

Sept. 29, 1931.

K. WANDEL

1,825,492

MACHINE FOR MAKING ABSORBENT PADS

Filed June 7, 1929

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Fig. 14,

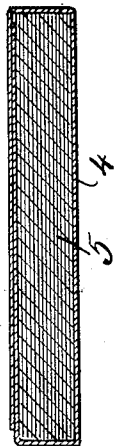


Fig. 13,

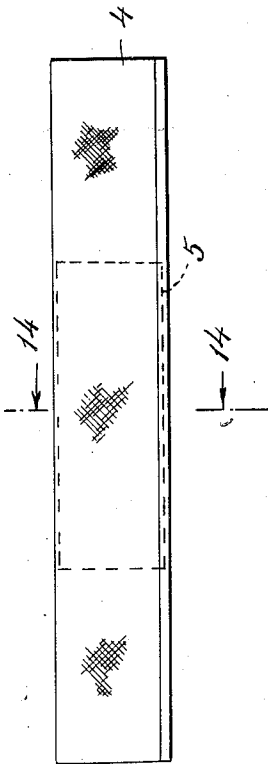
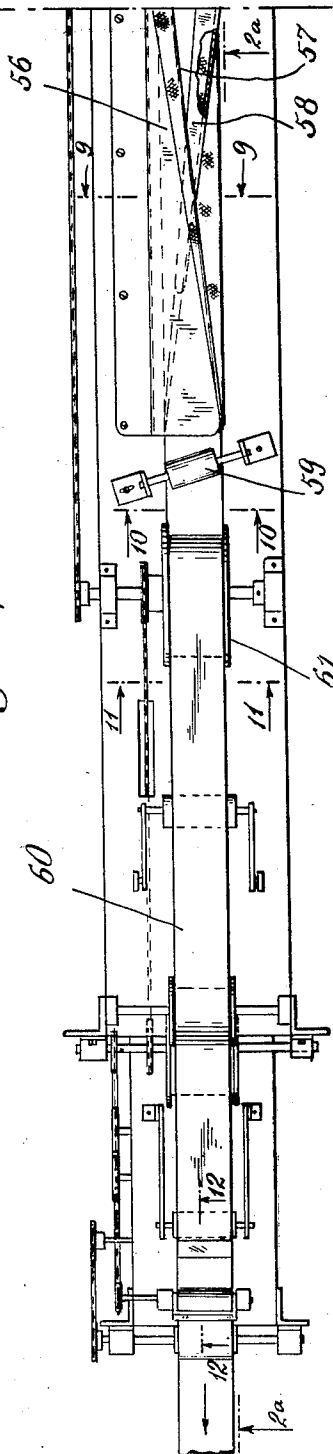


Fig. 1a,



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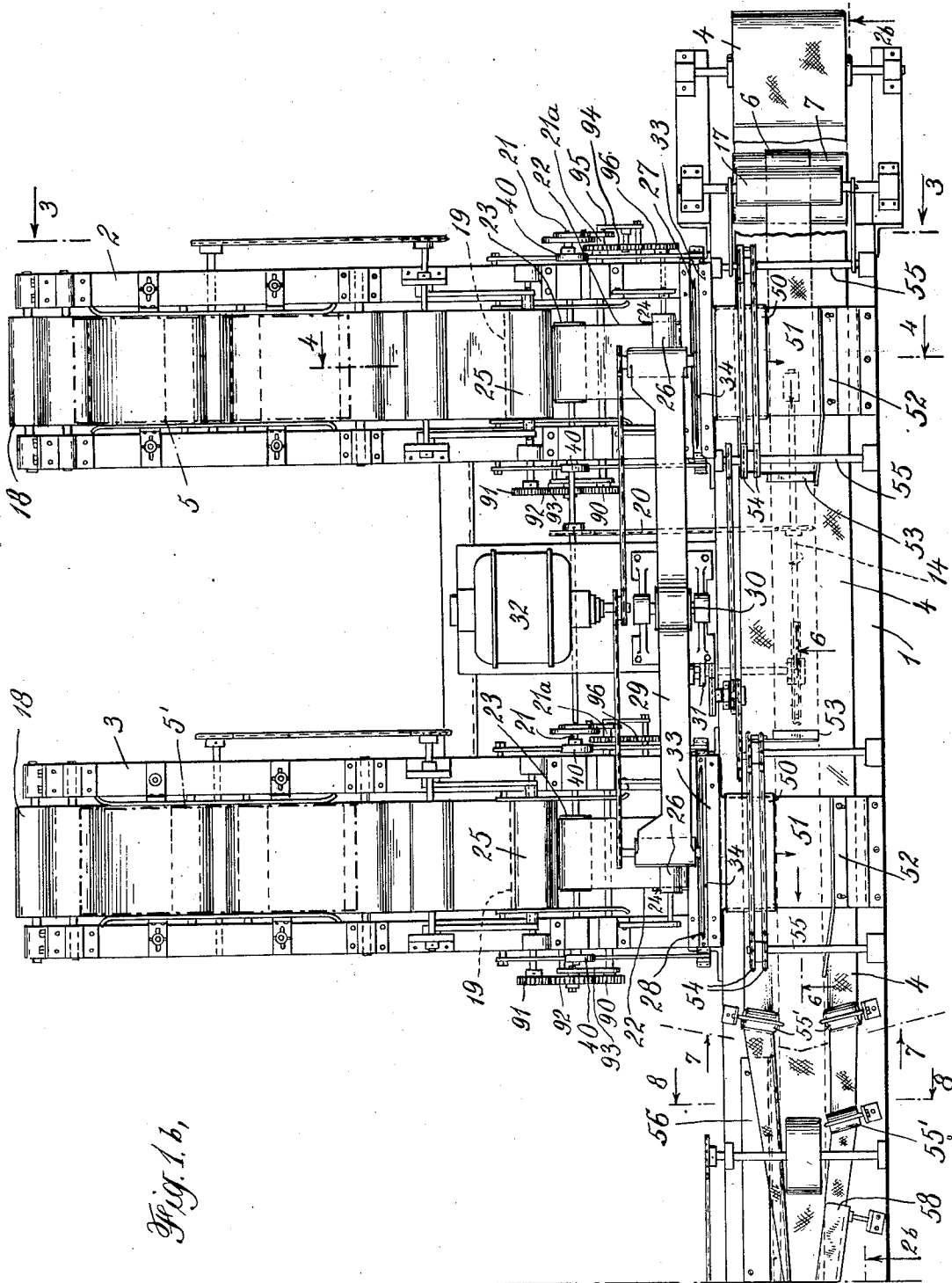


Fig. 1b,

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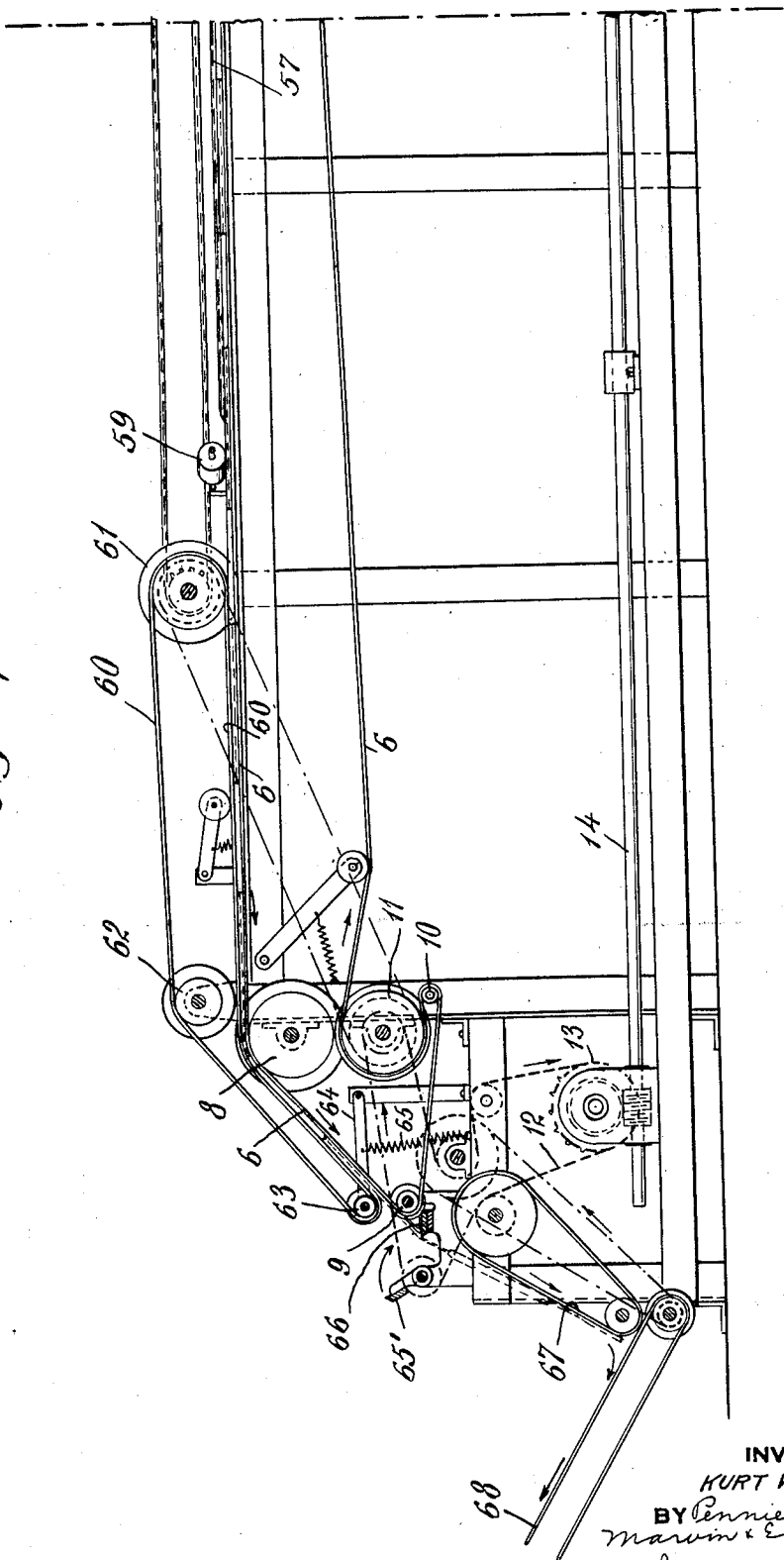
1,825,492

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Fig. 2a,



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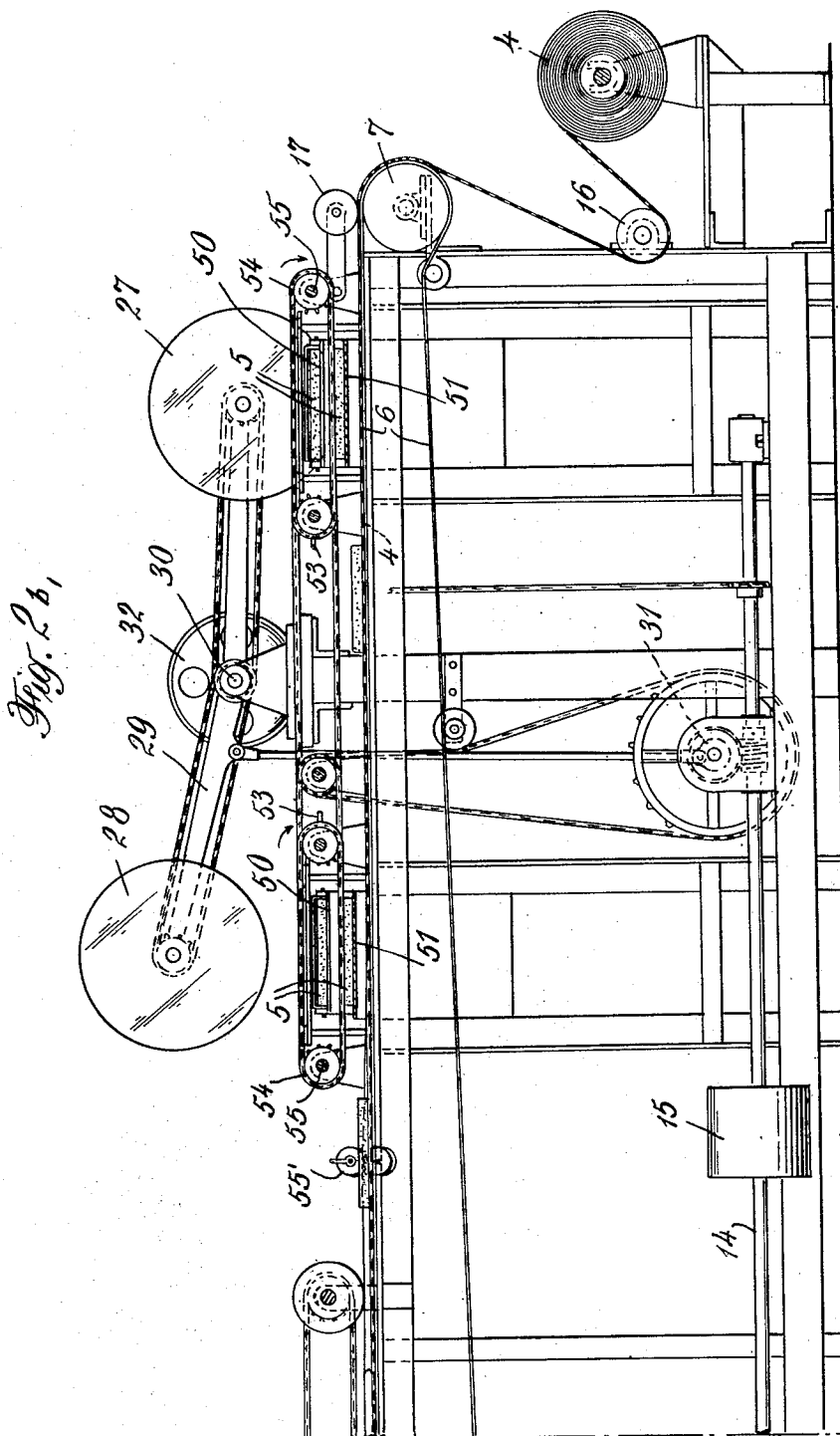
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MACHINE FOR MAKING ABSORBENT PADS

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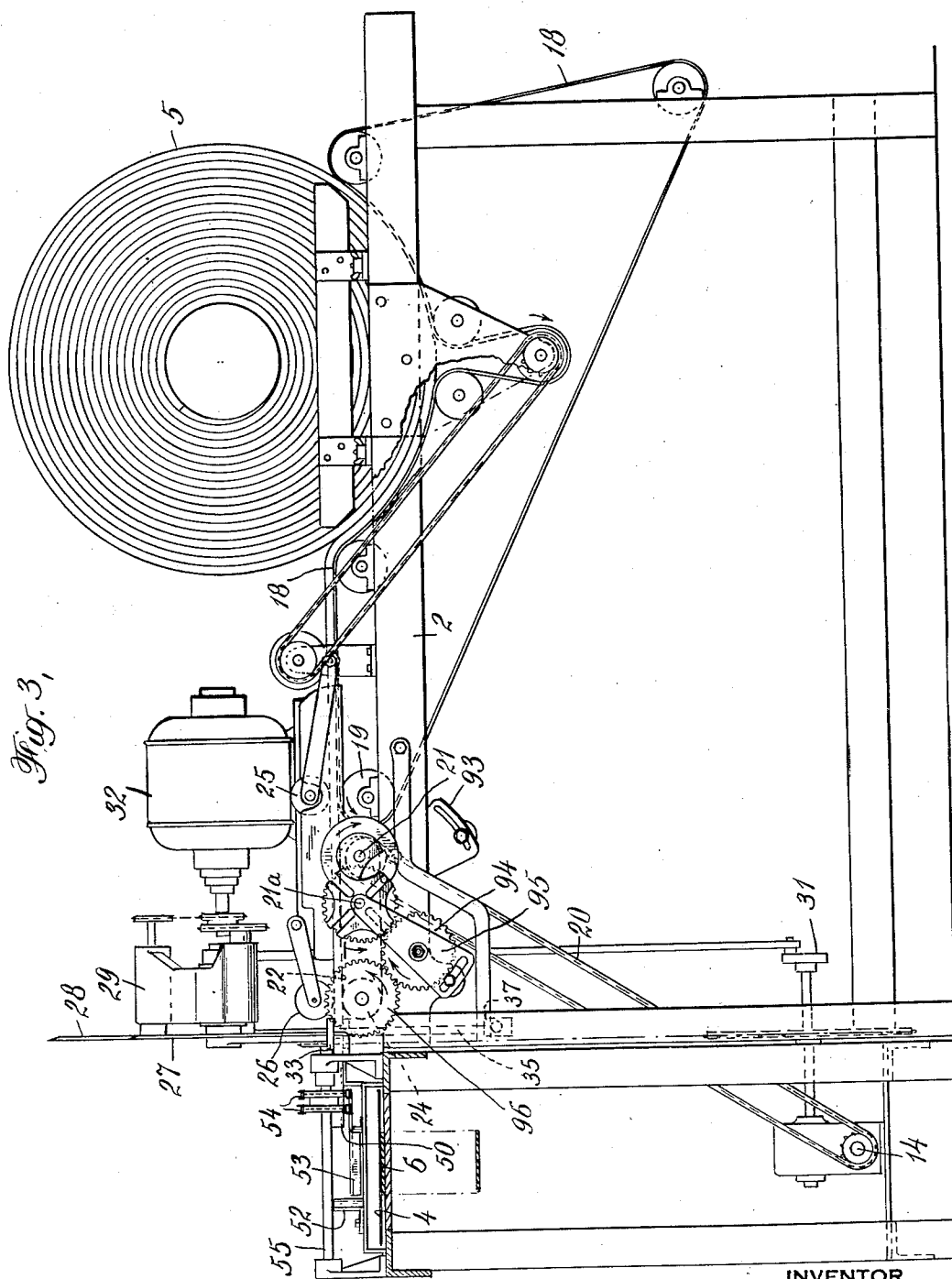
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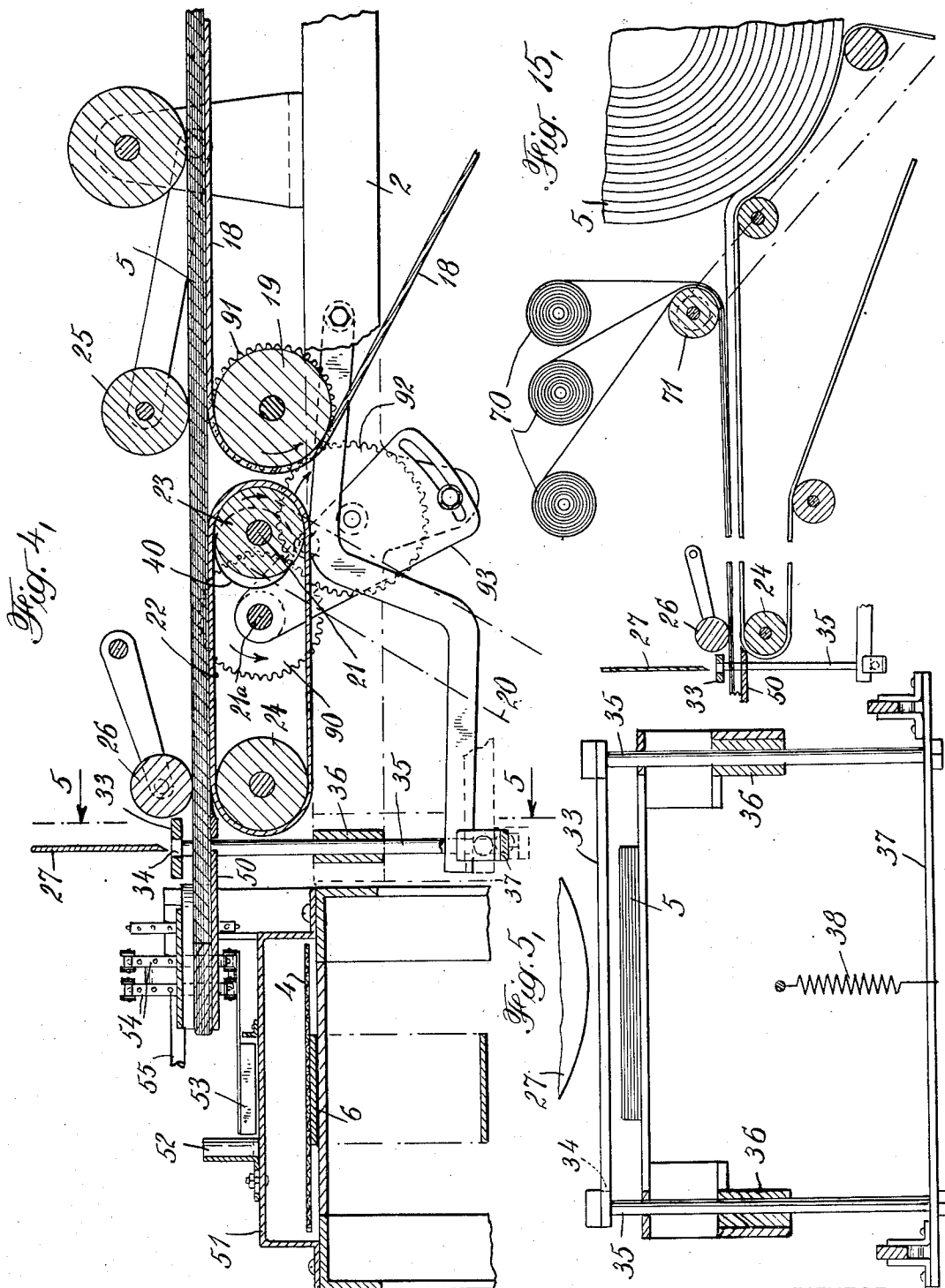
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MACHINE FOR MAKING ABSORBENT PADS

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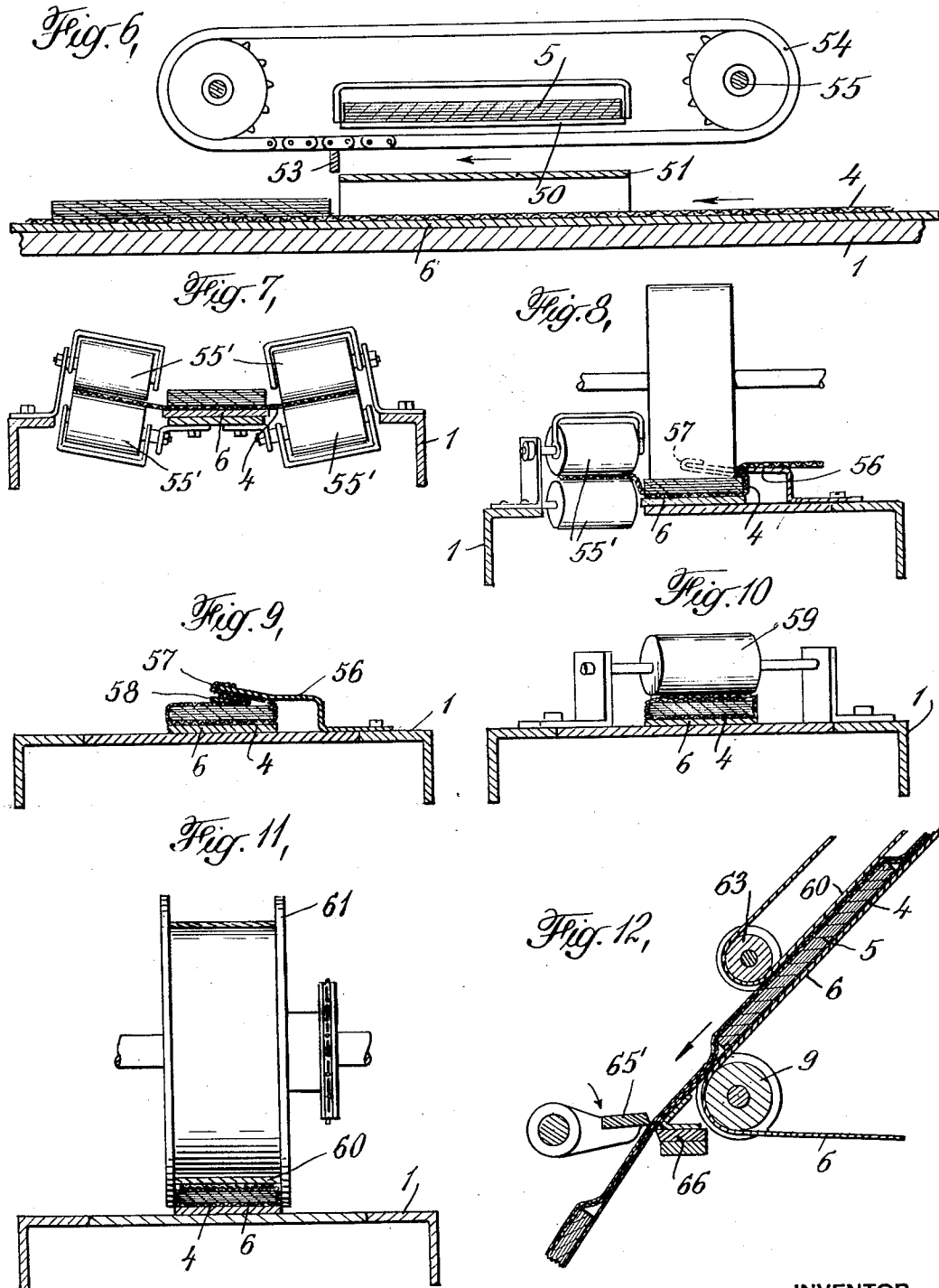
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MACHINE FOR MAKING ABSORBENT PADS

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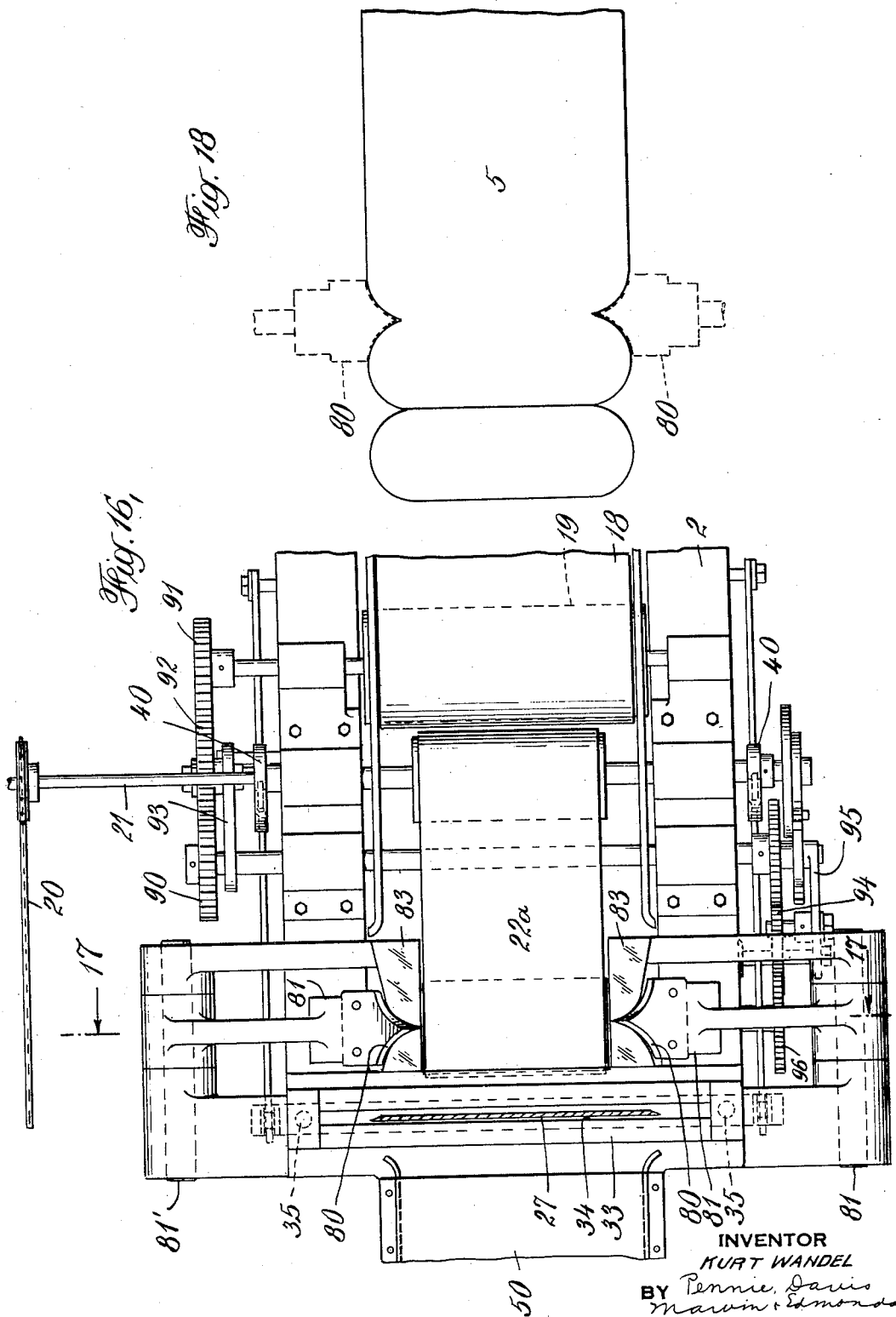
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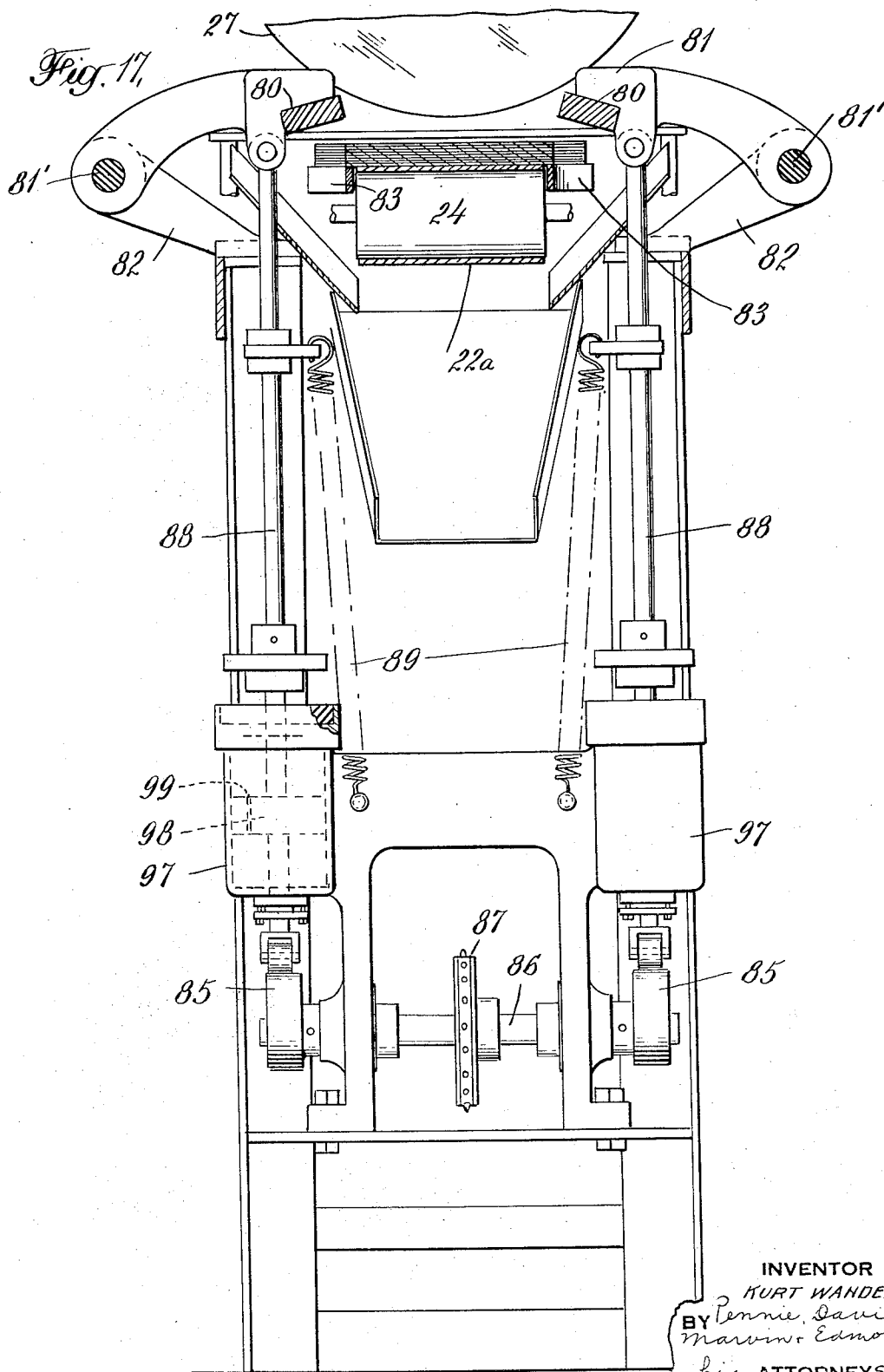
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UNITED STATES PATENT OFFICE

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MACHINE FOR MAKING ABSORBENT PADS

Application filed June 7, 1929. Serial No. 369,159.

This invention relates to improvements in machines for the manufacture of sanitary napkins, and has for its object the provision of a machine for the continuous automatic manufacture of such articles at a high rate of speed and without manual labor other than replenishing the rolls of materials out of which the napkins are made.

Sanitary napkins as now universally made consist of a pad of cellulose wadding enclosed within a wrapper of gauze which is folded around the pad and projects beyond the pad at each end. One popular form of napkin has the corners of the pad rounded, and the machine of this invention may be adapted to produce a napkin having a pad with rounded corners.

The cellulose wadding from which the pads are made comes from the machines by which it is manufactured in a continuous web of a width equal to the length of the finished pad. The web is supplied in large rolls several feet in diameter.

The gauze used in the manufacture of the napkins is also supplied to the machine in the form of a continuous web, the web being of a width sufficient to fold around the pad with the desired overlap. The machine is supplied with two rolls of cellulose wadding and one roll of the gauze, and in the operation of the machine the pad sections are cut from the advancing ends of the webs of cellulose wadding and deposited alternately on the gauze. The gauze is then folded around the pad with the padding spaced at intervals in the folded gauze. After this operation the gauze is cut between the pad sections to provide the necessary projecting ends of folded gauze.

The machine is continuous in its operation; that is to say, the web of gauze moves continuously through the machine, the other operations of the machine taking place at the necessary time intervals, as above indicated.

In the accompanying drawings I have illustrated in detail a preferred form of the machine as now used in the commercial manufacture of the pads.

In the said drawings

Figs. 1a and 1b constitute a plan view of the machine;

Figs. 2a and 2b show the machine in side elevation, Fig. 2a corresponding to Fig. 1a and Fig. 2b to Fig. 1b;

Fig. 3 is an end elevation of the machine on an enlarged scale looking from the right of Fig. 1b, the feed table for the gauze being cut away on the line 3—3;

Fig. 4 is a vertical sectional view on an enlarged scale on line 4—4 of Fig. 1b;

Fig. 5 is a vertical section on line 5—5 of Fig. 4 on an enlarged scale;

Fig. 6 is a sectional detail view on an enlarged scale on line 6—6 of Fig. 1b;

Figs. 7, 8, 9 and 10 are transverse sectional views on an enlarged scale on the correspondingly numbered lines of Figs. 1a and 1b, showing the operation of folding the gauze around the pad;

Fig. 11 is a sectional detail on line 11—11 of Fig. 1a showing the feed devices for the finished pad;

Fig. 12 is a sectional detail on line 12—12 of Fig. 1a showing the devices for cutting the gauze between the pads;

Figs. 13 and 14 are detail views of the completed pad in plan and section, respectively;

Fig. 15 is a view in vertical section, also taken on the line 4—4 of Fig. 1b, and illustrating certain of the parts shown in Fig. 4 and certain additional parts;

Figs. 16, 17 and 18 are detail views showing the mechanism for cutting pad sections with rounded corners.

The machine comprises a frame having a main portion 1 extending longitudinally of the machine in the direction of the feed of the gauze, and two side frames 2 and 3, respectively, extending at right angles away from the longitudinal frame section 1 adjacent the end thereof where the roll 4 of the gauze is supported. The rolls 5 and 5' of the cellulose wadding are supported at the outer ends of the side frames 2 and 3 respectively. The web of gauze from the roll 4 is fed continuously along the top surface of the main frame section 1 while the webs of cellulose wadding are fed from the rolls 5 and 5' along

the side frames 2 and 3 toward the main frame 1 and at a higher level than the bed of the main frame, whereby the sections of wadding may be cut off from the webs to form the pads and dropped upon the web of gauze as it passes along the bed plate of the main frame.

The web of gauze is fed through the machine by means of a belt 6 which extends from one end of the frame 1 to the other. The belt 6 is supported at the feed-in end of the machine by means of a pulley 7. The upper reach of the belt rests on the bed plate of the main frame and at the delivery end of the machine passes down over an idle pulley, thence over an idler 9 adjacent the cutting knives, thence over an idler 10 which holds the belt in contact with the driving pulley 11 from which the belt extends under the bed plate back to the pulley 7.

The driving pulley 11 is driven by means of a sprocket chain 12 from a sprocket wheel 13 supported on a lower longitudinal frame member and driven through a worm gear from the line shaft 14 which extends the length of the frame 1 and is itself driven from any source of power through a main driving pulley 15.

The gauze passes from the roll 4 around a guide pulley 16 and thence in contact with the belt 6 of the pulley 7 against which it is held by a weighted roller 17. The belt 6 as shown in Figs. 7-11 is about the width of the finished pad and lies underneath the middle of the gauze, the side edge of the gauze resting on the bed plate, as indicated in Fig. 1b. As the gauze in its advance through the machine passes by the end of the side frame 2 a section of the cellulose wadding from the roll 5 is deposited on the moving gauze.

The mechanism for cutting off the pad from the end of the web of wadding is disclosed in Figs. 2b, 3, 4, 5 and 6, to which reference is now made. As shown in Fig. 3, the roll of wadding is supported on a belt 18 whose upper reach is trained around a series of pulleys to form a concave seat for the periphery of the roll, whereby the wadding may be fed into the machine without placing any tension on the material of the web itself. The belt 18 is driven from a drive pulley 19 which is driven intermittently from the line shaft 14 through a Geneva gear and an intermediate adjustable gear as shown particularly in Figs. 3 and 4. This gearing comprises a shaft 21 supported in the frame 2 adjacent the pulley 19 and driven continuously by a sprocket chain 20 in front of the line shaft.

The shaft 21 carries the driving member of the Geneva, the driven member being attached to a shaft 21a supported in the frame adjacent thereto. Also attached is a gear 90 which drives a gear 91 on the end of the shaft of the pulley 19 through an idler 92 carried by an adjustable arm 93 swung on the shaft

21a. By substituting gears of different size for the gears 91 and 92 the extent of movement of the belt 18 at each operation of the Geneva may be altered.

A second feed belt 22 is provided in advance of the pulley 19 to feed the web of wadding to the cutting mechanism. This belt 22 is carried by a pulley 23 loosely mounted on the shaft 21 and is intermittently driven by a pulley 24 adjacent the cutting knives, through an adjustable gear train shown in Fig. 3. This gear train comprises an idler 94 carried by an arm 95 swung from the shaft 21a, and meshing with a gear 96 on the shaft of the pulley 24. The web of wadding is held in contact with the feed belts by weighted pulleys 25 and 26 overlying the pulleys 19 and 24, respectively.

The cutting mechanism for the wadding (see Fig. 2b) consists of two circular knives 27, 28, supported on the ends of a rocking frame 29 supported on a shaft 30 midway between the two side frames 2 and 3. This frame is rocked by means of a crank indicated in dotted lines at 31 in Fig. 2b, and driven by means of a worm gear from the main drive shaft 14. The crank 31 makes one complete revolution for each two pads that are formed, as will be obvious. The knives 27, 28 are continuously rotated at high speed from an electric motor 32, the armature carrying shaft of which is connected to the shafts carrying the knives 27 and 28 through suitable chains and sprockets, as shown in Fig. 1b.

In order to hold the wadding stationary while the pad is being cut from the end of the web the mechanism shown in Figs. 4 and 5 is provided. This mechanism comprises a plate 33 overlying the web and provided with a slot 34 through which the edge of the knife can project when brought down into contact with the wadding. The plate 33 is supported at its ends on rods 35 which extend through vertical bearings 36 at each side of the frame 2 and are connected at their lower ends to a cross bar. The bar 37 is lifted by a spring 38 and is depressed at intervals by means of eccentric cams 40 supported on the shaft 21 and operating in unison with the Geneva gear to clamp the wadding at the conclusion of its feeding movement.

When the plate 33 is brought down into engagement with the pad the frame 29 is rocked to bring the circular knife down on the wadding to thereby sever from the end of the web of wadding a piece of the proper width for the finished pad.

The forward advance of the web of wadding after the pad is cut therefrom causes the previously cut pad to be advanced across a shelf or platform 50 which partly overlies the path of the web 4 of gauze. The platform 50 is wide enough for its edge to terminate at a point over the web of gauze where the edge of the pad is to be positioned in the fin-

ished article, that is, the edge of the platform is so positioned with respect to the web of gauze that the pad when pushed off the edge of the platform will lie over the middle of the gauze. As the cut sections are advanced by the continued feed of the wadding the sections are pushed off the edge of the platform at successive intervals, the rate of feed of the wadding with respect to the gauze determining the spacing of the pad sections on the web of gauze, as will be obvious.

The pad sections do not fall immediately to the gauze, but drop upon the upper side of a bridge or table 51 which overlies the web of gauze immediately in front of the cutting knives, as shown in Figs. 1b and 4. In order to insure the proper positioning of the pad on the table 51 an adjustable guide 52 is provided which serves as a stop for the pad sections as they are ejected from the platform 50.

The pad sections are moved from the table 51 onto the web by means of a sweep 53 which is carried by a pair of sprocket chains 54 supported on cross shafts 55 overlying the table 51 and continuously driven in synchronism with the feed belt 6, which continuously advances the web of gauze through the machine. The sweep 53 projects laterally from the sprocket chains and is so spaced with respect to the table 51 as to just clear the surface of the table as it moves over the table in synchronism with the moving gauze beneath. The sweep engages the rear edge of the pad and sweeps it forward at the same speed as the gauze is moving, so that as the pad is brushed off the table 51 by the sweep it will be moving in synchronism with the web beneath and will be carried along with the web.

As stated above two cutting mechanisms are provided and two separate webs of wadding, so that the feed of the wadding need not be at too rapid a rate. The feed of the gauze is at such a rate that the pads as swept off one of the tables 51 are spaced on the web a distance equal to twice the length of the pads and the second pad-cutting and feeding mechanism is so positioned and timed with respect to the first that the pads produced by the second cutting mechanism drop on the web midway between the pads supplied by the first mechanism, so that when the gauze reaches the folders it will be provided with a continuous series of pads spaced apart the distance desired to give the necessary length to the free gauze ends of the finished napkin.

The fold mechanism is shown in Figs. 1a, 1b, and in detail in Figs. 7, 8, 9 and 10. The gauze is of light weight and difficult to fold without wrinkling, unless it is kept under tension. To this end rollers 55' are arranged as shown in Fig. 7 immediately in advance of the mechanism for depositing the second pad on the web. The web of gauze is threaded

between these rollers when the machine is started up. The rollers 55 are arranged in pairs as shown and at a slight angle to the plane of the bed plate, the purpose of the rollers being to hold the gauze tight and at the same time elevate the edge of the gauze so that it will pass over the edge of the stationary folder 56 which is arranged immediately in advance of the rollers 55'. The folder 56 consists of a piece of sheet metal with its folding edge elevated sufficiently to clear the pad sections and with its longitudinal edge inclined so as to gradually extend over the feed belt and thereby fold the edge of the gauze down onto the pad. The end of the folder 56 is so close to the rollers 55' that the gauze is drawn taut across the top of the folder and is so held as the inclined edge of the folder gradually effects the fold, as will be clear from Fig. 9 which shows at 57 the edge of the web folded around the edge of the folder.

The other edge of the web is folded under the folder 56 by means of a stationary folder 58. The web passes under the folder 58 as indicated in Figs. 1a and 1b, and the end of the folder projects under the folder 56 to thereby insure the passage of the edge of the web on that side of the machine, that is, the outside, under the edge of the web on the other side. After leaving the folders the folded web with the pads at intervals therein pass under a guide roller 59 overlying the feed belt 6 and set at an angle to the longitudinal axis of the machine so as to tend to draw the top fold taut across the pads. In advance of the roller 59 the web with the enclosed pads passes under a second feed belt 60 which is carried by a flanged drum 61 and driven in synchronism with the lower feed belt 6. The upper reach of this second feed belt 60 passes over a flanged idler 62 at the end of the machine frame, thence downwardly over an idler 63 mounted in pivoted arms 64 and drawn down against the web by springs 65 (see Fig. 2a).

By this arrangement the pads are sufficiently compressed to force the fibres of the pads into the interstices of the gauze so that the gauze and pad will be held together and the gauze will not tend to unfold during the handling of the pads.

The separate pads are cut from the folded web by means of a rotating knife 65' and a stationary knife 66 supported immediately below the idler 63, the speed of the rotating knife being timed with respect to the movement of the feed belt so as to cut the gauze between the pads at the points desired. The machine may be threaded up so as to bring the cut half way between the pads or at any other position between the pads so as to give projecting ends of different length if desired.

The cut pads drop on a feed belt 67 imme-

diately below the knife by which they are discharged onto a delivery belt 68 which carries them to the packing machinery.

It is believed that the operation of the machine will be obvious from the foregoing description. By reason of using two separate feeds for the wadding a large output is obtained without putting any undue strain on the wadding which would tend to pull it apart. The wadding is necessarily light and of a texture not to withstand much pulling, whereas the web of gauze can be fed at a high speed without being damaged.

By my present machine the wadding is fed only the distance of the width of the pad during the interval that the gauze is fed the length of two pads as well as the distance taken up by the extended edge of the gauze. That is, the feed of the web is about ten times as fast as the feed of the pad. If desired this ratio may be further reduced by having three or more pad-feeding and cutting mechanisms for each gauze-feeding and folding mechanism. The machine disclosed however has an output of approximately 120 pads per minute, which is entirely satisfactory for commercial production.

All parts of the machine which operate on the web of gauze are continuously driven and consequently may be operated at high speed. The knife frame is balanced and the grip plate of light weight, so that they may be operated at the necessary speed without causing undue vibration or interfering with the operation of the machine.

In Fig. 15 I have disclosed a modification of the machine for producing pads having a water-proof layer on one side. To this end there is arranged immediately above the path of the web of wadding as it leaves the roll a series of supports for reels 70 of a treated fabric out of which the waterproof layer is to be made. Any suitable fabric may be used for the purpose, gauze treated with some water-repellant substance being chiefly employed. The webs of material are fed under a feed roll 71 which is continuously driven in synchronism with the feed belt and serves to draw off the webs from their respective reels. The composite web passes from the feed roller 71 into the machine which requires no further modification to produce this type of pad.

In Figs. 16, 17 and 18 I have shown a modification of the machine to adapt it to make pads with rounded corners. To this end there is provided adjacent the cutting mechanism and immediately to the rear of the plate 33, a pair of die cutters 80 mounted to oscillate on a sub-shaft 81 supported in brackets 82 carried by the side frame, as shown more particularly in Fig. 17. The movable cutters 81 cooperate with stationary cutting dies 83 underlying the edges of the pads which pro-

ject beyond the sides of the feed belt 22a. The feed belt of this modification is purposely made narrower than the feed belt usually employed so that the edges of the pad may overlie the stationary cutters 83.

The movable cutters are operated by means of cams 85 supported on a shaft 86 extending across the frame beneath the cutters, and driven by a sprocket 87 in unison with the shaft 21 so that the movable cutters 81 will operate in synchronism with the plate 33.

The rods 88 which operate the cutters 81 are drawn downwardly to effect the cutting operation by means of springs 89 connected to the rods and machine frame as shown in Fig. 17. Also to cushion the jar of the cam action and to reduce the vibration of the machine, dashpots 97 are preferably provided on each of the rods, the dashpots being of usual construction, that is, with a piston 98 in a cylinder containing oil or other suitable liquid and provided with a port 99 through which the liquid may pass from one side to the other of the piston. By adjusting the size of the port the action of the dashpot may be modified as desired.

The knives are all of V shape as shown, and they are positioned so that their points are spaced from the knife 27 the width of one pad. Hence at each operation of the plate 33 the knife 27 will cut across the pad on the line between the notches cut by the cutters 80 and at the same time the cutters 80 will produce a second pair of notches. The pads thus formed will have the four corners rounded, as clearly illustrated in Fig. 18.

The construction described in the foregoing specification constitutes the preferred construction of my machine as it is now built and in commercial operation. It may obviously be modified in various respects and the invention is not limited to such preferred construction except insofar as defined in the appended claims.

I claim:

1. In a machine of the class described, the combination of means for continuously feeding a web of gauze, means for depositing pads of absorbent material at intervals on said gauze, a second pad-depositing mechanism for depositing pads in the spaces between the first deposited pads, and means for folding said gauze over said pads.

2. In a machine for making articles of the class described, the combination of means for feeding a web of gauze, means for feeding a web of pad material in a direction transverse to the path of movement of the gauze, a second means for feeding a second web of pad material in a direction transverse to the path of movement of the gauze and at a different point in such path of movement, and means for cutting pad sections from each of said webs of pad material and depositing said sections on the gauze.

3. In a machine for making articles of the class described, the combination of means for feeding a web of gauze, means for feeding a web of pad material in a direction transverse to the path of movement of the gauze, a second means for feeding a second web of pad material in a direction transverse to the path of movement of the gauze and at a different point in such path of movement, means for cutting pad sections from each of said webs of pad material and depositing said sections on the gauze, said cutting means comprising a rocking frame having its ends overlying the ends of said webs of pad material respectively, knives carried by the ends of said frame, and means for oscillating the frame.
4. In a machine for making articles of the class described, the combination of means for feeding a web of gauze, means for feeding a web of pad material in a direction transverse to the path of movement of the gauze, a second means for feeding a second web of pad material in a direction transverse to the path of movement of the gauze and at a different point in such path of movement, means for cutting pad sections from each of said webs of pad material and depositing said sections on the gauze, said cutting means comprising a rocking frame having its ends overlying the ends of said webs of pad material respectively, rotating knives carried by the ends of said frame, and means for oscillating the frame.
5. In a machine for making articles of the class described, the combination of means for feeding a web of gauze, means for feeding a web of pad material in a direction transverse to the path of movement of the gauze, a second means for feeding a second web of pad material in a direction transverse to the path of movement of the gauze and at a different point in such path of movement, means for cutting pad sections from each of said webs of pad material and depositing said sections on the gauze, said cutting means comprising a rocking frame having its ends overlying the ends of said webs of pad material respectively, knives carried by the ends of said frame, means for oscillating the frame, and clamps overlying the free ends of said webs operated in synchronism with the oscillation of said frame and clamping the ends of the web against movement during the cutting operation.
6. In a machine for producing articles of the class described, the combination of means for continuously advancing a web of gauze, means for depositing pads at intervals along said gauze, and means for folding the margins of said gauze over said pad sections, said means comprising stationary folders overlying the path of movement of the pads, and rollers having their axes at an angle to the path of movement of the gauze for holding the gauze taut against the edges of the folders during the folding operation.
7. In a machine for making articles of the class described, the combination of a longitudinal frame, means for continuously feeding a web of gauze along the upper surface of said frame, a transverse sub-frame at right angles to said longitudinal frame and comprising a table projecting over the path of movement of said gauze, means for feeding a web of pad material along said transverse frame, and means for cutting pads from said material and advancing them successively onto said table and from the table onto said web of gauze as the latter is advanced under said table.
8. In a machine for making articles of the class described, the combination of a longitudinal frame, means for continuously feeding a web of gauze along the upper surface of said frame, a transverse sub-frame at right angles to said longitudinal frame and comprising a table projecting over the path of movement of said gauze, means for feeding a web of pad material along said transverse frame, and means for cutting pads from said material and advancing them successively onto said table and from the table onto said web of gauze as the latter is advanced under said table, said last-named means comprising a member moving in parallelism with said gauge adapted to sweep the pad sections off of the table onto the gauze.
- In testimony whereof I affix my signature.
- KURT WANDEL.

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