Aug. 11, 1931. R. H. COOVERT ET AL 1,818,792

SHEET RUBBER GOODS FORM STRIPPER

Filed Dec. 28, 1928 3 Sheets-Sheet 1

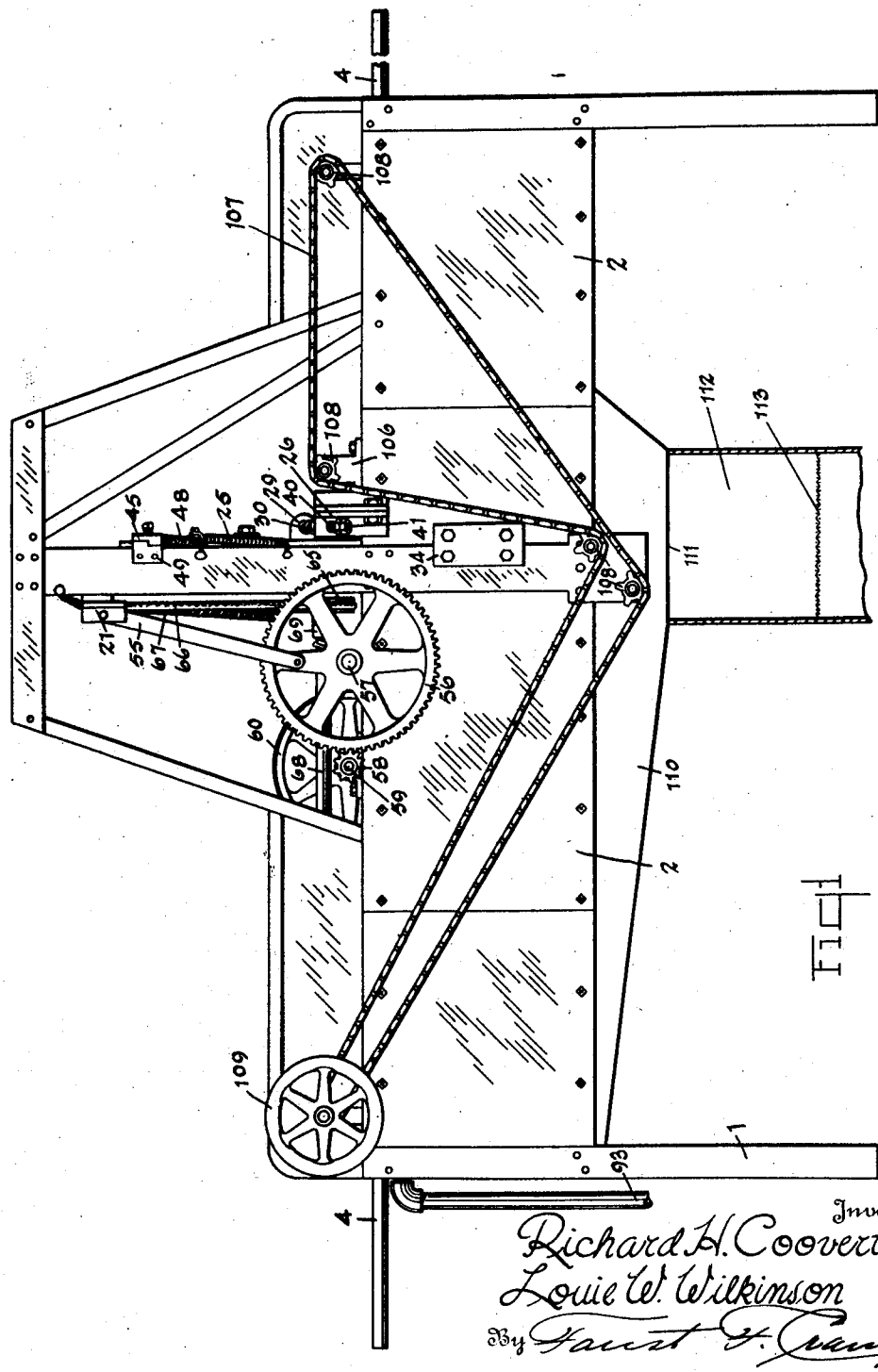


Fig. 1

Inventor
Richard H. Coovert and
Louie W. Wilkinson
By Faucett & Crawford
Attorney

Aug. 11, 1931. R. H. COOVERT ET AL 1,818,792

SHEET RUBBER GOODS FORM STRIPPER

Filed Dec. 28, 1928 3 Sheets-Sheet 2

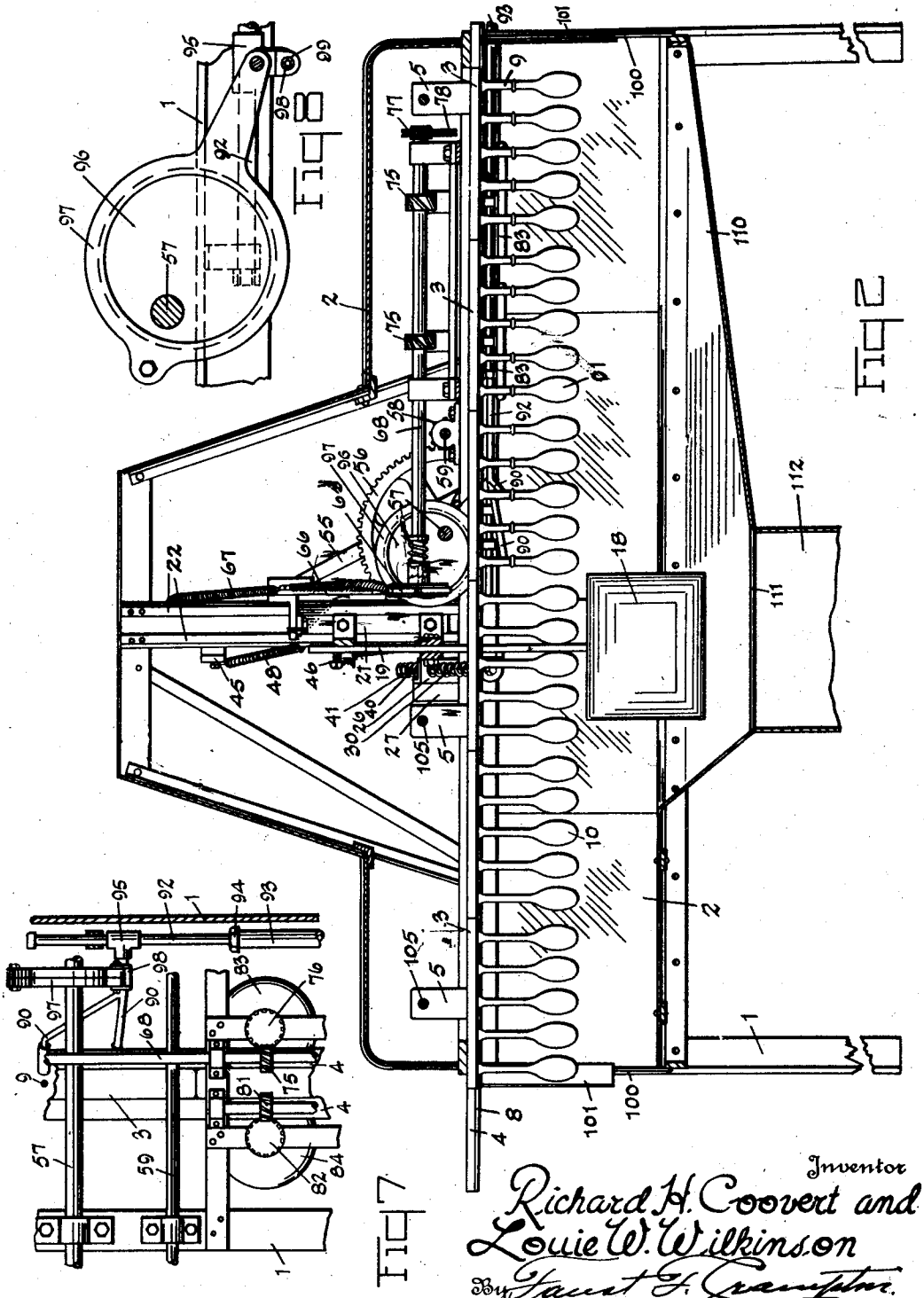


Fig 8

Fig 2

Fig 7

Inventor
Richard H. Coovert and
Louie W. Wilkinson
By Grant G. Crampton
Attorney

Aug. 11, 1931. R. H. COOVERT ET AL 1,818,792

SHEET RUBBER GOODS FORM STRIPPER

Filed Dec. 28, 1928 3 Sheets-Sheet 3

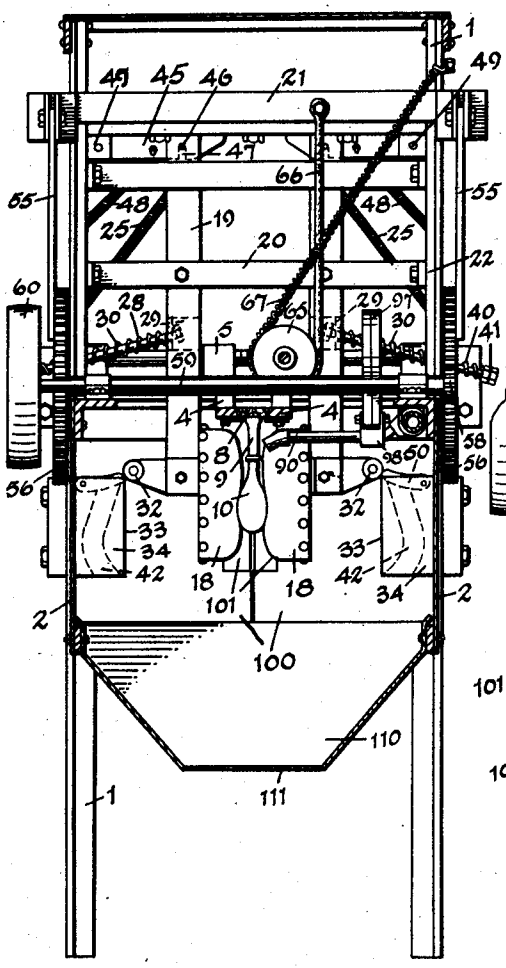


Fig 3

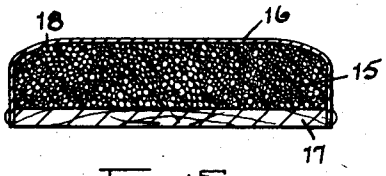


Fig 5

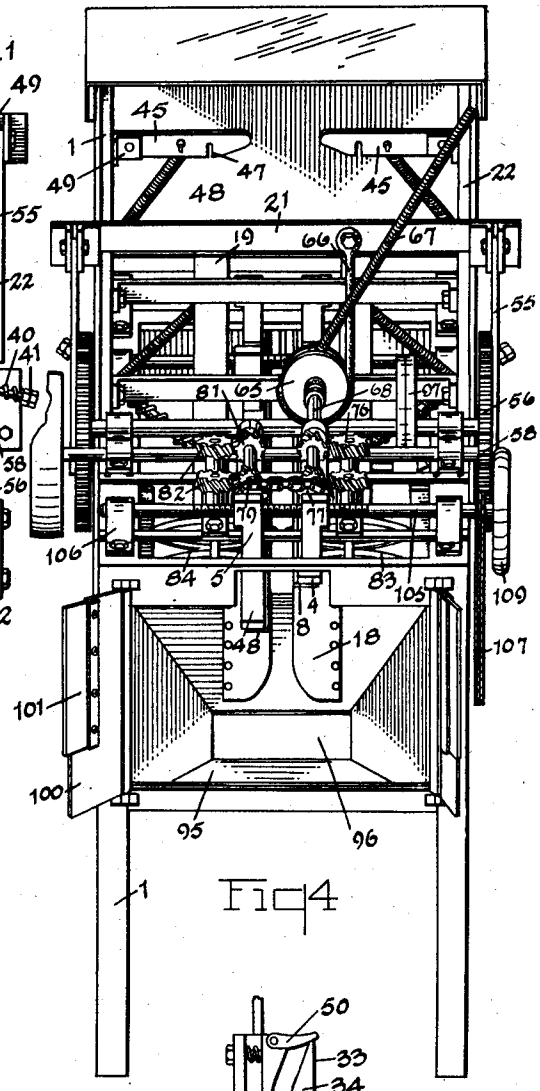


Fig 4

Fig 6

Inventor

Richard H. Coovert and
Louie W. Wilkinson

By Frank F. Crampton.

Attorney

Patented Aug. 11, 1931 1,818,792

UNITED STATES PATENT OFFICE

RICHARD H. COOVERT AND LOUIE W. WILKINSON, OF WILLARD, OHIO

SHEET RUBBER GOODS FORM STRIPPER

Application filed December 28, 1928. Serial No. 328,962.

Our invention has for its object to provide an efficient machine for removal of sheet rubber goods formed on molds or forms. The invention particularly provides a means for drawing shaped sheet material from forms without rolling the sheet material and thereby obviating the necessity of reversing or turning the goods, and also eliminating the "rings" or irregular formation in the goods due to the rolling of the goods off of the forms or due to turning goods "outside-in" during removal from the forms.

The invention may be contained in structures of different forms and such structures may be used in the manufacture of a variety of sheet rubber articles. To illustrate a practical application of the invention, we have selected a machine containing the invention as an example of such structures. The machine selected is shown in the accompanying drawings and is for the purpose of stripping toy balloons or rubber bladders from the forms on which they are produced by the dipping process well known in the art of the manufacture of articles formed of sheet rubber. The particular machine selected as an example is described hereinafter.

Fig. 1 of the drawings is a side view of the machine. Fig. 2 is a view of a longitudinal section of the machine. Fig. 3 illustrates a transverse section of the machine. Fig. 4 illustrates a perspective view looking diagonally downward into the machine, one of the end walls being shown opened or removed. Fig. 5 illustrates a view of a section of an elastic rubber pad used for removing the goods from the forms on which the goods are produced. Fig. 6 illustrates a side view of a cam block for controlling the movements of the pad. Fig. 7 is a top view of a portion of the mechanism, part being shown in section. Fig. 8 is a side view of certain of the parts.

In the particular form of construction illustrated in the drawings, a source of supply of liquid under pressure is connected to suitable nozzles in the machine and the liquid is directed with sufficient pressure between the forms and the sheet material produced thereon to cause separation between the surfaces of the forms and the rubber goods. The articles are stripped from the forms after they have been loosened by a rubbing movement of parts that frictionally engage the articles. In order to prevent spraying or scattering of the liquid, beyond the confines of the machine, the machine is provided with suitable walls that enclose its parts and the liquid is continuously circulated in the machine.

The machine may be provided with a suitable frame 1 having enclosing side walls 2 that may be made removable for the purpose of repair of the parts of the machine. In the particular machine shown in the drawings, a guide-way, formed of a plurality of strips 4, is provided for guiding the racks 3 that may be manually fed to the machine, or may be automatically conveyed thereto as may be desired. The strips 4 are supported by means of blocks 5 that may be supported on parts of the machine. Strips 8 are secured to the strips 4 and form a ledge for supporting the racks 3. The strips 8 are separated sufficiently to permit the stems 9 of the forms 10 to move between the strips 8. The guide-way for the racks 3 extends from one end of the machine to the other and the ends of the guide-way are so located as to permit the ready placement of the racks in position in the machine at one end, and the ready removal of the racks at the other end.

When the racks have been placed in position in the machine, they are moved through the machine by a step-by-step movement and during this movement are subjected to a plurality of streams of liquid which operate to loosen the rubber articles from their forms. Opportunity is given for loosening the rubber articles from the forms and stripping the articles from the forms when the forms are stationary. Any suitable means may be provided for producing the step-by-step movement of the racks while the rubber articles are being stripped from the forms by the movement in a direction at right angles to the movement of the racks through the machine. Since such step-by-step movement is necessarily dependent upon the right angular movement of the stripper, the longitudinal

movement of the racks is performed by a mechanism that is controlled by the stripper.

In order to remove the articles from the forms, we have found it desirable to use a pair of elastic or cushioned pads located on opposite sides of the forms and so operated that they may be pressed against the rubber goods formed on the forms, and subsequently moved downward so as to draw the goods off of the forms by reason of the frictional engagement of the pads with the goods, means being provided for maintaining the cushion pads away from the forms when they are raised relative to the forms. Preferably, the cushion pads are provided with a surface formed of rubber which produces an excellent frictional engagement between the pads and the rubber of the goods that are removed thereby.

In the construction shown, the pads are formed of sponge rubber 15 and may be provided with a sheet rubber covering 16, such as shown in Fig. 5, and also with a suitable back of stiff material, such as the back 17. The pads 18 are connected to rods 19 that are pivotally supported on a cross bar 20 that forms a part of a reciprocable frame 21 The frame 21 is located in a pair of guideways 22 that form parts of the frame 1 of the machine. The rods 19 are connected at their upper ends to the springs 25 which are in turn connected to the frame 21 and so as to normally and elastically press the pads 18 towards each other with a considerable pressure. The rods 19 are also connected to pivoted blocks 26. The blocks 26 are pivotally supported on brackets 27 connected to the sides of the frame 1 of the machine. Rods 28 extend through suitable lugs 29, formed on or connected to the rods 19, and through the pivoted blocks 26. Springs 30 are located intermediate the lugs 29 and the pivoted blocks 26 and operate also to yieldingly press the pads 18 towards each other as the pads 18 descend. The lower ends of the rods 19 are also provided with rollers 32 that ride on the inner edges 33 of the blocks 34 as the pads descend and thus operate to maintain the surfaces of the pads 18 in contact with the surfaces of the goods as the pads are moved downward over the forms 10, notwithstanding variations in the pressure that may be caused by the springs. During this operation, the pads move the articles from the forms and upon completion of the stroke, the rollers 32 are released from the edges 33 of the blocks 34 and pass beneath the lower ends of the blocks 34.

Upon completion of the downward stroke, the springs have also lost their compression by reason of the swinging movements that are imparted to the rods 28 about their axes of rotation or pivots on the blocks 26. Outward movements of the pads 18 are produced by means of the springs 40 that are located on the rods 30 and intermediate the pivoted blocks 26 and the outer ends of the rods 30. The outer ends of the rods 30 may be provided with suitable lock nuts 41 which operate to compress the springs 40 as the arms 19 are moved downward sufficiently to cause the rods 30 to be drawn diagonally downwardly through the blocks 26. This occurs when the rollers 32 are located below the blocks 34 and, consequently, the springs 40, operating through the rods 19, draw the rollers 32 beneath the lower ends of the blocks 34 and at the same time the articles are released from between the pads 18. On the return movement of the pads 18, they are further separated in order to prevent contact between the pads and the articles on the forms.

In order to prevent contact between the pads and the articles, during the upward movement of the pads, the blocks 34 are provided with channels 42 that are adapted to receive the rollers 32. The slots 42 have guiding surfaces for the rollers 32 that flare outwardly as the central parts of the blocks 34 are approached and again inwardly towards the upper and lower corners of the blocks and so as to receive and deliver the rollers 32 at points near the lower and upper inner corners of the blocks. Thus, as the pads 18 are moved upward, they are further separated as the rollers move in the slots 42 to enable the pads to clear the enlarged parts of the forms. As the pads move upward, they are subjected to the pressure produced by the compression springs 30 as well as to the continuous tension of the springs 25 which operate on the rods 19 and, consequently, when the rollers 32 move out of the slots 32, the pads 18 are elastically pressed against the articles on the forms 10. In order to insure that the pads 18 will thus be held pressed against the goods on the forms, particularly during a short downward movement of the pads, to insure engagement between the rollers 32 and the inner edges 33 of the blocks 34, a pair of latches 45 engage pins 46 located in the upper ends of the rods 19 after the rollers 32 have passed from the slots 42. The latches 45 are provided with deeply cut notches or recesses 47 into which the pins 46 enter as the rods 19 are raised. Also, the rods 45 are pivotally connected at their ends to the frame 1 of the machine by suitable brackets 49 and tension springs 48 operate to elastically draw the latches 45 downwardly. The latches 45 follow the ends of the arms 19 downward while the pins 46 are held in the recesses 47. The downwardly swinging movements of the latches 45 are limited by reason of the square end edges of the latches 45 that cause engagement at the lower outer corners of the latches 45 with the parts of the frame 1 of the machine on which they are supported by means of the bracket 49. The

engagement between the pins 46 and the latches 45 is maintained sufficiently long during the downward movement of the rods 19 to permit engagement of the rollers 32 with the edges 33 of the blocks 34 and upon continued downward movement of the rods 19, the pads 18 are maintained in contact with the goods on the forms 10 by the pressure that is created by the rollers 32 moving over the edges 33. Also, to prevent entrance of the rollers 32 into the slots 42 upon the downward movement of the pads 18, the upper ends of the slots 42 may be closed by traps 50 that are pivotally supported on the upper ends of blocks 34 so as to drop down to close the slots 42 as the rollers 32 are lifted out of the slots.

The frame 21 is reciprocably moved by means of a pair of links 55 that are connected to the upper end of the frame 21 and to the gear wheels 56. The gear wheels 56 are connected to the shaft 57 and the gear wheels and the shaft are rotated by means of the pinion 58 located on the shaft 59 which is driven by means of the pulley wheels 60. The racks 3 are moved forward through the machine during each upward movement of the pads 18, by means of mechanism that is operated upon by the downward movements of the frame 21.

The frame 21 is connected to a grooved pulley wheel 65 by means of a cable 66. A spring 67 is also connected to the pulley wheel 65 and to a part of the frame 1 of the machine. As the pulley wheel 65 is rotated by the movement of the frame 21, operating through the cable 66 or by the spring 67, the end of the cable 66 and the end of the spring 67 will lie within the groove of the pulley wheel 65. The pulley wheel 65 is rotatably supported on a shaft 68, and when the frame 21 is raised, the cable 66 will be unwound from the pulley wheel 65 and cause its rotation, while at the same time the spring 67 will be wound on the pulley wheel. When the frame 21 is lowered, the spring 67 will elastically withdraw from the pulley wheel 65 and wind the cable 66 thereon. This will cause reciprocatory rotative movements of the pulley wheel. A spring pressed clutch 69 is located on the shaft 68, the parts of the clutch being so formed that when the frame 21 is raised, the pulley wheel 65 will be connected to the shaft 68 through the clutch 69 and cause rotation of the shaft 68 but upon reverse rotation of the pulley wheel, through the operation of the spring 67, and the downward movement of the frame 21, the clutch 69 will slip and the shaft 68 will be held stationary by reason of its connection with other parts of the mechanism.

The shaft 68 is provided with a pair of spiral gears 75 that operate upon a pair of spiral gears 76 and also a sprocket wheel 77 that actuates a sprocket chain 78. The sprocket chain 78 operates a sprocket wheel 79 located on the shaft 80 which is also provided with two spiral gear wheels 81 that operate on the spiral gear wheels 82. The spiral gear wheels 76 and 82 are connected to suitable shafts having the rubber tired wheels 83 that are located in position so as to engage the stems 9 of the forms 10 and move the racks 3 through the machine. The shafts 68 and 80 and also the shafts interconnecting the spiral gear wheels 76 and 82 with the tired wheels 83 and 84 are supported in suitable bearings that are located on parts of the frame 1 of the machine. Thus when the pads 18 are raised, the wheels 83 and 84 operate to move the racks 3 through the machine and so as to present groups of the forms 10 in position such that the pads 18 will remove the articles from the forms in each succeeding downward movement of the pads 18.

In advance of the engagement of the articles by the pads 18, they are subjected to moving streams of a suitable liquid that are directed from a pair of nozzles 90. The ends of the nozzles 90 are provided with downwardly directed rubber tubes so as to protect the stems 9 as they pass the nozzles and enable a substantially vertical downward direction of the flow of the streams at a point slightly above the upper edges of the balloons 91, and so as to strike between the beads of the balloons and the stems. Moreover, the size of the openings of the nozzles and of the interconnecting pipes are such as to cause the streams to move at a high rate of speed. The streams strike between the surfaces of the forms 10 and the inner surfaces of the balloons 91, and the liquid causes separation of the surfaces or loosening of the balloons and, consequently, when the balloons are engaged by the pads 18, the balloons will slide on the surfaces of the forms 10, notwithstanding the fact that the necks of the balloons have to move over the larger lower ends of the forms. In order to provide for a continuous stream of water against the stems 9, for a substantial period of time, the nozzles 90 are mounted on a pipe 92 which telescopes in a pipe 93. The connection between the pipes 92 and 93 may be closed by a packing nut or gland 94 to prevent leakage. The pipe 92, midway in its length, is provided with a T connection 95 and the nozzles 90 are connected to the pipe 92 through the T 95. The portion of the pipe 92 extending beyond the T 95 is supported by straps secured to the angle irons of the frame 1. The pipe 92 is caused to move or reciprocate by a cam 96 and cam strap 97. The cam 96 is mounted on the shaft 57. The cam strap 97 is formed of two parts, bolted together and is connected in a block 98 through which a length of pipe 99, between the connection 95 to the nozzles 90, extends. The cam 96 is positioned on the shaft 57

so that as the pads 18 reach their lowermost position, the nozzles 90 will be moved toward the center of the machine. Thus, the stems 9 are constantly being subjected to a suitable liquid which is maintained under pressure from the source of supply, such as a pump, which will operate to force the liquid through the pipe 92 and the nozzles 90.

The bottom of the frame of the machine is provided with a hopper 110, that has an outlet 111 through which the liquid may pass. Preferably, the outlet 111 is located below the pads 18 so that when the articles are released from the pads 18, they will drop through the opening 111. A suitable chute 112 may convey the balloons and the liquid to a suitable receptacle or to a suitable separator, such as the separator 113, for separating the balloons from the liquid. The liquid may be continuously pumped through the pipe 92 and directed by means of the nozzle 90 against the forms at the points where the edge portions or the necks of the balloons make contacts with the stems of the forms 10.

In order to provide for the entrance of the forms, and to prevent the escape of the liquid by reason of the splash that occurs within the machine, the ends of the machine may be provided with suitable doors 100 having flexible rubber flaps 101 that cover openings formed in the doors 100 and so that when the doors 100 are closed, the forms may be pushed against the flaps 101 and, by reason of the elasticity of the flaps 101, they will immediately close the openings through the doors at the back of each form as it is passed into the machine.

In order to provide for variations in the width of the racks 3, that may be used in the machine, the distance between the strips 4 may be suitably adjusted by means of the threaded rods 105. The rods 105 are provided with right and left hand threads and the upper ends of the blocks 5 are threaded onto the rods 105, whereby, upon the rotation of the rods 105, the blocks 5 and, consequently, the strips 4 may be adjusted relative to each other. The rods 105 are supported by suitable bearings 106 and, if desired, they may be connected together by means of the sprocket chain 107, which operates upon the sprocket wheels 108. The hand wheel 109 that may be connected to a rod 105 having blocks 5 for supporting the rear ends of the strips 4, may be used for manipulating the chain 107 to adjust the location of the strips according to the widths of the racks used in the machine.

We claim:

1. In a sheet rubber stripper machine, a plurality of forms having sheet rubber articles thereon, means for forcing a liquid between the sheet rubber articles and the forms for loosening the sheet material from the forms, a pair of elastic rubber pads, means for pressing the pads against the articles, means for moving the pads relative to the forms to draw the articles from the forms, and means for moving the forms between the pads and in a direction at right angles to the direction of movement of the pads.

2. In a sheet rubber stripper machine, a plurality of base members, each base member having a plurality of forms, the forms having sheet rubber articles thereon, means for connecting the nozzle with a source of supply of water, the nozzle operating to direct the water between the sheet rubber articles and forms for loosening the sheet material from the forms, means for moving the base members and forms across the movement of the liquid from the nozzles, a pair of elastic pads located at a point at one side of a nozzle and the stream from the nozzle, means for pressing the pads against the articles when the articles have moved past the stream from the nozzle, and means for moving the pads relative to the forms to draw the articles from the forms.

3. In a sheet rubber stripper machine, a plurality of forms having sheet rubber articles thereon, means for forcing a liquid between the sheet rubber articles and the forms for loosening the sheet material from the forms, a pair of vertically movable elastic pads, each pad having a roller, fixed blocks having channel guideways therein for receiving the rollers upon the upward movement of the pads, a gate for closing the upward end of each channel guideway for preventing the entry of the roller into the guideway upon the downward movement of the pad, the roller engaging the edge of the block upon the downward movement of the pad to press the pad against the sheet rubber articles, means for moving the pads relative to the forms to draw the articles from the forms, and means for moving the forms between the pads and in a direction at right angles to the direction of the movement of the pads.

In witness whereof we have hereunto signed our names to this specification.

RICHARD H. COOVERT.
LOUIE W. WILKINSON.