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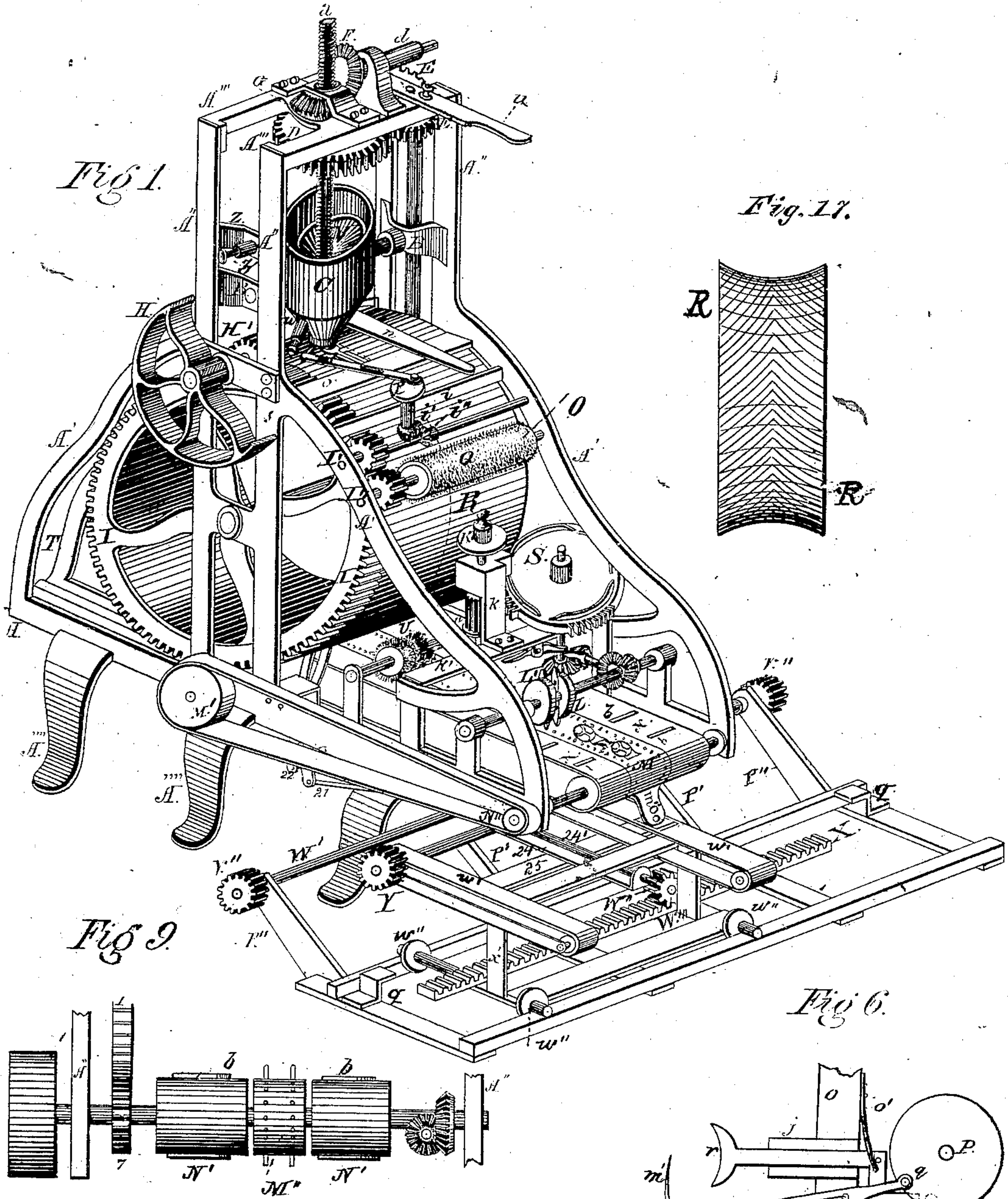
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T. H. & M. S. KELLER & C. W. MYERS.

BRETZEL MACHINE.

No. 277,573.

Patented May 15, 1883.



Witnesses
Wm. Blupperman
P. C. Dietrich

By

Inventors
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(Model.)

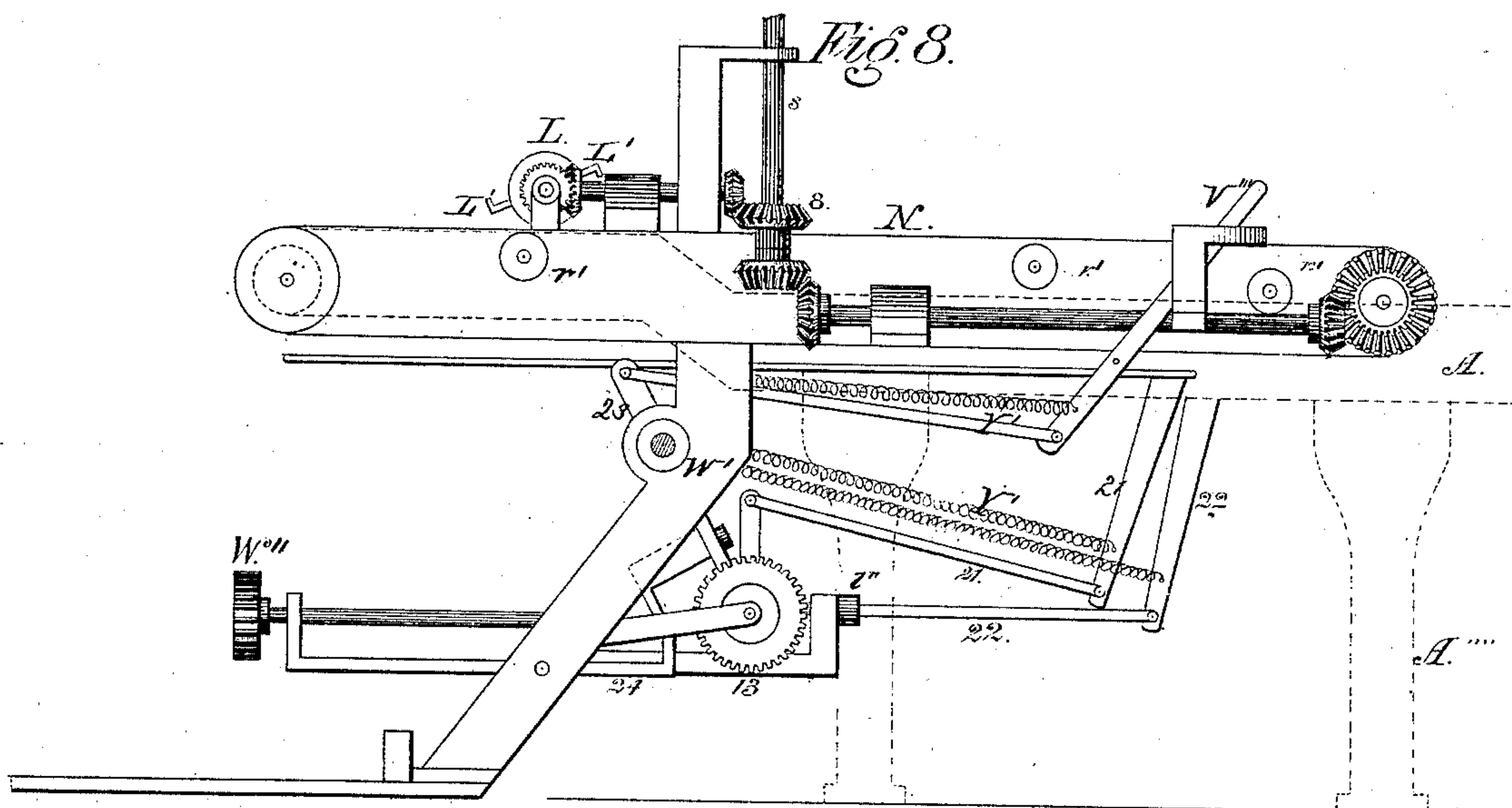
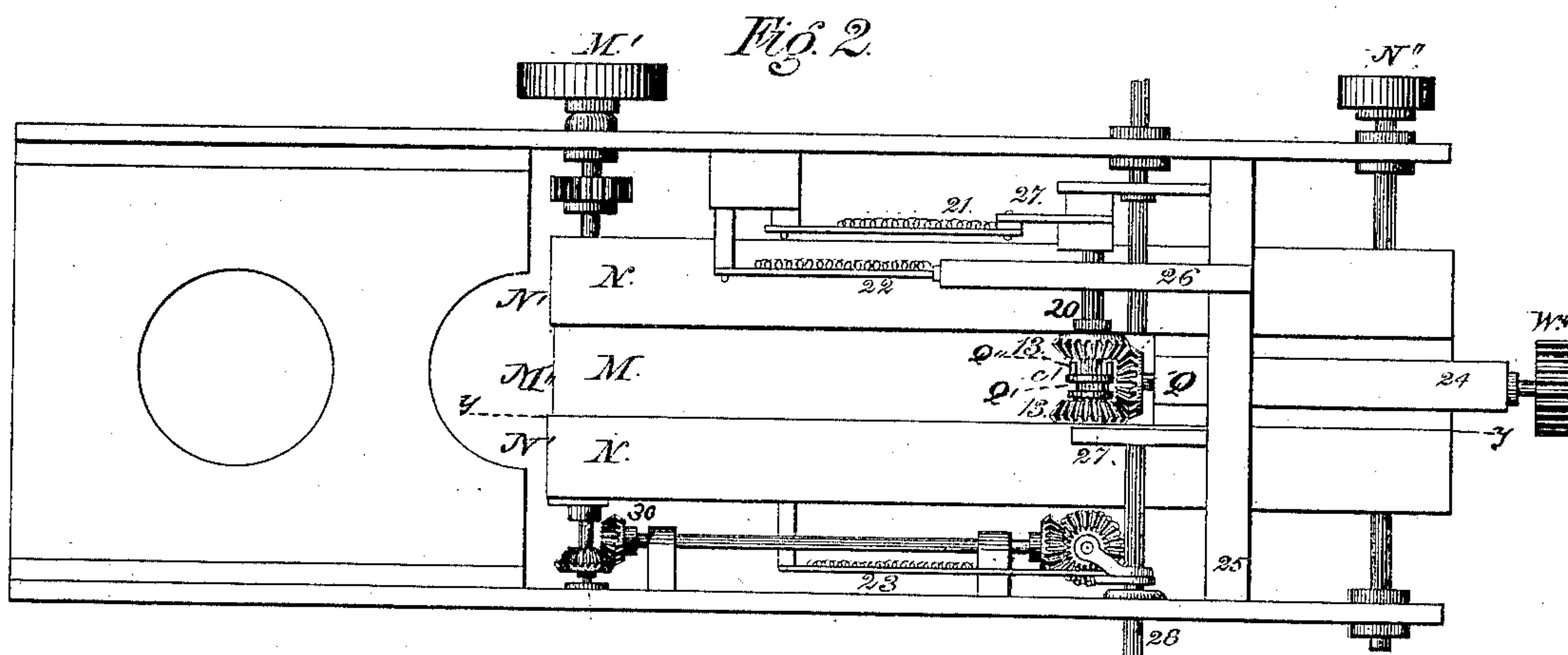
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BRETZEL MACHINE.

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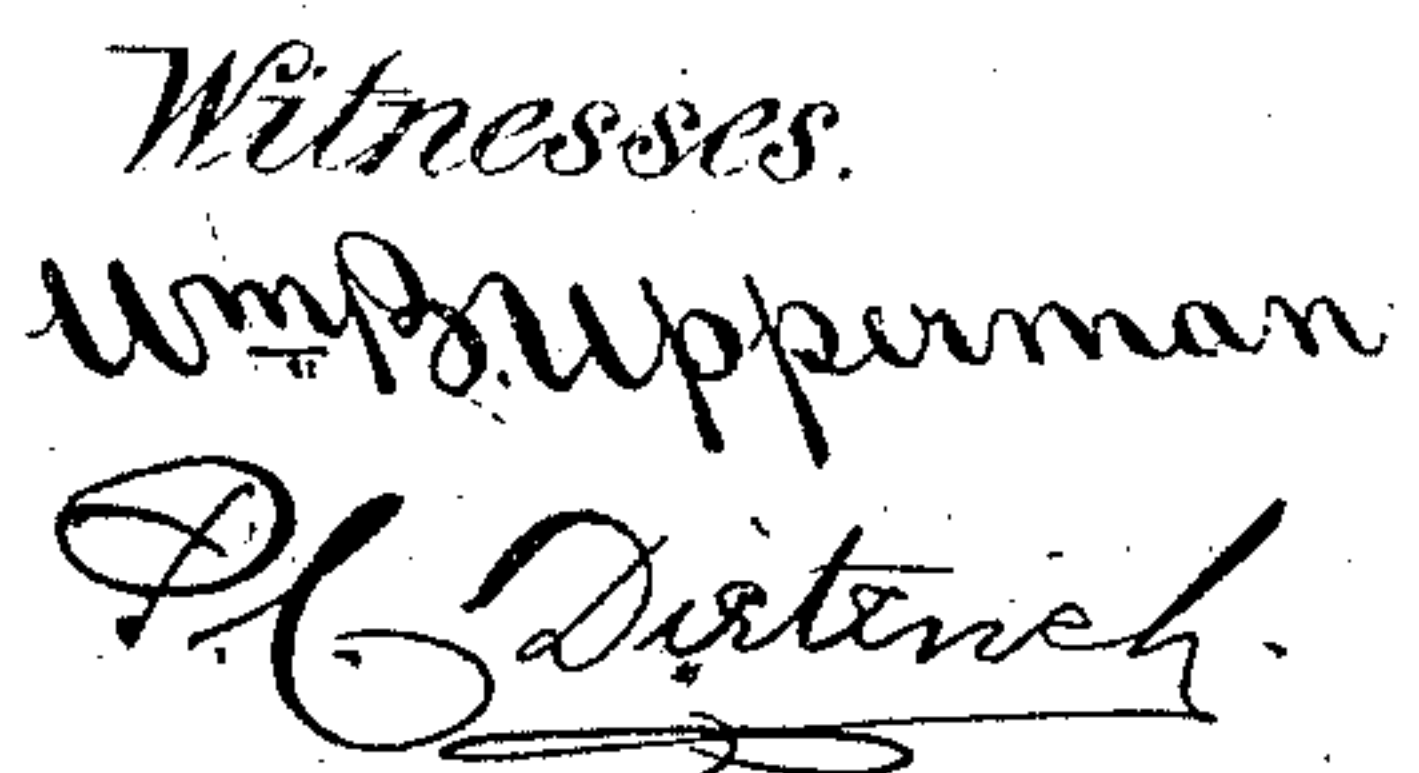
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5 Sheets—Sheet 3.

BRETZEL MACHINE.

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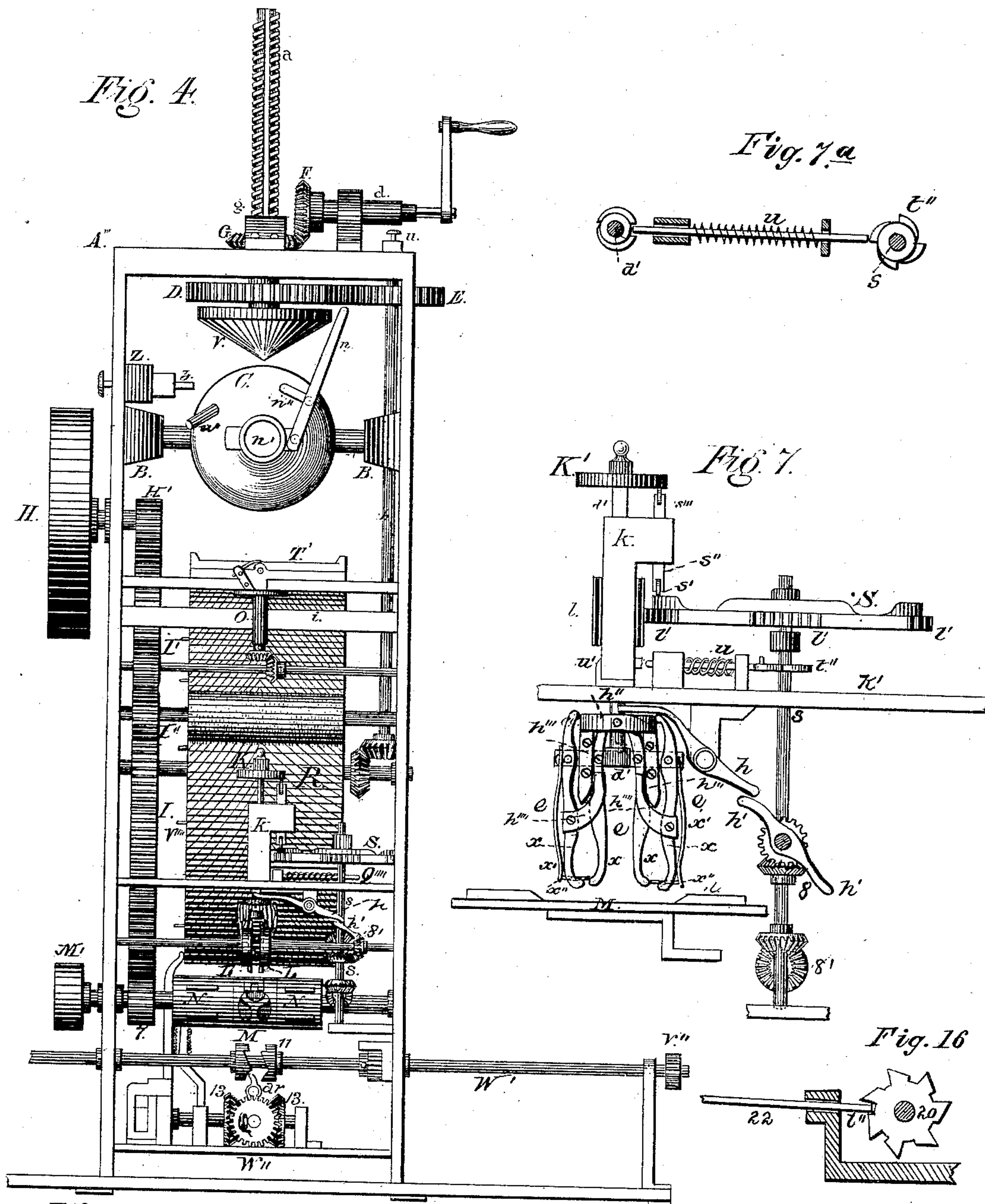
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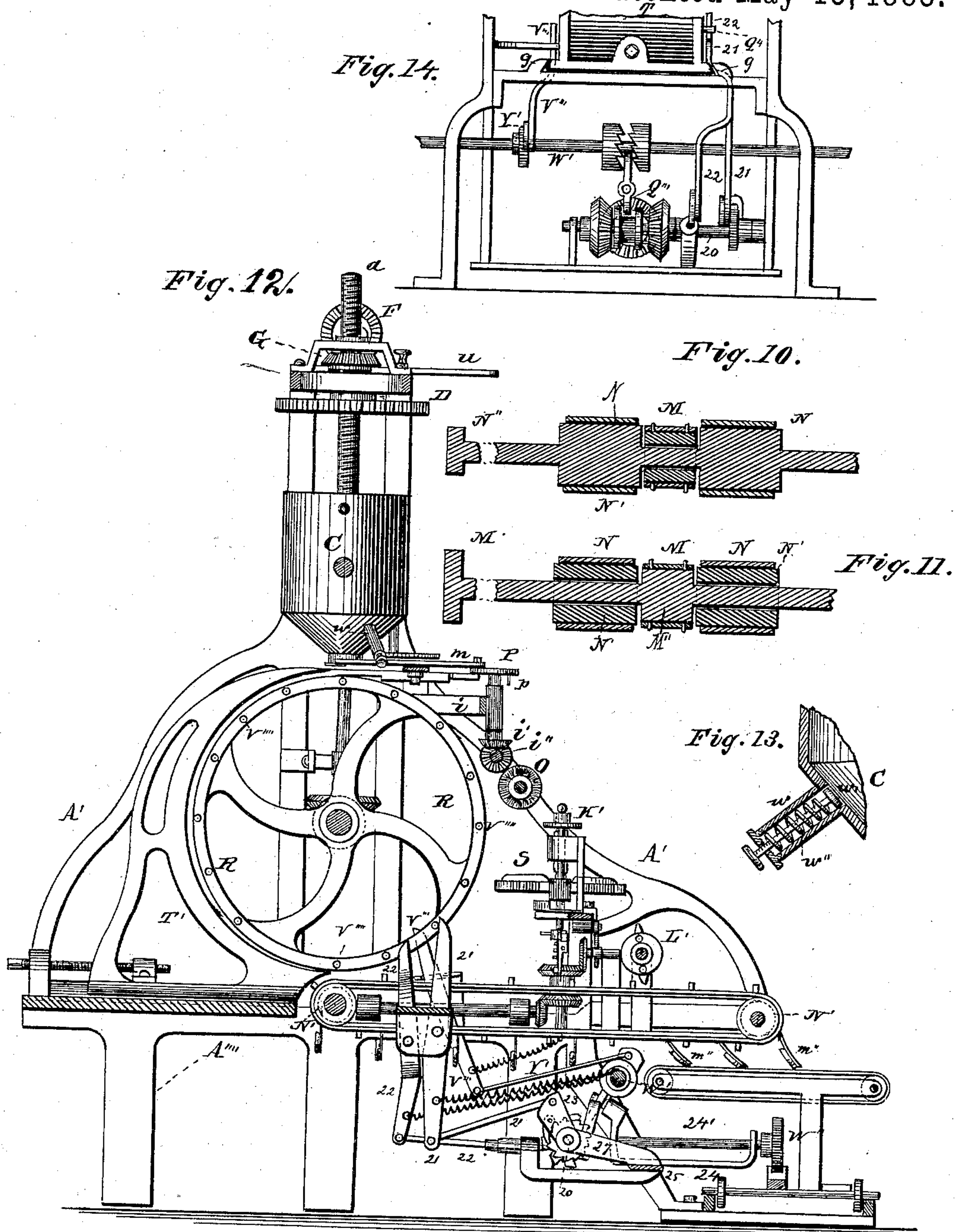
5 Sheets—Sheet 5.

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UNITED STATES PATENT OFFICE.

THOMAS H. KELLER, MARTIN S. KELLER, AND CHRISTIAN W. MYERS, OF LINCOLN, PENNSYLVANIA, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, OF A PART TO MARTIN V. B. STEINMETZ, OF SAME PLACE, GODFREY KEEBLER, OF PHILADELPHIA, PENNSYLVANIA, JAMES W. RUGER AND JAMES W. RUGER & CO., OF BUFFALO, NEW YORK, AND CHRISTIAN MÜLLER AND JOHN KAHLMUS, OF PHILADELPHIA, PENNSYLVANIA.

BRETZEL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 277,573, dated May 15, 1883.

Application filed December 29, 1879. Renewed October 3, 1882. (Model.)

To all whom it may concern:

Be it known that we, THOMAS H. KELLER, MARTIN S. KELLER, and CHRISTIAN W. MYERS, of Lincoln, in Lancaster county, and State of Pennsylvania, have invented certain Improvements in Machines for Rolling and Forming Bretzels, of which the following is a specification.

The object of this invention is to take suitably-prepared dough, press it, cut it into suitable and equal portions, roll the portions into form, bring the ends together and twist them, and deliver them upon a carrier operating to receive them without being piled one upon another, as is hereinafter more fully described.

In the annexed drawings, Figure 1 is a perspective view; Fig. 2, an under view. Fig. 3 is an end elevation of the main drum and the concave; Fig. 4, an end elevation from the delivery end, having the plunger raised and the receiver or hopper tipped for a fresh supply of dough. Fig. 5 is an end elevation from the rear; Fig. 6, details showing the cutting devices; Figs. 7 and 7^a, details showing the twisting devices. Fig. 8 is a side elevation of a portion of the machine; Fig. 9, a detail of the inner roller of the carrying-belt. Fig. 10 is a section showing the attachment of the rollers to the forward shaft; Fig. 11, a similar view, showing the attachment of the rollers to the rear shaft. Fig. 12 is a central vertical section. Fig. 13 is a section of the pressure-gage on the hopper. Fig. 14 is a rear detail view, showing the clutch-ratchets and levers. Fig. 15 is a rear view of the fingers. Fig. 16 is a detail view of the bolt and stop. Fig. 17 is a detail view showing concave roller.

The frame is made of iron, and is composed of the rails A, braces A', uprights A'', cross-bars A''', and legs A'''. The uprights A'' are connected by suitable bars, the lower ones of which form the bearings of the shaft which carries the drum R and the main gear-wheel I. The second one forms the bearing for the driving-pulley H and the driving-pinion H'. On the inner side of the uprights are curved cross-bars B, which form supports for the trunnions of the hopper C. On the side carrying the

driving-pulley there is an additional cross-bar, Z, which supports a spring-pin, z, for locking and holding the hopper in an upright position. On the upper cross-bars of the uprights, which have a central connecting-piece, is a curved cross-plate which serves to hold the beveled-gear wheel G down, and which, with the connecting-piece, prevents said beveled-gear wheel from rising or falling with the screw a. The gear-wheel G is connected with and fastened to the gear-wheel D by a collar, and both of the gear-wheels G D and the connecting-collar are provided with an interior screw-thread, so that when in rotation they give an end movement to the screw-shaft a. The screw-shaft is prevented from rotating by means of a groove (shown in Fig. 1) and a feather or pin firmly attached to the supporting cross-plate. This screw-shaft a operates the plunger V, and when driven in one direction it forces the dough out of the hopper, and when reversed it lifts the plunger, and has a sufficient length to cause it to be lifted entirely free from the hopper, so that the hopper can be turned to the position shown in Fig. 4. The bevel-gear G is driven by a similar gear, F, on the shaft d, which shaft is squared at its outer end to receive a crank-handle or winch, and it is by this means that we prefer to raise the plunger from the hopper; but it may be used for depressing it. For this purpose, however, we prefer to use the gear-wheels D and E, the pinion E being driven by power from the opposite end of the shaft carrying the drum, and the main gear I gives the depression of the plunger a steadier and more uniform motion than can be given by hand-power applied to the shaft d.

The hopper C is hung by strong trunnions to prevent its sagging under pressure, and is provided with a spring-indicator, w, which indicator has a pin supported upon a spring and projecting into the hopper, so that the amount of pressure on the dough can be observed by the projecting of the pin from its inclosing-tube, and is shown so projecting in Fig. 1. The bottom of the hopper is conical, and the opening at the apex is provided with a valve or

cover, n' , which is made to slide above projections sufficiently strong to hold it, and is inserted in place or withdrawn by a lever, n , which is pivoted to a bracket or projection, n'' , as shown in Fig. 4. The object of this valve is to prevent the hopper from feeding when the plunger commences pressing upon the dough. When the spring-pin w indicates sufficient pressure the valve or cover n' is withdrawn and the feeding commences. Thus the first portion pressed out is of uniform texture with the others, which would not be the case if the valve n' or some equivalent device were not used. As the dough is pressed from the hopper it is cut into uniform sections of a size suitable for a single pretzel by means of a knife, m' , which knife is reciprocated across the hopper-opening by means of a wheel, P , (shown on a larger scale in Fig. 6.) and which is placed on the upper end of a shaft having its bearing supported by the cross-bar i , at its lower end provided with a gear-wheel, i' , which engages with a similar gear-wheel, i'' , on a cross-shaft driven by the pinion I' , which engages with the main gear-wheel I . The arm m rests upon another framing cross-bar, and is provided with a slot, which permits an endwise movement, and is held in place by a pin, as shown in Fig. 6. As the wheel P rotates the arm is given a swinging movement, which is adjusted to throw the knife m' out when it passes to the rear of the hopper, and in when it is drawn back, so as to sever the dough with an approximately-straight cut. On the under side of the wheel P there is placed a pin, p , which strikes against the end of the bent arm of the pusher r , moving the pusher forward and pushing the severed dough in between the drum and the concave, so as to insure its being caught for rolling. After the pin p has passed the bent end of the pusher-arm the pusher is returned by the spring o' . The pusher is held in its position by a guide, j , attached to the cross-bar o of the framing. The space between the drum R and the concave T' , into which the dough is forced by the pusher and the motion of the drum, is made tapering, as shown in Fig. 3—that is to say, the space is wider where the dough enters than it is where it makes its exit. The dough-sections, as they pass into this space, acquire a rolling motion, which elongates them as the space narrows, and they emerge in a suitable length and form for the subsequent bending and twisting. The concave T' is formed in a movable framing, T , resting in grooved bearings g on the main frame, and is made adjustable or movable by means of the screw K , passing through the nut t' on the framing T , and rotating in a bearing, t , attached to frame A .

The rolled dough-sections are delivered onto three traveling belts, $N N M$, the belts N having twice the speed of the belt M . The belt M is driven by a shaft located immediately beneath the drum R , which is operated by a pinion, 7 , Fig. 9, which engages with the

main gear I , which shaft has upon it two fast pulleys, $M' M''$, and two loose pulleys, N' . The pulley M'' is provided with small pins, which enter suitable holes in belt M to insure its traveling. The pulley M' drives a belt which passes to the pulley N'' upon the outer end of a shaft at the front of the framing, which shaft has three pulleys, the outer ones of which carry the belts $N N$ and are fastened to the shaft. The middle one, which carries the belt M , is loose upon this shaft, and as the pulley N'' is sufficiently smaller than the pulley M' to give the belts N a double speed, they travel, therefore, with twice the speed of the belt M , which is driven by the pulley M'' , and has the same motion as pulley M' , which drives the smaller pulley N'' . As the rolled dough-sections fall upon these three belts the ends will move faster than the central portion, which movement gives them a horseshoe form, and by the time they reach the gripping-fingers the pretzel-blank is thrown entirely onto the belt M . To prevent any slipping or rolling of the pretzel-blank from getting it out of position, the belts N are provided with small cleats or stops b , which are arranged to take behind the dough-blank as it falls through the concave onto the belts. The middle belt, M , carries the molds m'' , which are arranged on hinged plates to allow them to travel with the belt around the pulleys. These molds m'' are hinged at one end, and are so arranged that when they pass over the forward roller they will drop down and lay the pretzel upon the receiving-board, thus insuring the placing of the pretzel in its proper position upon the receiving-board without danger of disturbing its shape. The operation is such that the central portion of the dough, coming in contact with the rear of the molds when dropped from between the drum and concave, the fast-traveling belts draw the ends of the dough forward, bending the same around the mold, and leaving it upon the central belt in the form as before mentioned.

To straighten out the ends of the dough-blank and secure its position for the fingers to operate upon a double brush-wheel, U , is used. This double brush-wheel is secured upon a suitable shaft situated between the drum R and the gripping-fingers. Upon a cross-bar, k' , of the framing, and working in an upright bearing, k , are the gripping-fingers e , which take hold of the ends of the blank, lift them up, and by making a full turn or revolution twist the two ends, and then drop the same upon the central or curved part of the blank. This operation is performed by the cam S , working upon a suitable shaft, and having at four points on its upper edge a raised flange or camway, and upon which camway rests a friction-roller, s' , held in a shaft, s'' , in side bearings to the vertical bearing k . This shaft s'' has also a friction-roller, s''' , upon its upper end, which is in contact with the under side of the disk K' , secured to the spindle d' , which supports

the gripping-fingers. Upon this spindle d' is secured an elongated cogged pinion, l , by which the gripping-fingers are turned one full revolution by means of the cogs l' , arranged upon the outer periphery of the cam S , as shown. Upon the cam-shaft s is arranged a cam-wheel, t'' , which actuates a spring-bolt, u , which said spring-bolt is pushed forward and locks the finger-shaft from turning at fixed intervals in its up and down motion. There is also a spring, u' , secured upon the bearing k , which rests against a ratchet on the spindle d' , to prevent any reverse motion of the same. There is a bevel-pinion, 8 , secured upon the cam-shaft s , which receives its motion from the pinion $8'$, and which in turn gives motion to one or more lifters, h' , secured upon a pinion which engages with a lever, h , pivoted in suitable bearings on the under side of one of the cross-pieces of the framing. The opposite end of said lever h rests upon a cross-piece, h'' , or pin in said cross-piece which secures the two sets of fingers together, and through which passes the shaft d' . The shaft d' is hollow, and is provided in its interior with a spring, to which the cross-piece h'' is secured by means of a bolt passing through a slot in the shaft d' . To the cross-piece are attached slides h''' h''' , which pass between the pivoted arms x of the fingers. To the outside of the outer arm of each finger is secured a spring, x' , provided on its end with a pin, x'' , which passes through an opening in each arm. The lever h , when brought to bear against the cross-piece h'' , forces the slide h''' between the arms x and opens them, and at the same time the slide h''' strikes a projection, h'''' , which throws the spring x' out, withdrawing the point x'' and dropping the twisted bretzel-blank. The spring in the shaft returns the slide and allows the arms to close the point or pin x'' , passing through the end of the bretzel, allowing it to swing freely in its motion.

Upon a shaft secured in suitable bearings upon the framing A are the pressers L , held in circular disks L' , and operated by means of beveled pinions geared with the cam-shaft s . These pressers L , attached to said disks, are made of elastic material, and are so arranged as to strike the ends of the bretzel-blank as it passes under them, and compress or bind them together, the same resting upon the hinged mold m'' . To prevent the middle belt, M , from sagging under the weight upon it, there are affixed to suitable shafts the rollers r' , over which said belt M passes.

The bretzel thus formed is delivered from the molds on the middle belt onto the carrier, the table of which rests upon the traveling belts w' . The carrier is supported upon a suitable frame to receive the rollers w'' , arranged upon suitable shafts, which frame is attached to the frame of the machine by means of suitable standards, P' , and to which standards the sill-plates are attached, and to which sill-plates the track is affixed. At either end of

the track are attached standards P'' , which receive the shaft W' at their upper ends, and are provided with sill-plates at their lower ends, to which the track is secured. Upon either end of the track are arranged check-plates, q , to stop or retain the car while the table is run forward, as hereinafter more fully explained. The shaft W' carries a lever-arm, 23 , and upon either end a cogged pinion, V'' . These pinions V'' come in gear with like pinions Y on the end of a shaft supported by the car when the said car reaches the end of the track on either side. To the top of the shafts or axles w'' is affixed a rack-bar, X , and to said axles are also attached the framing which supports the rollers over which the belts w' pass. The alternate movement of the car to the right or left is produced by means of a central shaft, $24'$, supported in bearings on a longitudinal plate, 24 , supported on a cross-plate, 25 , and which shaft carries a pinion, W'' , which engages with the rack-bar X . The inner end of this shaft is provided with a beveled-gear wheel, Q , which engages with the pinions 13 , supported and running loosely on a cross-shaft, 20 , which is supported in side bearings, 27 , projecting from the cross-plate 25 .

Between the pinions 13 there is a clutch, Q' , which is provided with a lip which fits into a longitudinal slot in the shaft, and in which it slides, and it is also provided with an annular groove on its periphery, and pins Q'' on its outer faces, made to engage in a dished surface on the beveled wheels 13 . When the pins Q'' engage the dished surface of the beveled wheels 13 they hold them, and cause them to revolve with the clutch, while so engaged, alternately, as the clutch is shifted from one side to the other by a lever-arm, Q''' , working in a groove in the clutch. This lever is actuated by a cam, 11 , affixed to the shaft W' , and in which cam the opposite end of the lever works.

The shifting of the carrier is produced by a single pin, Q'''' , on the outer side of the roller R , which is so calculated as to strike a lever, v''' , just when the car has reached the end of the track, and the axle comes in contact with the arresting-plate. The pinion Y on the inner pulley-shaft engages with a pinion, V'' , on the ends of the shaft W' , which moves the rollers over which the belts pass, and which belts carry the table a fixed distance forward for the purpose of leaving a space for the next row of bretzels on the board. Upon the opposite side of the roller R are fifteen (or more) pins v'''' . The sixteenth pin is omitted and inserted at Q'''' on the opposite side of the roller. These sixteen pins correspond to the sixteen molds employed. The pins v'''' actuate a pair of levers and connecting-arms, 21 and 22 . The office of these levers is to give an intermittent action to one of the bevel-wheels 13 , held by the clutch between them, and to impart said intermittent motion to the car as it is alternately shifted from one side to the other.

While the bretzel is being laid upon the ta-

ble the motion of the gear is stopped by a bolt, l'' , and as soon as the bretzel is laid on the table one of the fifteen pins strikes the lever 23 to move it sufficiently forward to make room for another bretzel.

5 The roller R is provided with ridges or grooves extending nearly at right angles from the outer edge and meeting at the center, whereby the dough-sections are prevented from slipping and the more perfect rolling out of the dough insured. (See Fig. 4.) The concave T' may also be provided with these grooves, if desired. It is important that the lower end of the part T' be rounded off to prevent its edge forming an indentation on the rolled dough as it drops on the traveling bands.

20 The brush U is for the purpose of removing any loose flour or crumbs that may adhere to the roller R.

In forming the hinge on the molds we leave a projecting lip to prevent the mold from carrying the formed dough with it under the machine; but as it is about to turn this lip acts as a check and tends to dislodge the bretzel and lay it gently on the table.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

30 1. The spring-pin w , in combination with the hopper C and plunger V, for indicating the pressure on the dough within the hopper, substantially as specified.

2. The handle m , having the knife m' , pivoted to the wheel P, and provided with a slot in which works a pin attached to the framing O for severing the dough with nearly a straight forward cut as it is discharged from the hopper, and clearing the aperture of said hopper by a backward semicircular motion, as set forth.

3. The concave T' , in combination with the drum R, having its face concave from its edges to the center, the space between said concave and drum diminishing gradually, substantially as set forth.

4. The combination of the belts N N with the belt M, moving in the same plane and at different speeds in the same direction, substantially as and for the purpose specified.

5. The wheel t'' and spring-rod u , in combination with the shaft d' , having a notched collar for regulating the rotations of the shaft d' and preventing the gripping-fingers from being rotated out of position, substantially as specified.

6. The combination of the cross-bar h'' , having the slide h''' , with the pivoted finger-arms x , whereby the finger-arms are opened by the downward movement of the slide and closed by its return, said slide working between the upper parts of said arms, substantially as specified.

7. The combination of the cross-bar h'' , having the slide h''' , with the pivoted finger-arms x , stops h'''' , and spring-pins x'' , substantially as specified.

8. The combination of the wheel S, having the broken gears l' , with the long pinion l , shaft d' , stop-rod u , and vertically-moving twisting-fingers, constructed and operating substantially as specified.

9. The molds m'' , hinged at one end, in combination with the belt M, to assist in forming and for discharging the formed bretzel, substantially as specified.

10. The pressing-fingers L' and wheels L, in combination with the belt M, having the molds m'' for compressing the bretzel ends, substantially as described.

11. The combination of the brush U, constructed as described, with the traveling belts M N, arranged to travel at different speeds, substantially as specified.

12. The combination of the long shaft W' , having the wheels V'' , with the belts w' , shaft P', wheels Y, and the reciprocating carriage for advancing the receiving-platform when it has reached the limit of its travel to right or left, substantially as and for the purpose specified.

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