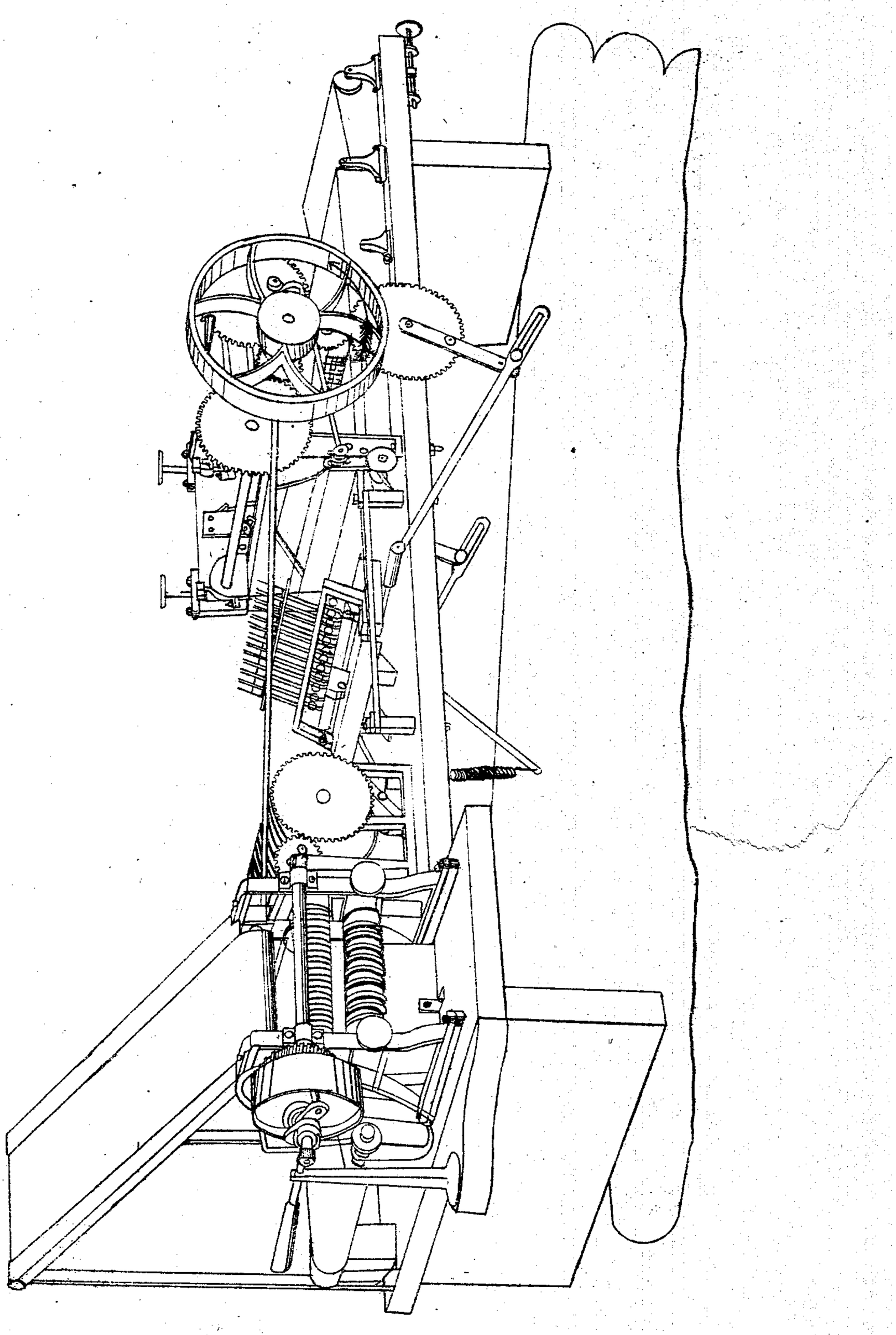
Sheet 1 — 5 Sheets

D. Stewart.

Cracker Making Machine.

No. 71420 Patented Nov. 26, 1867.

David Stewart's Cracker Making Machine Patented Nov 26 1867 No 71420



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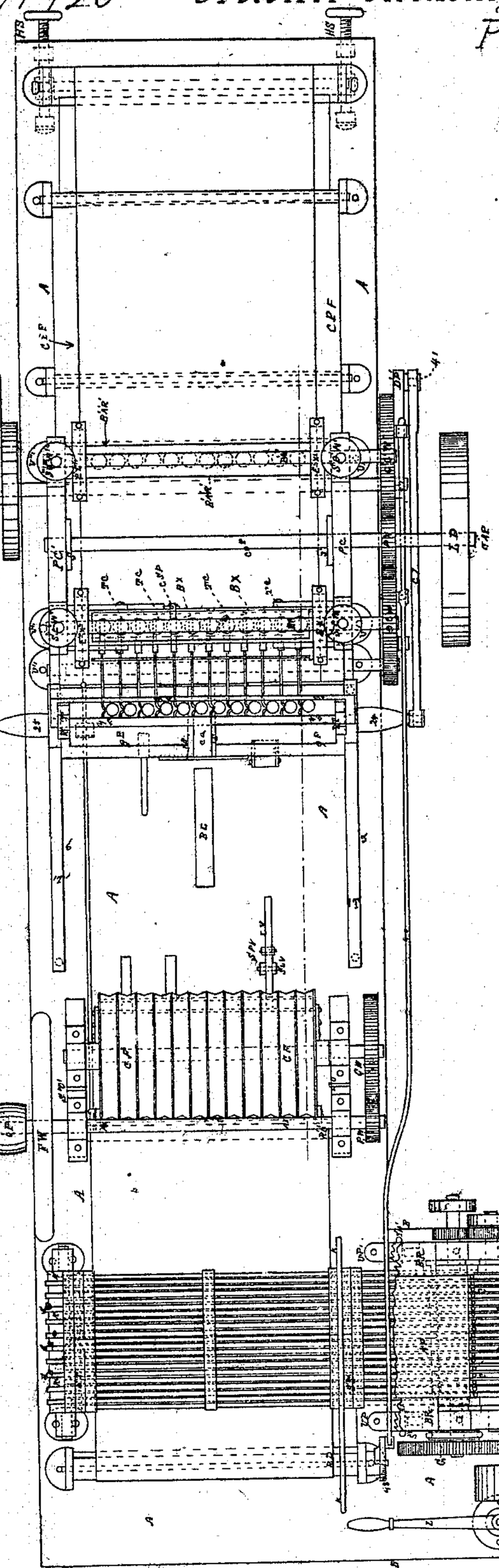

Fig. 1.

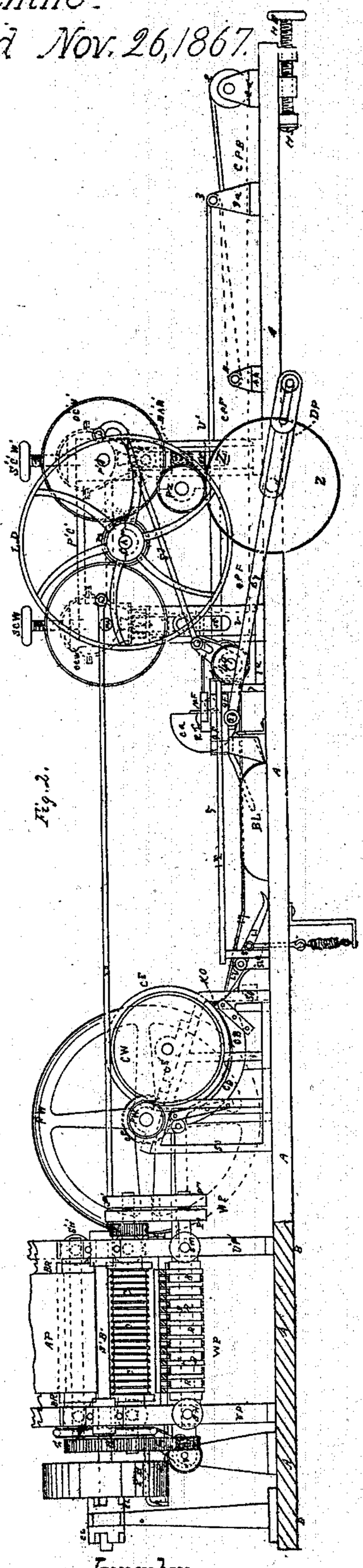

Fig. 2.

Witnesses
Simon G. Egginton
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Sheet 3 - 5 Sheets.

D. Stewart.

Cracker Making Machine.

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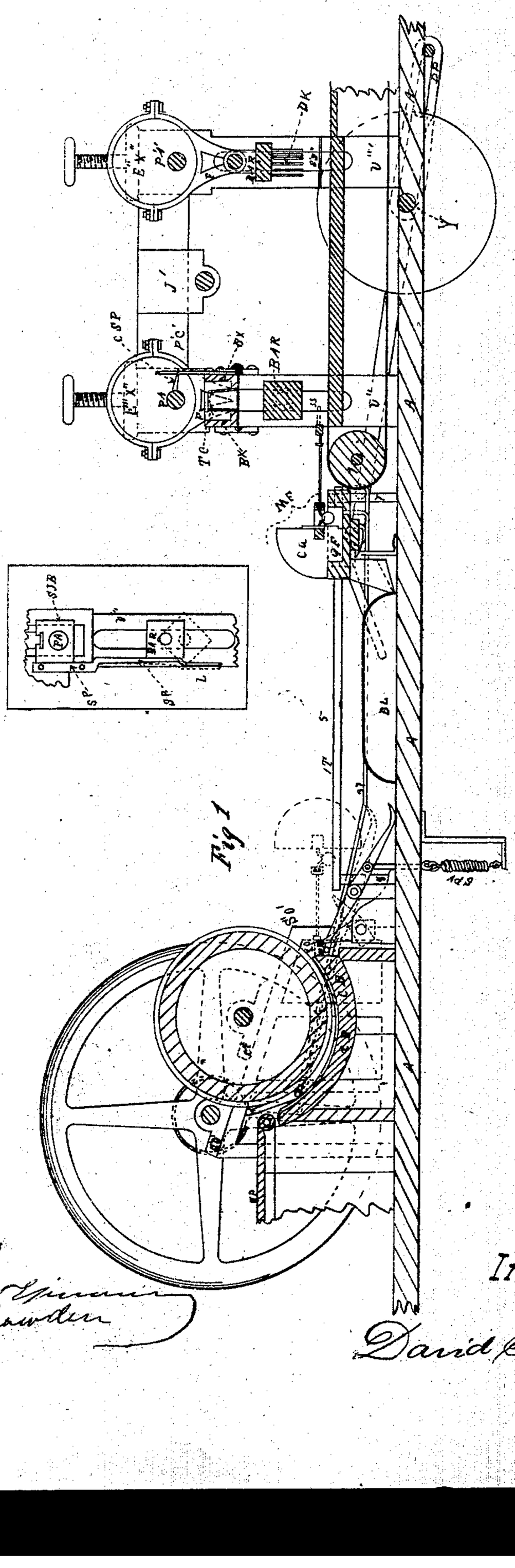


Witnesses

Lincoln Witness

J. H. Bowden

Inventor

David Stewart

Sheet 4 – 5 Sheets.

D. Stewart.

Cracker Making Machine.

No. 71420 Patented Nov. 26, 1867.

Fig. 3.

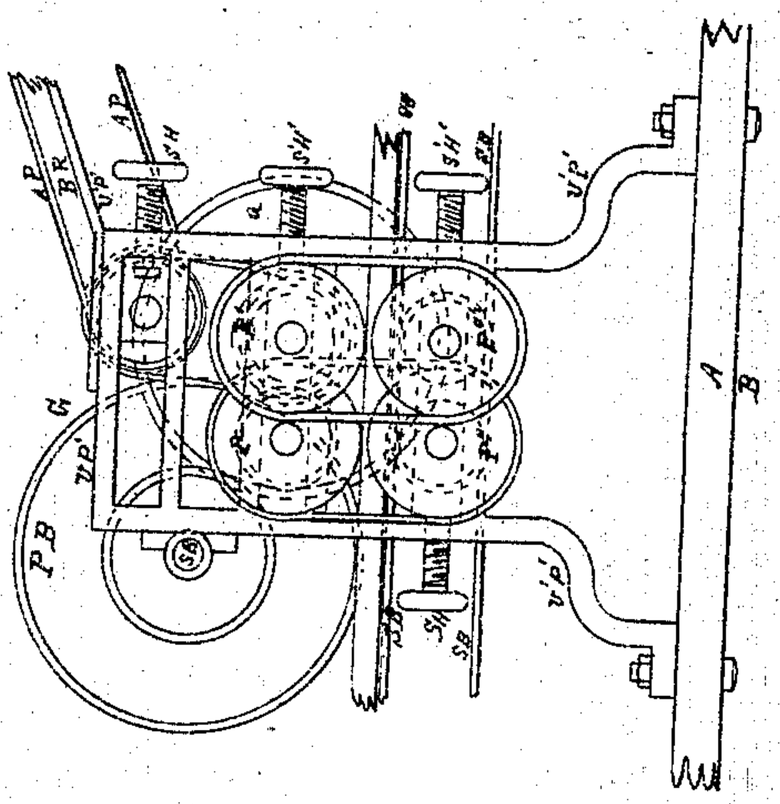


Fig. 2.

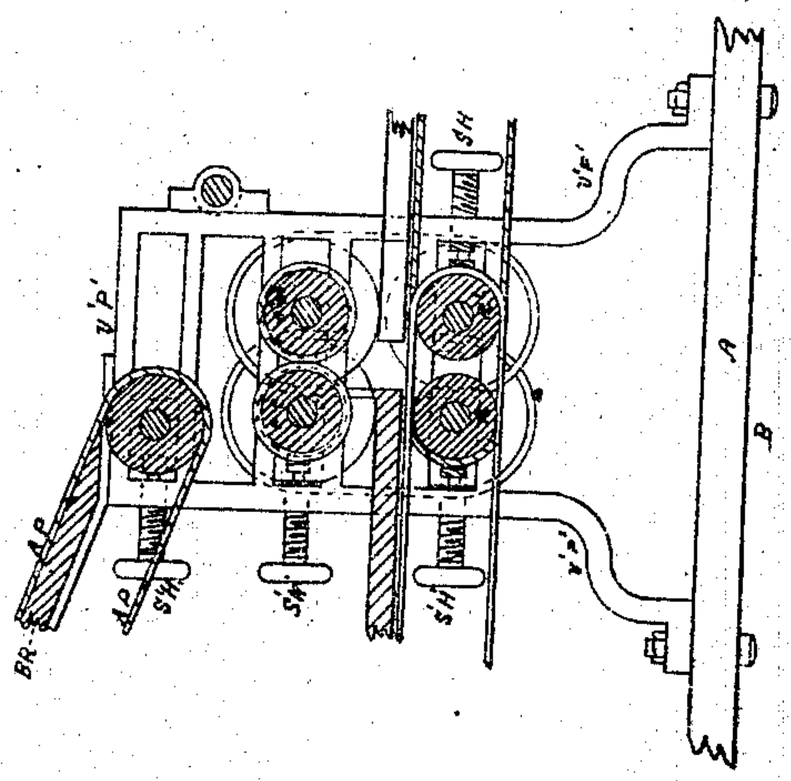
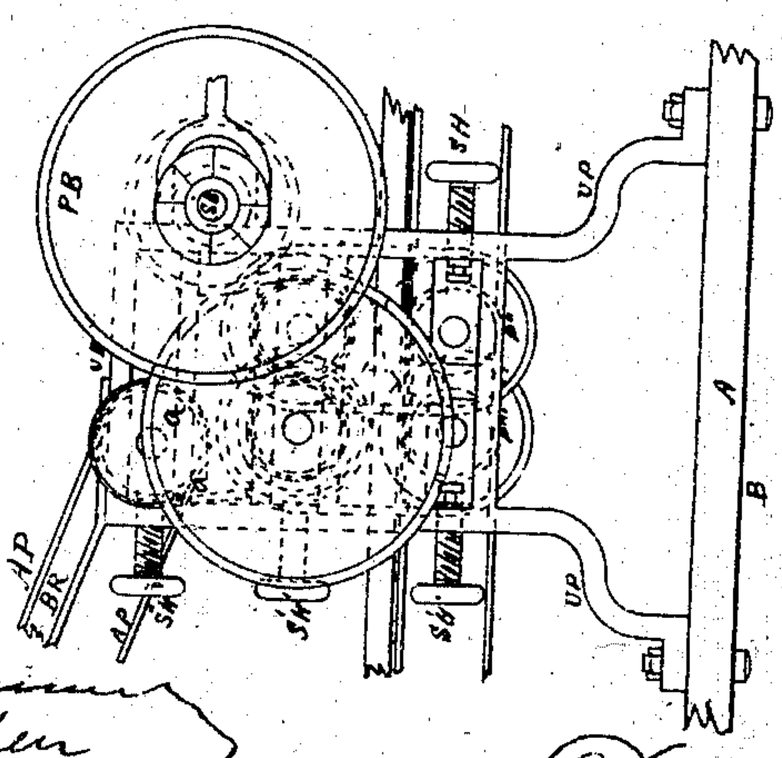


Fig. 1.



Witnesses

Thomas G. Ewing
J. H. Bowden

Inventor

David Stewart

Sheet 5 – 5 Sheets.

D. Stewart.

Cracker Making Machine.

No. 71420 Patented Nov. 26, 1867.

Witnesses

Lemuel Egerton
S. H. Bowden

Inventor

David Stewart

United States Patent Office.

DAVID STEWART, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 71,420, *dated November* 26, 1867.

IMPROVED CRACKER-MAKING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, DAVID STEWART, of the city of Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented a new and useful "Machine for Making Crackers;" and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, and in which—

Figure 1, plate 1, is a perspective (photographic) view of my whole machine.

Figure 1, plate 2, a plan view of my machine.

Figure 2, plate 2, a side elevation of the same.

Figure 1, plate 3, a longitudinal sectional elevation of part of my machine.

Figure 2, plate 3, an elevation view (detail) of one of the side uprights, with spring, and the different positions of the square of the bar against said side spring.

Figure 1, plate 4, a side elevation of one of the uprights on the dough-cutting part of the machine.

Figure 3, plate 4, a side elevation of the outside face of the other similar upright.

Figure 2, plate 4, a cross-sectional elevation between the two said uprights.

Figure 1, plate 5, showing in detail the disk with its fork apparatus.

Figure 2, plate 5, showing in detail a longitudinal sectional elevation of the large fluted roller and its fluted concave under box.

Figure 3, plate 5, a side elevation of the disk and the fork-apparatus, with its revolving movement shown in red arrows.

Figure 4, plate 5, showing detail of the stopper-bar or rod, with weight and crank.

Figure 5, plate 5, showing detail, and, in red lines, different movements of the catch and its spring.

Similar letters and figures refer to similar parts throughout this description.

The object of my invention is to contrive a machine for making and moulding crackers which will give a regularly-shaped and formed cracker, and save time and labor.

To enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

My machine is built up on wooden table A A, which is secured on a metallic bed-plate or frame set on legs of a height to suit. The metallic bed and legs having no special shape or dimension, and being in nowise part of my invention, I have not figured them in the drawings. They must of course be made to suit the shape of table A A.

In the following description my machine will be considered as composed of two distinct parts, which I will term Part No. 1, (or dough-cutting machine,) and Part No. 2, (or cracker-making machine.)

Part No. 1.

Table A, as shown in plan, is a rectangular table, turning on one end at right angles, as in B. It is on part B of said table that stand uprights V P and V′ P′, (figs. 1, 2, and 3, plate 4.) On said uprights are set fluted rollers C and C′, parallel, and placed on a level, and of same diameter, the edges of the grooves of one being opposite to the edges of the grooves of the other. On the back of uprights V P and V′ P′ are screws S H, S′ H′, by means of which the distance between rollers C and C′ is regulated at will. Lower down on same uprights, and parallel to rollers C and C′, are two wooden rollers, R and R′, also regulated by screws S H and S′ H′. The proper gearing G will drive rollers C and C′ in contrary directions, (towards each other,) as would terminating roller. The spaces left by their respective grooves will be nearly circular.

On end of the pinion-bearing shaft S B, in front of gearing G, is keyed pulley P B, which, by means of a lever, L, and clutch C L, is easily coupled or uncoupled. Now, parallel to the cylinder and rollers already mentioned, and on same level with rollers R and R′, but on the other side of the table, is placed a roller, R″, similar in size, shape, and material to rollers R and R′. Parallel endless strips or bands, S B, of leather, or any other suitable material, are next set around rollers R and R″, tight enough to keep parallel and equidistant when the rollers are in motion. Those bands should be disposed so as to correspond vertically with every second space formed by the grooves of fluted rollers C and C′.

W P is a light wooden platform, erected so that its top will be parallel to bed-table A, and pass between

the upper and lower part of endless strips S B. W P is covered with an endless canvas, held around two parallel rollers, R D and R′ D′, the axis of which is perpendicular to that of rollers R, R′, and R″, and parallel to the plane of bed table A.

On both sides of platform W P are two stands, S T and S′ T′, on which rests and slides backward and forward a frame, F, made of strips of wood of the same width of leather strips S B, each strip of wood being made to correspond to the space between two consecutive strips of leather. The position of said leather strips S B on top of platform W P is kept rigid by sliding in metallic rests or guides, (right-angle shaped, in the sense of their length,) and fastened by both ends, as stands S T and S′ T′.

On one side of F is a small space, between it and the stand, which is filled up by the blade of a knife, K, the handle of which passes on top of frame F, and allows the operator to draw the knife or push it forward, so as to give it a cutting motion. On the side of table A, opposite to uprights V P and V′ P′, is built up a stand, S M, high enough so that if a plane were conceived to pass from its top to that of uprights V P and V′ P′, the said plane would make, with the horizontal plane, an angle twenty to twenty-five degrees, or about. From top of stand S M to top of upright V P and V′ P′, is a boarding, B R, at each end of which are set two rollers, R P and R′ P′, parallel to each other, and also to rollers C and C′ and R and R′. Roller R P is permanent, but roller R′ P′ can be regulated (to stiffen or loosen the endless leather apron, or any suitable material, A P, set around both rollers) by means of a staple or shifting-screws S″ H″ set on back of uprights V P and V′ P′.

On end of shaft of rollers R P, on same side with pulleys P B, and between uprights V P and cog-wheel *a*, is keyed a pulley, P″, connected by a belt to another small pulley, set on centre shaft of rollers C′, back of cog-wheel *a*, so that when pulley P B is coupled, and therefore gearing G in motion, apron A P and roller R′ P′ will be driven by roller R P. Now, at right angles with upright V P and V′ P′, and parallel to sides of table A, are two metallic stands, S O and S′ O′, on which are the journals of a fluted roller, C F, of a diameter about four or five times that of rollers C and C′. Cylinder C F is set so that its axis is parallel to roller R′ D′, and in the same horizontal plane, only a very small space being allowed between R′ D′ and C F.

On end of axle of C F, towards uprights V P and V′ P′, is a cog-wheel, C W, gearing with P W, a pinion set on an axle, A X, running parallel to C F; and back of it, on the other end of A X, is a fly-wheel, F W, and outer pulley, O P. Under cylinder C F is placed concave box C B, the arc of concavity of which has been drawn from centre back of that of cylinder C F, and with a larger radius, so that the space between the concave box C B and the lower part of roller C F will progressively diminish towards the front of said roller. Box C B is fluted similarly to roller C F, the edges of the grooves of one being opposite the edges of the grooves of the other. Cylinder or fluted roller C F is driven by pulley O P, gearing C W and P W, and fly-wheel F W.

Except two small contrivances that I will describe hereafter, the description of Part No. 1 is now completed.

Part No. 2.

At about two-thirds of the distance from roller C F to end of table A are uprights V V′ V″ V‴, made of metal, and vertically slotted from the lower to the upper one-quarter, or about, of their length; said slots S S, S′ S′ being in width about one-quarter of the width of the upright. V and V′ and V″ and V‴ are respectively connected by pieces P C and P′ C′, on the centre of which are respectively set journals J and J′. In the head of the upright are cut large square slots, into which are inserted sliding journal-boxes S J B, S′ J′ B′, &c., and shifting-screws S C W, S′ C′ W′, &c. Two parallel shafts, P A, P′ A′, are set into boxes S J B, S′ J′ B′. Both ends of said shaft on the side of V and V′, respectively, bear a cog-wheel, O C W and O′ C′ W′, of same diameter, about fourteen inches.

A centre shaft, C A F, set in journals J and J′, bears a pinion, P X, gearing with both cog-wheels O C W and O′ C′ W′, and on the outer end of same shaft is a pulley of large diameter, L D. Inside each upright, and on shaft P A and P′ A′, are set four eccentrics, E X, E′ X′, E″ X″, E‴ X‴, for the purpose as hereinafter described. From the lower strap of each of the eccentrics falls a fork, F, to which a square bar, B A R, hangs horizontally. B A R is of a thickness nearly equal to the width of uprights V V′, and is constructed so that the branches of fork F meet in a sort of ring, into which the ends of B A R, made round to that effect, are inserted. The round ends of B A R, on the side opposite to pulley L D, are not only inserted through the ring of fork F′, but are made to go through the ring and the slots of the upright, and outside of said upright a square block, of same dimensions of width as the bar, is keyed on said bar. On the same outside face of the same upright is a spring, S P, shown in fig. 2, plate 3, having receding elbow I, as shown in I, same figure and plate. Between shafts P A and top of bar B A R is a rectangular box, B X, held in proper horizontal position by braces from the table to the box, on both sides. The bottom of B X is a sieve, on which are symmetrically disposed a set of tin cups, T C, the bottoms of which are also made as a sieve. Said cups are besides set on sliding strips, which can be shifted side or lengthways by a catch-spring, C S P.

From the other eccentrics E″ X″ and E‴ X‴ hangs in similar manner a square bar, B′ A′ R′, the ends of which are inserted in slots of uprights V′ and V‴, into which they slide, guided up and down. The lower face of B′ A′ R′ is provided with series of dockers, D K, by means of which I dock or stamp the crackers. Each set of dockers is in a straight line with the fork on fork-apparatus M F.

Close to upright V′ and V‴, on a level with table A, is set an axle-shaft, Y, bearing on one end (side of stand V‴) a crank, D P, and on the opposite end a cog-wheel, Z, of same diameter with cog-wheel O C W, O′ C′ W′, on which (Z) is set crank D′ P′, equal in size and similar shape to crank D P. Cog-wheel Z gears with pinion P Z, set on a stud on V′, which gears itself with O′ C′ W′. Two main rollers 1 and 2, and two intermediate disk-rollers 3 and 4, are next fixed across table A, parallel to each other. They are held in proper place by pedestals 1ª, 2ª, 3ª, and 4ª, and are hidden from view, ends excepted, by a boarding of thin wood, forming what one might call an inverted box or closed platform, C P F. Around the rollers and disk-rollers above

described is enrolled an endless piece of canvas, which, starting from rollers 1, goes to disk-roller 3, thence around roller 4, thence around 2, thence to 1 again. Pedestal 2ª is made so that its foot runs through table A in a slot or hole, and is shifted forward or backward by means of screw arrangement H S. The canvas on roller can therefore be tightened or loosened at will with the help of said screws. The height from top of canvas to top of table A is so determined that, when in motion, eccentrics E X, being at its lower point, will bring bar B A R and dockers on bar B′ A′ R′ to rest on said canvas, but without pressing upon it.

On end of rollers R D, towards upright V P, is a ratchet-wheel, 48, acted upon by a crank, which receives its motion from cog-wheel O C W by means of connecting-rod 50. When in motion, said cog-wheel rod 50 acts on ratchet-crank and wheel 48, and intermittently drives forward canvas on rollers R D and R′ D′. The canvas on rollers 1, 4, 3, and 2, is similarly driven forward by a ratchet, 49, set on head of roller 1, and acted upon by a ratchet-crank connected with cog-wheel O′ C′ W′ by rod 51. Between roller 1 and canvas box C P F, and on each side of table A, are set two slides, 5 and 6, the top part of which is on a level with the above-described canvas. Slides 5 and 6 are composed of uprights 7 and 8 and top pieces 1 T and 1 T′. A sliding table, 9 F, or frame, one foot or so in width, runs backward and forward on 1 T and 1 T′. A slot, 1 S, is cut across table or sliding frame 9 F, and in said slot is inserted a disk-segment, C *a*, made of wood or metal, and of about nine or ten inches in diameter. If I suppose sliding frame 9 F, with its axis, resting on the middle point of slides 5 and 6, disk C *a* must have been set so as to rest the plane of its diameter parallel to table A, the said diameter being perpendicular to the axis of slide-frame 9 F. Again, the centre of C *a* must be about one and a half inch or so above the top surface of slide-frame 9 F, and to be kept in this position it is made to rest on a block, B L, or cushion, of sufficient length and thickness. B L is covered with a band of leather or India rubber, or any kind of material to suit, and so is the periphery of disk C *a*.

I next construct a metallic frame, M F, as shown on a larger scale in figs. 1 and 3, plate 5, on both longer sides of which are bored holes *h h h*, and journal-holes *h′ h′ h′*, into which are inserted rods *r d r d r d*, standing parallel to each other, every one of them being perpendicular to M F. Portions of rods *r d*, between M 1 and M 2, form a series of elbows, on to each of which are attached weights W W W, for the purpose hereinafter described. On end of each rod is set a fork, *f f*, constructed either as shown in figs. 1 and 3, plate 5, or in any other way to suit; rods *r d* being held in proper parallel positions by a wooden or metallic strip, W S. Thus prepared, the fork-frame is set on the centre of disk C *a*, (fig. 3, plate 5,) and C *a* being inserted into slots 1 S of sliding frame M F, the lower face of M 2 sits on two pillow-blocks R T and R′ T′, on each end of M F. The part of M 2 inserted into disk C *a* is square, and that revolving in blocks R T R′ T′ is round; therefore the axis around which the whole, disk and fork-apparatus, revolves, is the axis of M 2, (fig. 3, plate 5.) The length of top pieces 1 T and 1 T′ is calculated so as to regulate and limit the stroke of the forks either way.

On the lower face of slide-table 9 F are attached two arms, 24 and 25, right on the middle of each end of 9 F, and to each of those protruding arms are fastened, by means of a collar ring and washer, two connecting-rods C 7 and C′ 7, connecting 24 and 25, and consequently table 9 F itself to the above-described cranks D P and D′ P′ on both sides of uprights V′ and V‴. The ends of C 7 and C′ 7 on cranks are slotted about one-fifth of their total length, so that pins 41 and 42, of cranks D P and D′ P′, will play in said slots with a loss of motion to C 7 and C′ 7, as will hereafter appear.

Now, between rollers R′ D′ (part 1) and back of fluted rollers C F is set a small rod, 33, parallel to the axis of cylinder C F, and held in proper place by journals on both ends. An upright rod, 34, with a weight, 35, is attached on one end of rod 33, and on the other end is a crank, 36, to which is attached a horizontal rod, 37, which runs parallel to table A towards part 2, its end being a right-angled elbow, the sides of which stand up and in about three or four inches from roller 1. On rod 33 are attached lugs, wooden or metallic, 38, 38, each one of which must be opposite to each circular groove or fluted cylinder C F. Rod 34, with weight 35, must be so attached that when no other force acts on rod 33, weight 35 will keep rod 34 and lugs 38 inclined to an angle of about eighty degrees, lugs 38 thus bearing against roller R′ D′, and when rod 37 is drawn back towards part 2, then lug 38 will bear against fluted roller C F.

In front of concave box C B is a horizontal strip of wood or metal, set on rod 41, parallel to the axis of fluted roller C F, and placed on a level with the space between front of concave box C B and roller C F. The rod on which the metallic or wooden strip is set revolves in upright journal and hole 40. On the other edge of the strip is a series of right-angled elbows, 40, facing towards part 2, and they are so placed that each of them is opposite each edge of the fluted cylinder C F. If abandoned to itself, the weight of the elbow all on the same edge of strip 40 would make it revolve and the elbow fall, as shown by black and red lines in fig. 5, plate 5.

To maintain the whole system, the strip horizontal, and the standing lugs or elbows vertical, a lever, L V, having its fulcrum on standard S L V, is set on table A, as shown in fig. 5, plate 5, black lines, and is itself (lever L V) held in such position by spring S P V set under table A, same figure and plate. This whole lever arrangement is set on one side of table A, the rod of spring S P V running in a slot through said table.

On the other side of table A is symmetrically placed an upright lug, 42, set on a weight hanging on a line running through the weight back of its centre. If any force acting on the lower part of the weight pushes it in the direction from part 2 towards part 1, (see red lines fig. 5, plate 5,) as soon as the force ceases to act, the fact of the weight being hung out of centre will bring it to its former position. 42 is, as well as L V, destined to keep 41 and lugs 40 in proper horizontal and vertical position.

On the lower face of slide-table 9 F, and towards part 1, are set lug 45 and shovel 46, respectively opposite standing lug 42 and lever L V. They are set so that when slide-table 9 F is driven towards part 1, shovel 46 will act on lever L V and lift it up in the mean time, when lug 45 will strike the foot of weight-lug 42. When this simultaneous action takes place, lever L V, upright lug 42, and rod 41, with elbow 40, will all occupy the respective positions shown in red lines, fig. 5, plate 5.

The description of my machine is completed so far, that it explains the construction of one of the two symmetric machines that I propose to always connect and run together. However, I should call the attention of the reader to this, one of the most important features of my invention, viz, the relative arrangement of the leather or endless bands of both machines.

Speaking of rollers R, R′, and R″, I have said that a series of endless leather bands, S B S B, were set around rollers R and R″, so as to correspond vertically to each second space formed by the opposite grooves of both fluted rollers C and C′. This left roller R′ unoccupied. Now, if I suppose a second machine, exact symmetric duplicate of the one already described, to be placed connected with that last one so as to run them symmetric and together, the set of uprights V P and V′ P′, with the system already described, of fluted rollers C and C′, and rollers R and R′, will answer for both machines, but it will be necessary to have a series of endless leather bands running around roller R′, and a roller R‴ placed in relation to R′ in the second machine, as R″ is to R in the first, each band of the second series corresponding to each second space of fluted cylinder C and C′, and setting into the space between two connecting bands in the first machine. The purpose of such an arrangement will appear hereafter.

After having connected the different pulleys of my machine with the shafts of the power which is to drive it, the diameter (relative) of said pulleys being so calculated that each part of my machine will have a speed proportional to what that special part is, in relation with the other, expected to accomplish, I place a sheet of dough of sufficient thickness on leather apron A P. Said apron brings the dough slowly towards rollers C and C′, between which it falls and passes. It finds itself there cut in slices, the thickness of which can be regulated by set-screws S H S′ H′, &c., on uprights V P and V′ P′. Each slice is directed to the corresponding leather strip S B, which drives them across canvas on platform W P. As soon as they reach near the outer edge of said canvas, the operator draws towards him knife K, which cuts all the strips of dough. He immediately afterwards pushes forward frame S T, thus throwing each strip of dough on canvas underneath. The said canvas is driven forward towards C F, where, one by one, each strip of dough falls between C F and concave box C B.

I should say, the operation thus described as taking place on one machine takes place also on and through similar parts of the other, and in order to give a full idea of the merits of using two machines, I will now suppose that there are altogether forty-eight grooves to cylinders C and C′, and consequently forty-eight strips of leather, twenty-four running towards and on one machine, and twenty-four towards and on the other. The leather bands on first machine to be designated as 1, 3, 5, &c., and the other way by 2, 4, 6, &c.

Now, when a sheet of dough, of the width of leather apron A P, reaches and is caught between C and C′, it is then divided into forty-eight strips, which fall, one half on bands 1, 3, 5, and driven towards machine No. 1, while the other half falls on bands 2, 4, 6, which carry them towards machine No. 2.

The advantage of the opposite movement of the bands is obvious. Bands of dough destined to be cut in lumps for crackers, should be of an even thickness all through. It is essential the machine should carry them, without any stoppage or accident, to the cylinder, where they will be cut in lumps, because if they be allowed to choke any of the inways through which they pass on the canvas that carries them, they could not be lifted up by hand without impairing their needed evenness, and the whole operation would therefore prove a failure. My system of double series of bands running in contrary directions obviates any such danger. Falling between the concave box and fluted rollers C F, each strip of dough is then cut in lumps of equal size, somewhat egg-shaped, and which the rotary movement of cylinder C F brings out in K O. The lumps fall on strip 41, then horizontal, from which they are prevented from falling by elbow 40. When on strip 41 the lumps rest on their longer side. At the very same moment the lumps of dough have reached and fallen on strip 41, the forks, driven towards C F by the gearing, connecting-rods, and arms on part 2, arrive in the position shown in red lines, fig. 1, plate 3, and each one runs through one of the lumps on strip 41.

In the same time this last operation is performed, the lugs and shovel-lug under slide-table 9 F, have one lifted up and the other pushed down, both lever L and weight 42, so that strip 41 falls, thus leaving such lump of dough stuck on each one of the forks *f*. Meanwhile sliding table 9 F is slowly driven back towards part 2, and when, in that movement, the outside of disk C *a* reaches the cushion-block B L, the friction having a tendency to retard the sliding movement, if not of the whole system, at least of disk C *a*, on the said disk, is held, but by its centre, it will revolve, and thus the system of forks will describe an arc of circle, bringing the lumps of dough towards bar B A R.

Cranks D P, playing in slots of rod C 7, allow the fork arrangement to remain in the horizontal position, as shown in M P, fig. 1, plate 3, long enough for bar B A R to take hold of the lump of dough, so that the fork system being pushed back by the action of cranks D P and D′ P′ on rod C 7, and C′ 7, withdraws from the dough, revolves, takes out of C F another supply of lumps, which it will bring as before under bar B A R, and so on.

I should, before going further, explain now the object and action of weights W W W, set on each elbow of the fork-rods. When each lump of dough reaches strip 41, into which they fall and rest before being caught by the forks, they are somewhat egg-shaped, and resting with their longer diameter horizontal. It is in that position that the fork picks them up. Now, should they reach bar B A R in that same position, it would flatten them so that each lump or cracker would be rather thin, and entirely long, oval-shaped. To obviate this inconvenience, I have attached weights W to the elbow of each fork, so that during the revolutions of the fork-apparatus towards bar B A R, weights W will fall, and causing each fork to make one-quarter revolution, each lump of dough will necessarily reach under bar B A R with its longer diameter vertical, and being flattened when in that last position, will become round, with the needed or desired thickness, said thickness being, besides, regulated by the more or less stroke allowed to B A R. These weights W W W, and their action on fork *f* and the lump of dough, are one of the important features of my machine.

One row of lumps having been explained, brought to the action of bar B A R, are flattened by said bar, and then driven forward by means of canvas on rollers 1 2 3 4, driven itself by the ratchet on end of roller 1. The relative speed of the different pieces of part 2 must be so calculated that when the first row of crackers reaches under stamping-bar B′ A′ R′, the same bar will fall on the row of crackers in dough and stamp them. It is also well to remark that the grooves of fluted roller C F must be so that each fork faces normally each groove, and that the groove, the fork, and the corresponding set of dockers on bar B′ A′ R′ are in one same straight line, otherwise some of the crackers in dough would not find themselves just under their corresponding docker, and would therefore come out badly stamped. When stamped, the row of crackers is ready to be lifted up and sent to the oven.

In the description of the construction of my machine, I have mentioned the spring S P, fig. 2, plate 3, set, as has been said, on upright V″. In its upward and downward movement it is obvious that the bar B A R slides up and down along S P, and when the top of the square piece, keyed on end of B A R, reaches the point or elbow I on said spring, B A R being no longer pushing S P open, the said S P springs back into its normal position, and when B A R goes up again, its angle, catching into I, will revolve, as shown in red lines, fig. 2, plate 3, so that when it falls on the dough it will be each time on a different face. This will in a measure obviate B A R striking into the dough. But the inconvenience is yet more completely avoided by the sieve and the sieve-box arrangement B X and T C placed on top of B A R, as above described. At each revolution of shaft P A, a cam set on it catches on spring C S P, to which the sieve is connected, and when the cam leaves C S P, it springs back, giving a shake to the sieve and flour-box, which are thus made to powder the top face of B A R with flour, so that as B A R at each of its ascensions revolves, each of its faces is powdered in turn, and this prevents the face in contact with the dough to ever stick to it.

The advantages of my machine are obvious. With it the dough, when in strips or in lumps, has not to be handled by hand. Each lump is perfectly similar to its fellow in shape and size; it is mechanically cut, crushed, and stamped. My machine will therefore make a cracker more uniform, more regularly shaped, more perfect, more pleasing.

I do not intend claiming broadly having invented the first cracker or bread-making machine, nor any of the parts of my invention, which parts may be found combined with machines of other kind; but having described my invention as fully and clearly as I could,

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The mechanical combination of fluted rollers C and C′, roller R R′ R″ and R‴, double set of endless leathern or other suitable material bands S B S B and S′ B′ S′ B′, running symmetrically in opposite directions, for the purpose and in the manner above set forth and described.

2. The combination of fluted rollers C F with concave box C B, drawn from different centres, for the purpose and in the manner above set forth and described.

3. The combination of rollers C and C′, R R′ R″ R‴, endless band S B and S′ B′, roller C F, and concave box C B, all constructed and operated in the manner and for the purpose above set forth and described.

4. Sliding-top frame (wooden or otherwise) S T, and knife K, combined, constructed, and operated in the manner and for the purpose above set forth and described.

5. The combination of rod and claw-stoppers 33 with weight-rod 34, weight 35, constructed and operated in the manner and for the purpose above set forth and described.

6. The rest or horizontal strip 41, with elbow 40, constructed and operated in the manner and for the purpose above set forth and described.

7. Spring-lever L V, eccentric-weight lug 42, combined with rest 41 and elbow 40, constructed and operated in the manner and for the purpose above set forth and described.

8. The combination of frame M F, disk C A, and forks *f f f*, with slides 1 T and 1 T′, constructed and operated in the manner and for the purpose above set forth and described.

9. The application to elbow of rod *r d r d* of weights W W W, for the purpose above set forth and described.

10. Cushion-block B L, combined with the fork arrangement, and constructed and operating in the manner and for the purpose above set forth and described.

11. The combination of bar B A R with eccentric E X and E′ X′, and shaft P A, constructed and operated in the manner and for the purpose above set forth and described.

12. Bar B′ A′ R′, combined with its eccentrics E″ X″ and E‴ X‴ and shaft P′ A′, constructed and operated in the manner and for the purpose above set forth and described.

13. The combination of spring S P on uprights V″, bar B A R, and its square-keyed end, constructed and operated in the manner and for the purpose above set forth and described.

14. Sieve-box B X and flour-sieve tin cup T C, combined with spring and cam C S P, constructed and operated in the manner and for the purpose above set forth and described.

15. A cracker-making machine, being the combination of all the different parts and pieces above separately claimed, constructed and operated in the manner and for the purpose above set forth and described.

DAVID STEWART.

Witnesses:

LIONEL J. D'EPINEUIL,

J. H. BOWDEN.