

J. CHESNEY.
MACHINE FOR MAKING PAPER SHELLS.
APPLICATION FILED OCT. 25, 1907.

939,948.

Patented Nov. 9, 1909.

3 SHEETS—SHEET 1.

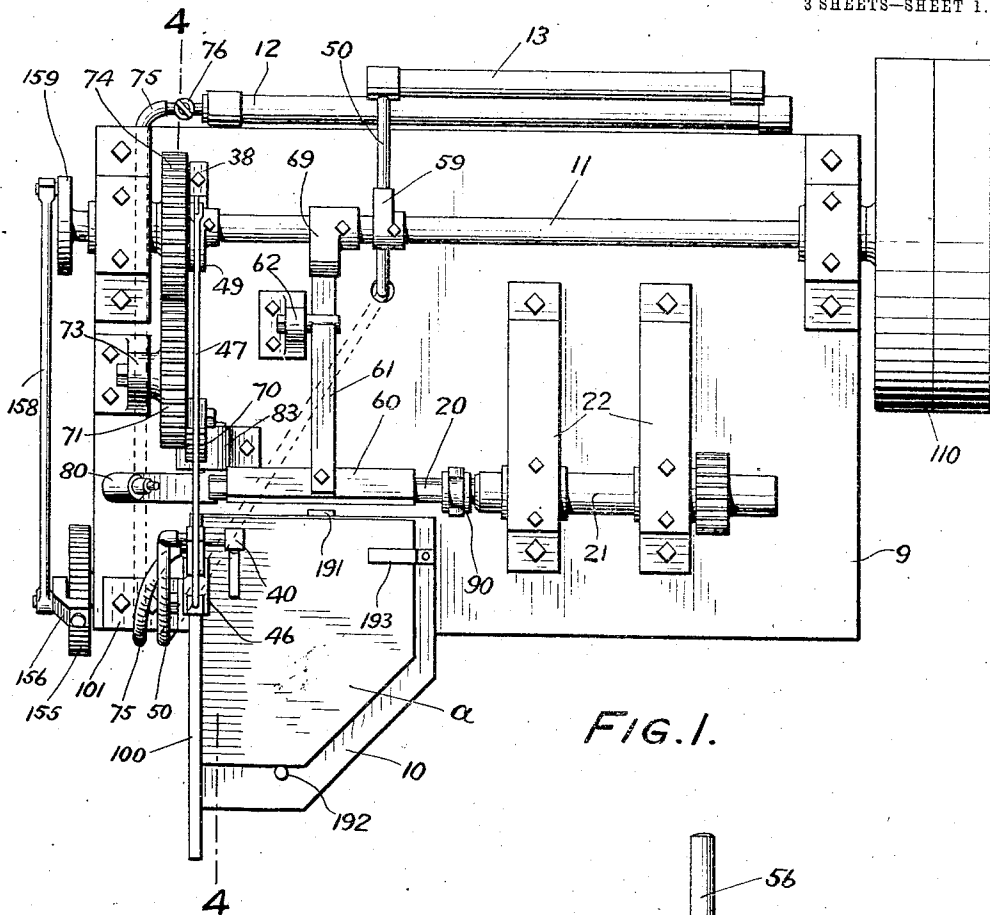


FIG. 1.

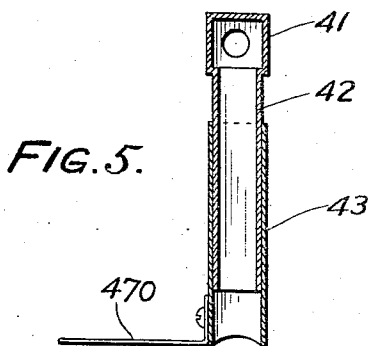


FIG. 5.

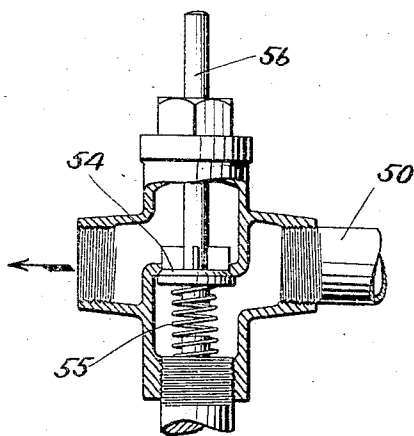


FIG. 6.

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3 SHEETS—SHEET 2.

FIG. 2.

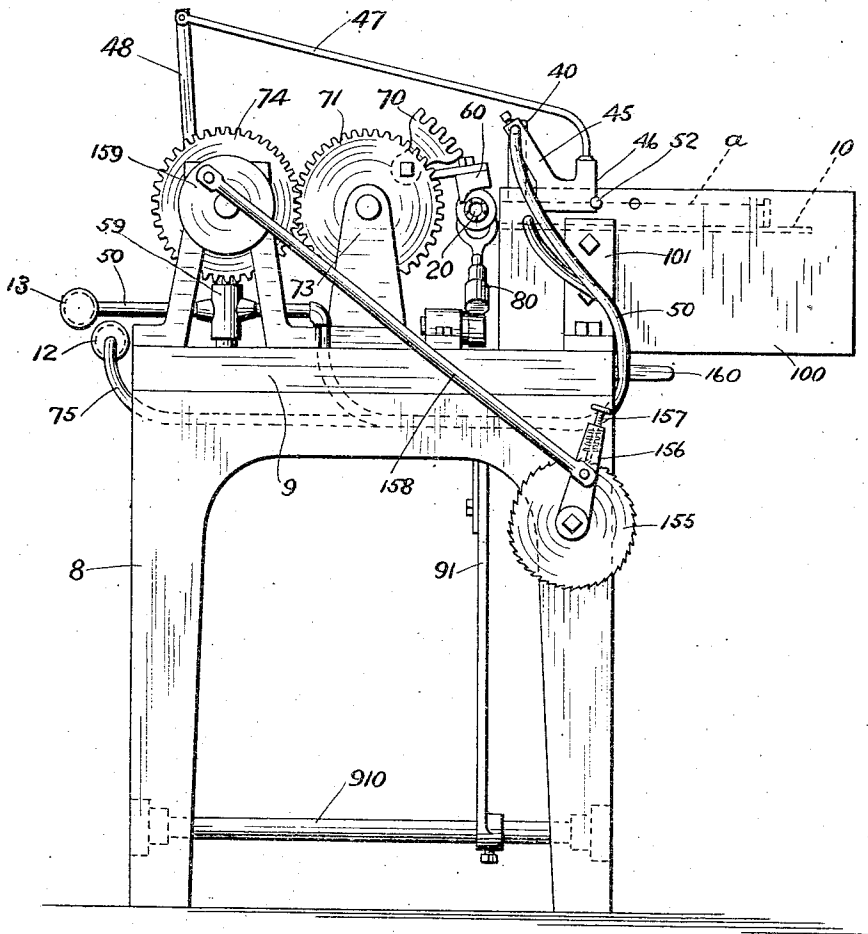
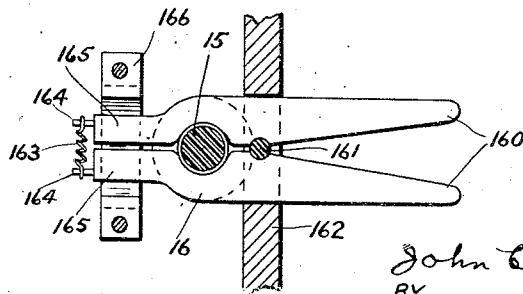


FIG. 7.



WITNESSES:

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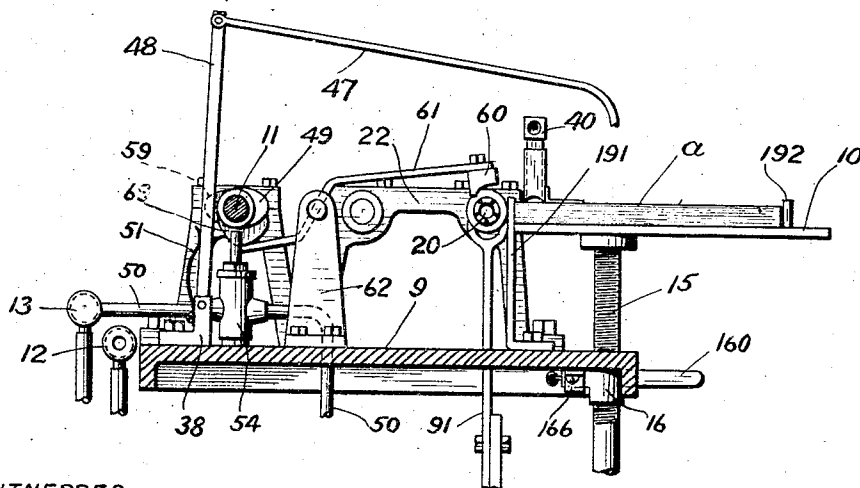
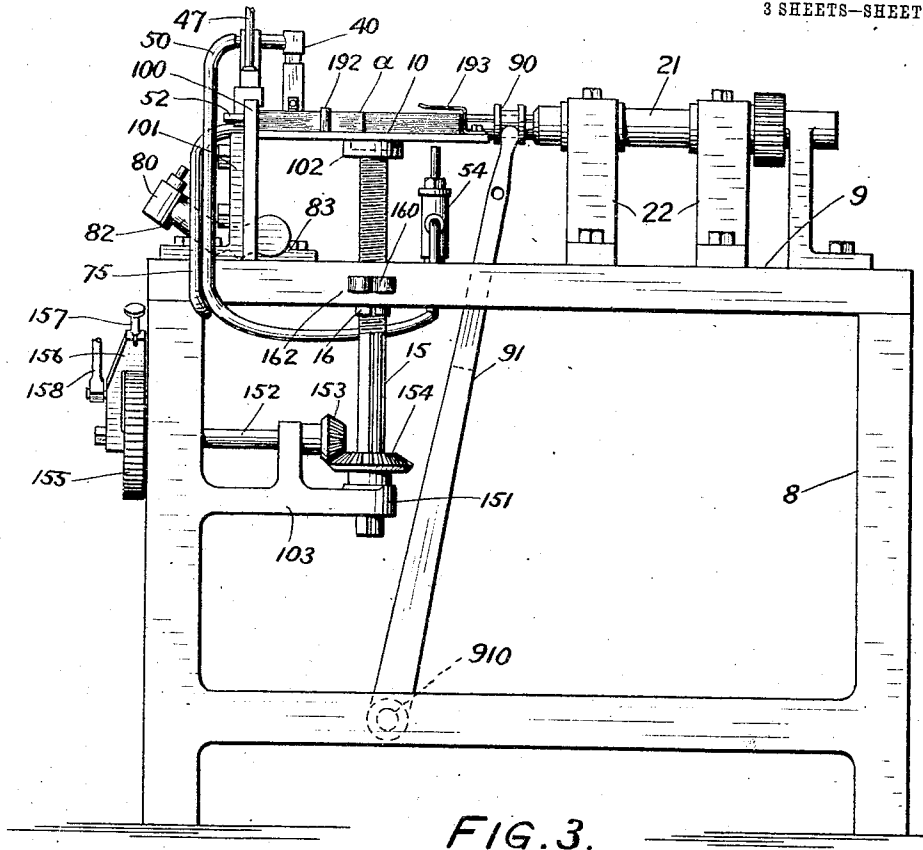
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3 SHEETS—SHEET 3.



WITNESSES:

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FIG. 4.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING PAPER SHELLS.

939,948.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Original application filed December 11, 1906, Serial No. 347,380. Divided and this application filed October 25, 1907. Serial No. 399,106.

To all whom it may concern:

Be it known that I, JOHN CHESNEY, a citizen of the United States, residing at Paulsboro, county of Gloucester, and State of New Jersey, have invented a new and useful Improvement in Machines for Making Paper Shells, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The invention relates to that class of machines for making paper shells for holding explosives in which the paper sheets are fed to a rotating mandrel and wrapped thereon to form a tube, the end of which is folded and closed and which is then slipped off the mandrel.

The object of the invention is to provide new and improved means to supply and convey the paper sheets to the mandrel.

This application is a division of an application filed by me December 11th, 1906, Serial No. 347,380, in which the construction and operation of the whole machine are set forth. In the present application, only the parts of the machine embodying my invention and the parts immediately cooperating therewith are illustrated and described.

In the drawings: Figure 1 is a plan view of the machine. Fig. 2 is a side elevation. Fig. 3 is a front elevation with certain parts omitted for the purpose of more clearly showing the construction of the remaining parts. Fig. 4 is a section on the line 4-4 of Fig. 1. Fig. 5 is an enlarged detail sectional view of the pneumatic picker. Fig. 6 is a detail sectional view of the exhaust valve. Fig. 7 is an enlarged detail plan view of the split nut for supporting the threaded shaft on which the paper table is supported.

8 is the frame of the machine and 9 the top plate of the frame; 10 is the vertically movable table holding the sheets of paper *a*. The stationary side-plate 100 of the table 10 is bolted to the angle-bar 101, which is bolted to the top plate 9 of the frame.

20 is the mandrel to which the sheets of paper are successively fed and about which the paper is wound to form the paper tubes. 40 is a pneumatic picker and feeder for picking up the paper sheets and feeding them to the mandrel.

60 is the guide piece for guiding the sheet around the mandrel.

70 is the folder for folding in one end of the tube after it is formed on the mandrel.

80 is the header or puncher that depresses the center of the folded head of the tube and completes the head-forming operation.

90 is the ejector that pushes the finished tube from the mandrel.

The first step in the operation is to apply suction to the picker and feeder 40, thus lifting the front end of the top sheet, and move the picker and feeder toward the mandrel, thus carrying the front edge of the sheet over the mandrel, which lays hold of the sheet and winds it around the mandrel to form a tube.

The picker 40, shown in detail in Fig. 5, comprises the hollow head 41, connected to and supported by the exhaust pipe 50, the hollow shank 42 depending from the head 41, and the mouth piece 43 surrounding and sliding on the shank 42. The exhaust pipe 50 extends through and is supported by an arm 45 on the slide 46, and communicates with the exhaust chamber 13. The slide 46 is movable back and forth on side-plate 100 as a guide.

Secured to the slide 46 is a bar 47 whose rear end is attached to a lever 48 pivoted on a bracket 38 on the top plate 9. A spring 51, secured to the bracket 38 and bearing against the lever 48, normally holds the slide 46 in its outer position against a stop 52 secured to the side-plate 100. A cam 49, on the main driving-shaft 11, moves the lever 48 inwardly against the tension of the spring 51 and moves the slide 46 toward the mandrel.

110 is the driving pulley for the main shaft.

Interposed in the pipe 50 is a valve 54, (see Fig. 6) normally held, by the spring 55, against its seat to close communication between the exhaust chamber 13 and the picker and feeder 40; but the stem 56 of the valve is operated at the proper time by a cam 59 on the main driving shaft 11. When the valve 54 is thus operated, the air is sucked inwardly through the shank 42, the mouth piece 43 sliding upwardly on the shank and lifting the top sheet above the pile below it. The suction being maintained, the picker and feeder is moved inwardly toward the mandrel by the described action of cam 49. This brings the front edge of

the sheet over and against the upper face of the rotating mandrel 20. The cam 59 then passes beyond the valve-stem 56, and the valve closes, shutting off communication between the exhaust cylinder 13 and the picker and feeder 40, and releasing the sheet fed to the mandrel. The cam 49 subsequently passes beyond the lever 48, which is moved outwardly by means of the spring 51, returning the picker and feeder 40 to its original position.

A holder 470, consisting of a plate secured to the mouth-piece 43, and extending outwardly on a level with the lower edge of the mouth-piece, continues to engage the inner end of the pile when the picker and feeder is moved to its farthest inner position, and prevents the mouth-piece of the picker and feeder from catching in the top sheet or sheets of the paper as it moves outwardly.

After the sheet is carried back to the mandrel and released from the picker and feeder as before described, the guide-piece 60 is moved down, the same guiding the edge of the sheet around the mandrel and holding the sheet in contact with the mandrel during the rolling operation. The guide-piece is supported on a lever 61, which is pivoted between its ends on a standard 62 and is raised out of action by a cam 69 on the main shaft (see Figs. 1 and 4) and drops into action by its own weight.

The mandrel 20, which is of a well known construction, being hollow and orificed, is detachably secured to a hollow shaft 21, turning in bearings in standards 22. The hollow shaft 21 and mandrel 20 are rotated, to roll the sheet upon the mandrel, by means of connections, not shown, from the driving shaft. By other means, not shown, air is exhausted from the mandrel before each rolling operation until the sheet is rolled into a tube and before the ejector is operated.

After the sheet is wound in tube form, the folder 70 is brought into operation, said folder (shown best in Fig. 2) acting upon the end of the tube projecting beyond the end of the mandrel and folding in this part of the tube against the head of the mandrel, thus closing this end of the tube. The folder is of known construction, consisting of a plate provided with several fingers, which act successively upon the projecting paper to form a corresponding number of overlapping folds. The folder is secured to a gear 71, pivoted on a bracket 73, and the gear 71 is driven from a gear 74 on the main shaft 11.

After the folder has operated, the header 80 is operated. The header consists simply of a punching-head secured to the head of a lever 82 pivotally secured in a bearing 83 on the top plate of the frame. The lever is swung upwardly and inwardly to cause the

plunger to impinge against the central part of the folded end of the tube, pressing the same inwardly within the recessed end of the mandrel and causing the folds to be permanently set, thus completing the formation of the bottom of the shell. The lever 82 is operated at the proper time by means not shown, as the same form no part of the invention herein claimed. After the shell is thus completed, it is ejected from the mandrel by means of the ejector 90, which consists of a grooved collar closely fitting the mandrel and which is projected toward the outer end of the mandrel at the proper time, causing the inner or open end of the tube to be engaged thereby and forced off the mandrel. The collar is operated by means of a swinging lever 91, pivoted on the shaft 910, whose forked upper end engages the groove in the collar. The lever 91 is operated by means not shown, as the same form no part of the invention herein claimed.

To enable the sheets on the table to be separated, if there is any tendency for them to stick together, a blow pipe 75 is provided, said pipe extending from the pressure cylinder 12 along the side of the machine and through the side plate 100 to a point alongside the upper sheets of the pile. Admission of air through the pipe is controlled by the hand valve 76.

The table is supported on the top of an upright screw shaft 15, whose flanged upper end fits rotatably within a cap 102 on the under side of the table. The screw-shaft extends through a two-part nut 16 supported on the top plate 9 of the frame as hereinafter described.

The bottom of the shaft turns in a bearing 151 on a bracket 103 on the frame. A horizontal shaft 152 drives the screw-shaft through bevel gears 153 and 154, the latter being splined on the screw-shaft. On the shaft 152 is a ratchet wheel 155. Pivoted on the shaft 152 is a pawl-lever 156 carrying a spring-pressed pawl 157 and operated by a connecting rod 158 from a crank 159 secured to the main shaft.

In the operation of the machine, after the recession of the picker and feeder 40, the pawl 157 turns the ratchet 155 a distance of one tooth, thus imparting a partial turn to the screw-shaft. This causes the screw-shaft to have a slight upward movement due to its engagement with the fixed nut 16. The parts are so proportioned that the extent of the upward movement of the screw-shaft just equals the thickness of a sheet of paper. The top of the pile is thus maintained on a constant level.

When one pile of paper is exhausted and another pile is put in place, the two parts of the nut 16 are separated, permitting the shaft to drop. This is effected by pushing

toward each other the arms 160 secured to the two parts of the nut and pivoted on the pin 161 (see Fig. 7). These arms project forwardly through a cut-away part of the flange 162 of the top-plate 9. The two parts of the nut are held together by means of a spring 163 connecting lugs 164 on the rear extensions 165 of the two parts of the nut. The nut is also supported in position by a clamp 166 secured to the top plate 9 and engaging the extensions 165.

To prevent the paper on the table from creeping forwardly, there is provided the holding-plate 191 secured to the top-plate 9, which extends up to a point that enables the top sheet to be fed over it to the mandrel.

192 is a stop secured to the table and extending in front of the pile and preventing the paper from slipping outwardly.

193 is a holder at the side of the paper, the same consisting of an angle plate secured to the table and extending up along-side, and also overhanging the pile.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:—

1. In a machine for making paper shells, the combination with the table for supporting the pile of paper, of means for conveying the paper sheets from the table, an upright screw shaft on which the table is sustained, means to turn the screw-shaft, thereby elevating the table, a two part nut engaging the screw-shaft, arms extending forwardly from the two parts respectively of the nut and pivoted between the nut and their ends, whereby the parts may be retracted by moving the free ends of said arms toward each other, lugs extending rearwardly from the two parts respectively of the nut, a spring between said lugs normally holding the two parts of the nut in engagement with the screw-shaft, means for supporting the nut, and driving mechanism adapted to rotate the shaft while permitting it to move vertically.

2. In a machine for making paper shells, the combination with the table for supporting the pile of paper, of a pneumatic picker

overlying the pile, a slide on which the picker is supported and by the movement of which the picker is moved horizontally into and out of position to select a sheet of paper, an exhaust chamber, a pipe connecting the exhaust chamber and the picker, a spring-pressed valve normally closing the pipe, the driving shaft, a cam thereon adapted to operate said valve to open the pipe, a spring-pressed lever connected with the slide and normally holding it in one position, and a cam on the driving shaft adapted to operate said lever and thereby move the slide toward its other position.

3. In a machine for making paper shells, the combination with the table for supporting the pile of paper, of a pneumatic picker overlying the pile, means to reciprocate the picker, outwardly and inwardly respectively, into and out of position to select a sheet of paper, means to exhaust air from the picker when the same is in position to select a sheet of paper, and a holder moving with the picker and extending outwardly so as to overlie the inner edge of the pile when the picker is in its inner position, thereby preventing the picker from catching in the paper when moved outwardly.

4. In a machine for making paper shells, the combination with the machine frame, of a vertically movable table for supporting the pile of paper, a side-plate secured to the frame and extending above and alongside the table, a slide movable back and forth on the side-plate as a guide, an exhaust pipe carried by said slide and overhanging the table, a hollow pneumatic picker carried by and depending from and communicating with said exhaust pipe, a valve on said pipe, a driving shaft, and means operated thereby to respectively reciprocate the picker and control the operation of said valve.

In testimony of which invention I have hereunto set my hand, at Paulsboro, on this 21st day of October, 1907.

JOHN CHESNEY.

Witnesses:

WILLIAM J. ADAMSON,
JOHN H. BROWN.