a cider mill, the frame, the milling devices at one end of said frame, the pressure rollers mounted within the frame, a swinging belt or apron roller mounted at one end of
75 said frame, means for adjusting said roller axially with respect to its point of support, an opposite fixed apron roller mounted between said pressure rollers near their point of contact, and an endless apron passing over
80 said rollers from beneath the milling devices to between said pressure rollers, substantially as set forth.

9. In a cider mill, the frame, the cutting wheel, the pressure rollers in rear of said cut-
85 ting wheel, swinging bearing arms adjustably mounted at one end of said frame and below the cutting wheel, an apron roller journaled in said arms, and provided with opposite end sprocket disks, an opposite spring supported
90 apron roller mounted between said pressure rollers near the point of contact, and an endless apron passing over said rollers and having side sprocket belts passing said roller sprockets substantially as set forth.

10. In a cider mill, the frame, the cutting wheel at one end of said frame, pressure rollers mounted within the frame and carrying meshing gears connected with suitable driv-
100 ing gear, a gear shaft mounted within said frame and carrying a gear wheel meshing with the lower roller gear, opposite swinging bearing arms loosely mounted at their lower ends upon said gear shaft to be radially ad-
105 justable thereon, a front belt roller journaled in said arms and carrying a pinion meshing with said gear wheel and opposite sprocket disks having beveled tongues, an opposite belt roller mounted between said pressure rollers and an endless carrier belt or apron passing
110 over said roller and having side sprocket belts engaging said sprocket disks, substantially as set forth.

11. In a cider mill, the combination with the frame, the cutting devices and pressure
115 rollers, of the front swinging apron roller adjustably mounted within the frame below said cutting devices, an opposite spring supported apron roller arranged between said pressure rollers, an endless apron passing over said
120 opposite apron roller and a guide roller mounted between said apron rollers under the top of the belt to hold the same in close proximity to the upper pressure roller, substantially as set forth.

12. In a cider mill, the combination with the frame, the cutting devices at one end of the frame and the pressure rollers, of opposite notched brackets on opposite sides to the frame, horizontal bearing arms pivoted at one
130 end of the frame and moving in said brackets to support said arms, a rear apron roller journaled in said arms and arranged between the pressure rollers, an opposite adjustable apron

roller at the front end of the frame, an endless apron passing over said rollers and an intermediate guide roller elevating the top of the apron near the lower portion of the upper roller, substantially as set forth.

13. The combination of the frame having slotted side pieces, opposite side plates facing said side pieces and having slots registering therewith, guide recesses back of said slots and flanges at their upper ends, the fixed lower pressure roller, bearing blocks sliding in said guide recesses and projecting through the slots in the plates, the vertically adjustable upper pressure roller journaled in said blocks, tubular spring housings arranged above said blocks, springs mounted in said housings and bearing on said blocks, adjusting screws working through said flanges and bearing on the upper ends of said springs, adjustable scrapers contacting with both of said rollers, the cutters, and a carrier passing from the cutters to the pressure rollers, substantially as set forth.

14. In a cider mill, the combination with the frame and the upper and lower pressure rollers, of the trough board provided at one end with a projecting collecting strip tightly resting on the front of the lower pressure roller, converging trough strips converging from said collecting strip to the front of the frame, and fulcrum blocks adapted to bear under suitable points of contact, a notched supporting block secured to the front and one side of the frame and a swinging supporting bar pivoted at one end to the opposite front side of said frame and adapted to swing under the outer end of said trough and have its other end rest in said supporting block, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JESSE BOWEN.

Witnesses:

FRANK E. SHUE,
D. P. WOLHAUPTER, Jr.