

Jan. 31, 1939.

F. F. RUAU

2,145,529

MANUFACTURE OF FILTER PLUGS OR WADS FOR CIGARETTES

Filed Aug. 24, 1936

6 Sheets-Sheet 1

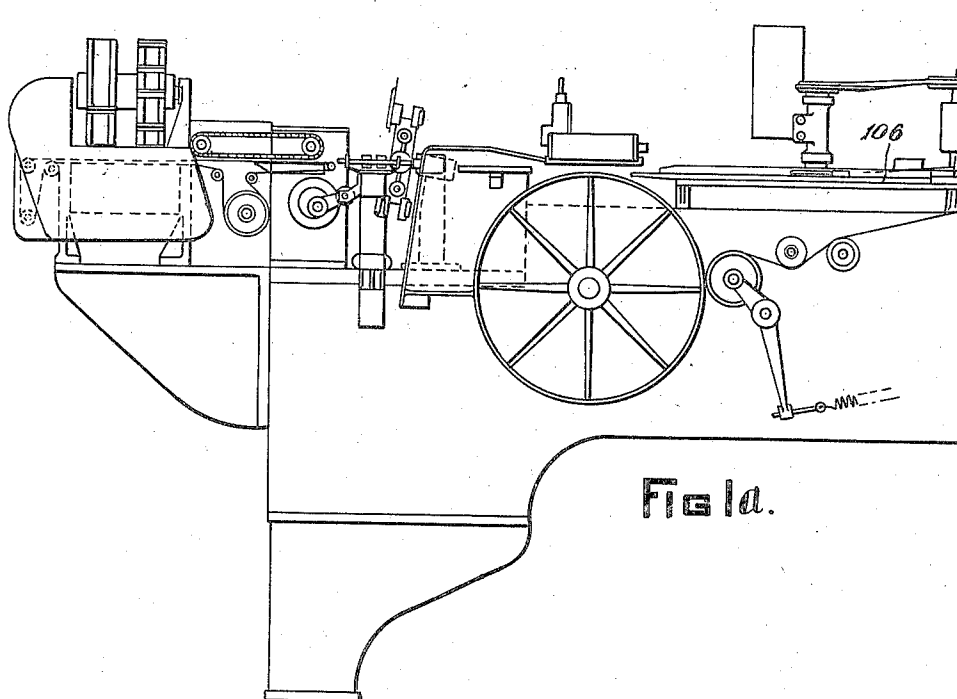


Fig. 1.

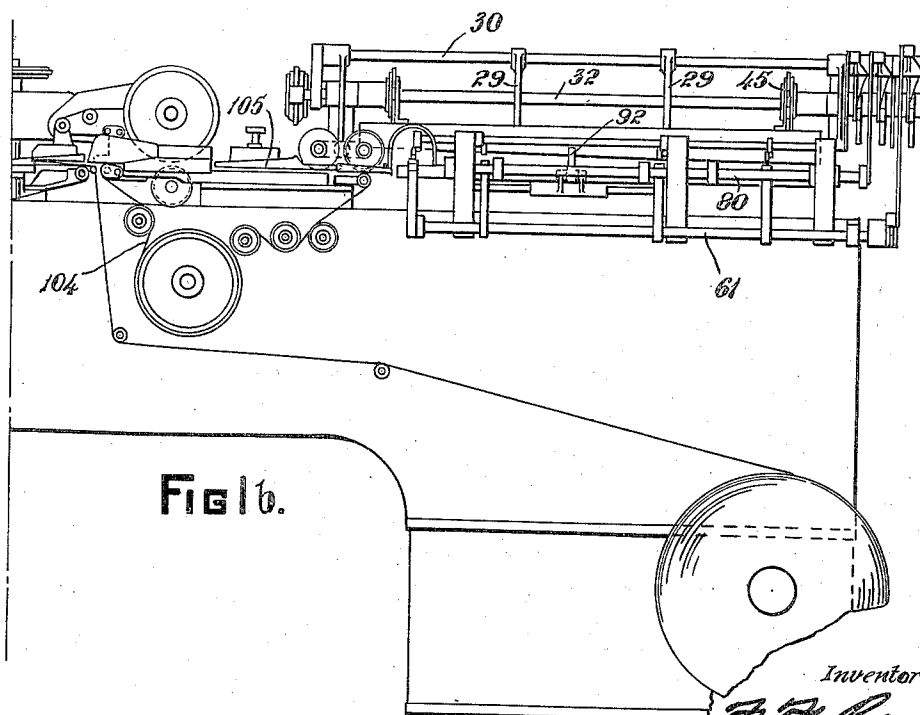


Fig. 2.

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6 Sheets-Sheet 2

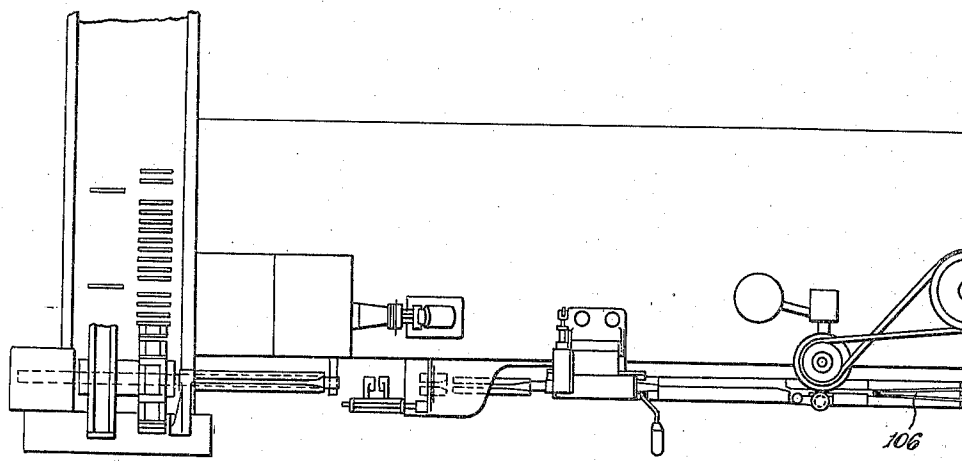


Fig. 2a.

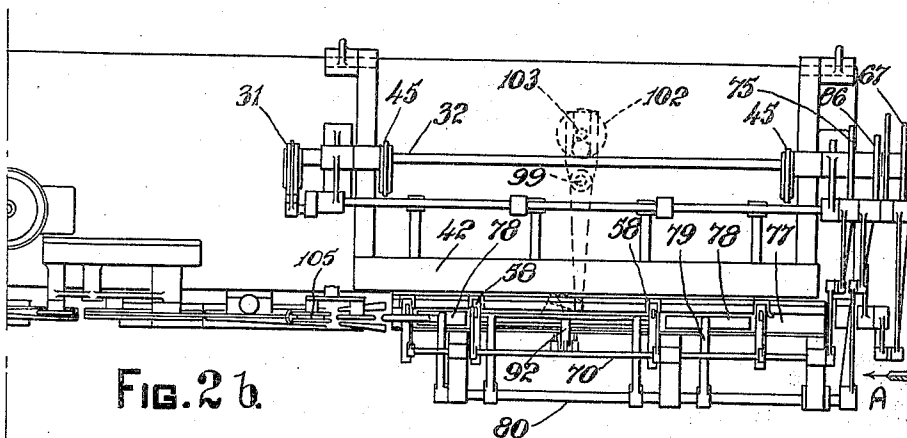


Fig. 2b.

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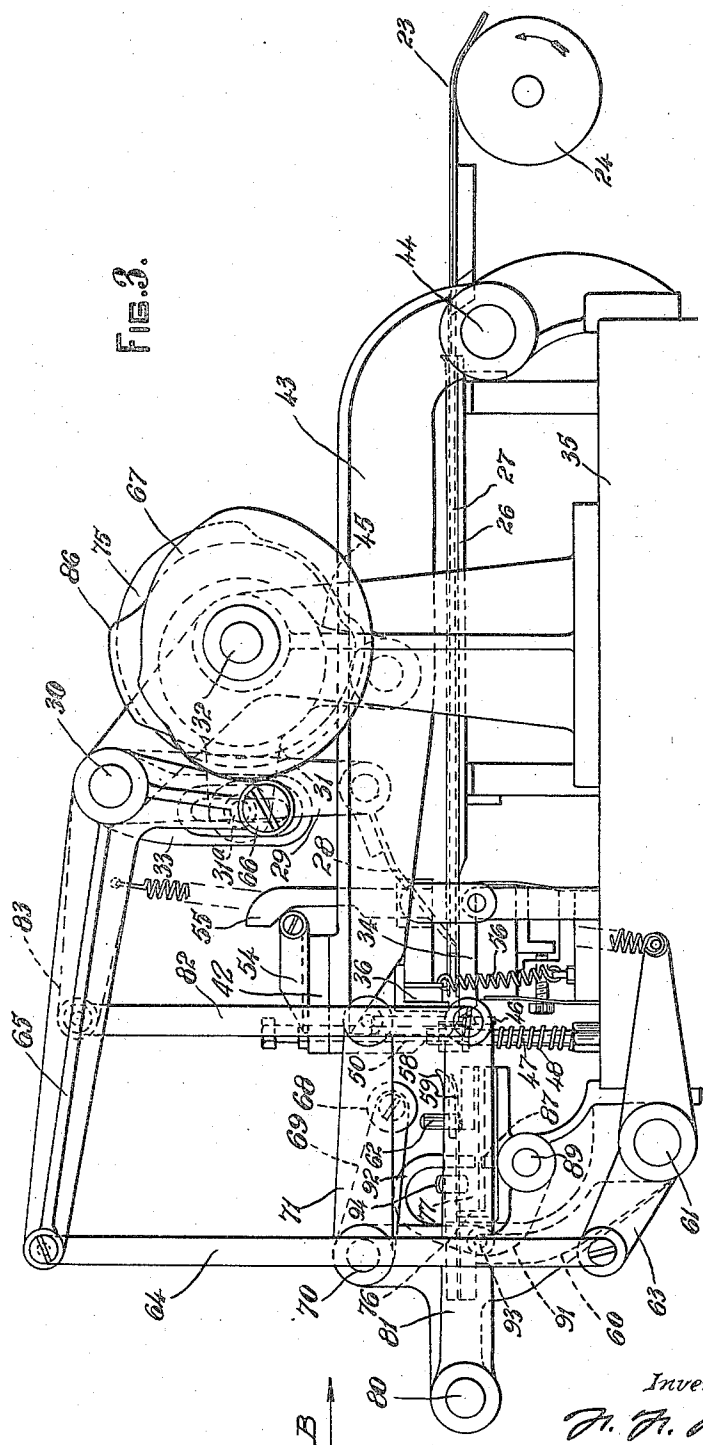
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MANUFACTURE OF FILTER PLUGS OR WADS FOR CIGARETTES

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6 Sheets-Sheet 3



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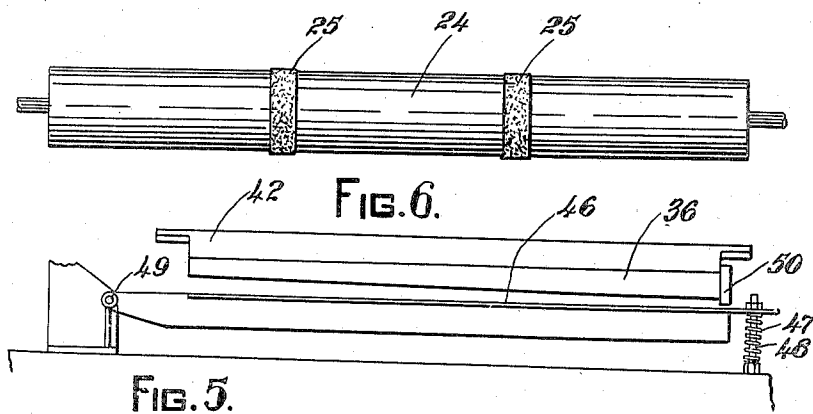
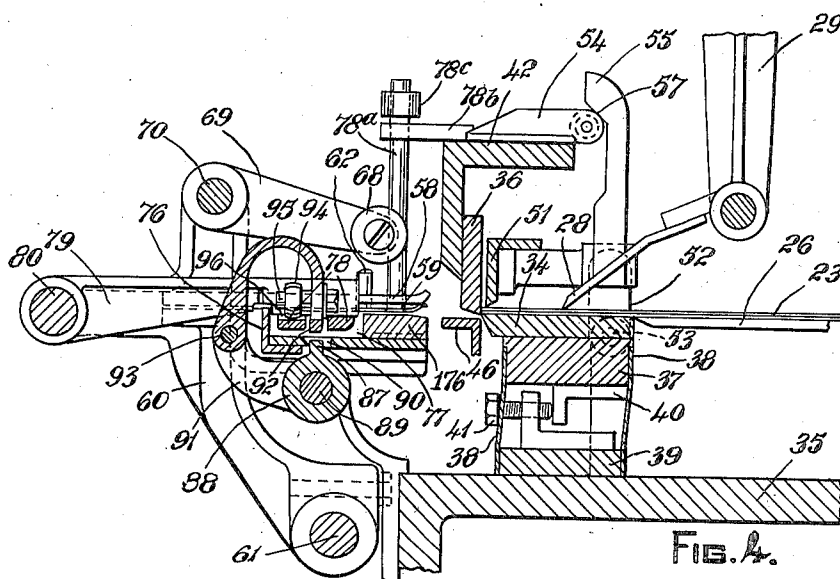
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MANUFACTURE OF FILTER PLUGS OR WADS FOR CIGARETTES

Filed Aug. 24, 1936

6 Sheets-Sheet 4



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MANUFACTURE OF FILTER PLUGS OR WADS FOR CIGARETTES

Filed Aug. 24, 1936

6 Sheets-Sheet 5

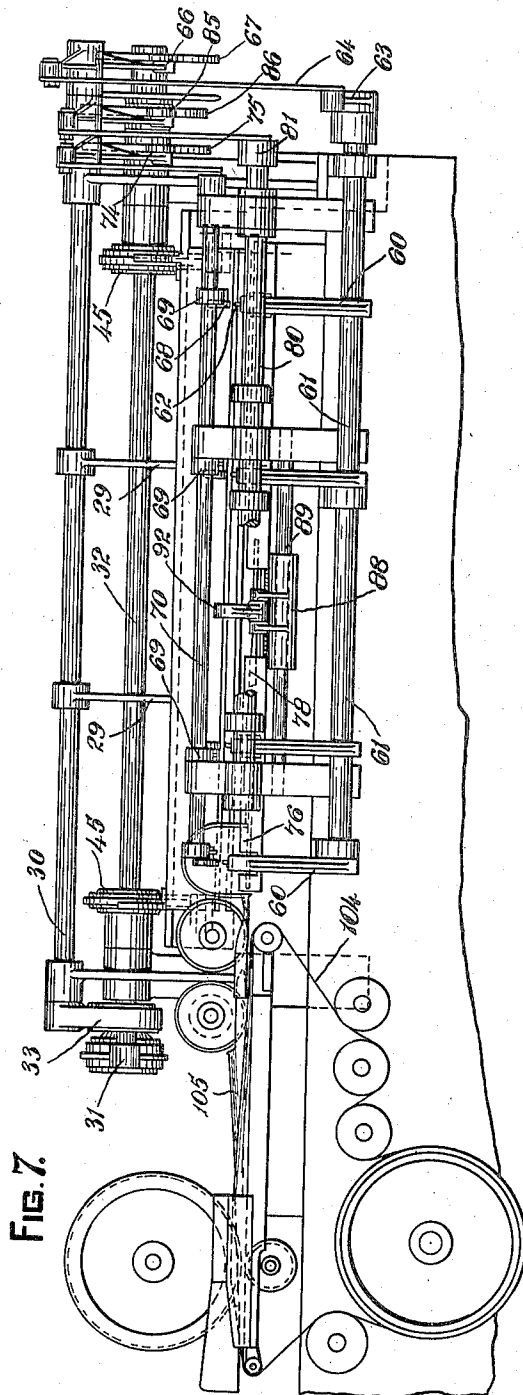


FIG. 7.

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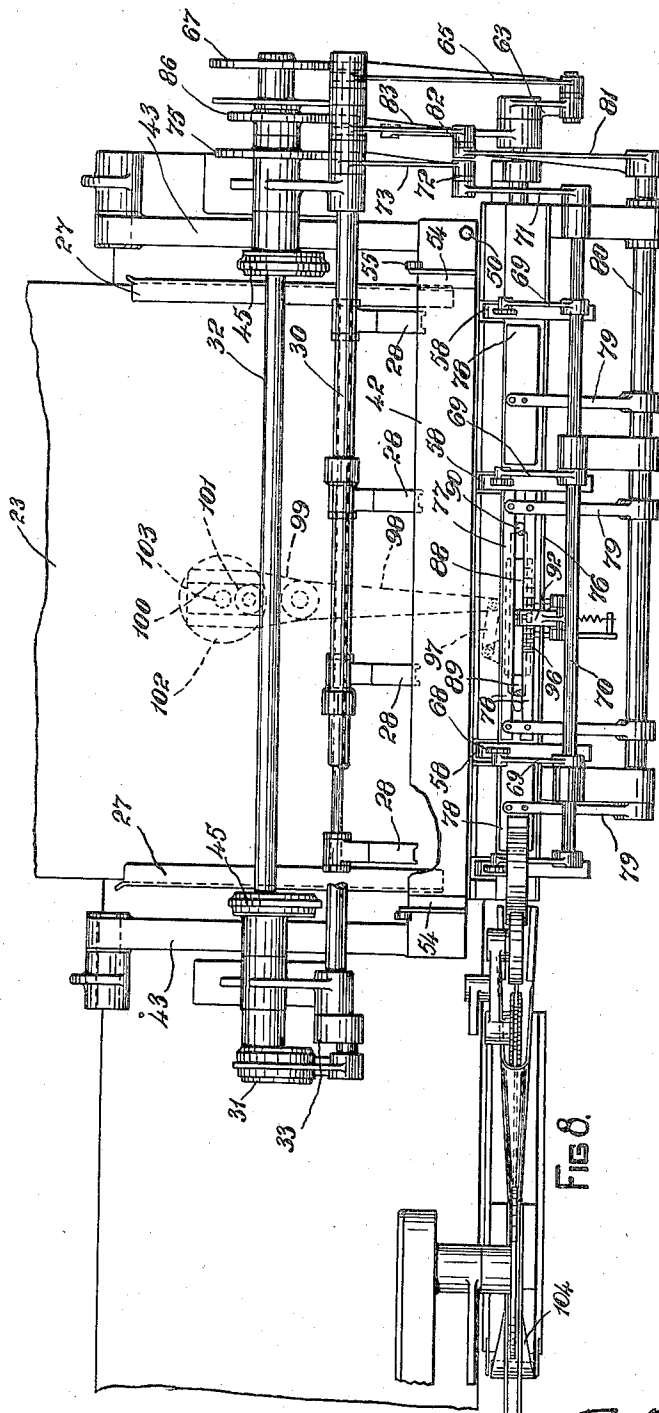
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MANUFACTURE OF FILTER PLUGS OR WADS FOR CIGARETTES

Filed Aug. 24, 1936

6 Sheets-Sheet 6



UNITED STATES PATENT OFFICE

2,145,529

MANUFACTURE OF FILTER PLUGS OR WADS
FOR CIGARETTESFélix Frédéric Ruau, London, England, assignor
to Molins Machine Company, Limited, London, EnglandApplication August 24, 1936, Serial No. 97,686
In Great Britain September 10, 1935

25 Claims. (Cl. 93—1)

This invention is for improvements in or relating to the manufacture of filter plugs or wads, for example, plugs or wads for use with cigarettes at that end of the cigarette which is to be placed in the mouth.

In some cases plugs or wads are manufactured from strips of material, such strips comprising layers of creped or corrugated paper. The strips are extensible transversely of their length, and consequently, when the paper is corrugated, the length of the corrugations extends transversely of the width of the strips. If desired, the layers of creped paper may be interposed by absorbent cellulosic material.

When such plugs or wads are used with cigarettes the plugs or wads are sometimes arranged so that smoke from the cigarettes is filtered. It is, however, to be understood that where the term filter plug or wad is used herein, it is to include plugs or wads that are capable of filtering smoke when the plugs or wads are used with cigarettes, but that it is not to be limited to plugs or wads which are capable of acting as complete smoke filters; for instance, where the plugs or wads comprise layers of creped paper with or without interleaved layers of absorbent material it will be appreciated that a complete filtering of the smoke is not obtained since some of the smoke can pass through the small channels in the plugs. Where however the plugs or wads are made of layers of absorbent material a more complete filtering is obtained.

Where herein the term "strip" is used in connection with the material from which plugs or wads are to be made, it shall mean material which is longer than it is wide.

In one form the strips comprise three layers of creped paper interleaved with two layers of absorbent cellulosic material. The length of the strips is approximately 66 centimetres and the width approximately 44 millimetres.

The strips are obtained by severing them from a length of material, for example, a sheet or a web comprising layers the width of which sheet or web is equal to the length of the strips, and the sheet or the web is extensible in a lengthwise direction, and consequently, when the strips are severed from the end of the sheet or the web the strips are extensible transversely of their length. The material from which the plugs or wads are made is referred to for convenience as "wad material".

Accordingly, the present invention has for its general object the provision of an apparatus which comprises means for feeding strips of wad

material severed from a web or a sheet by a cutting device to the forming mechanism of a filter plug or wad forming machine, the wad material and each strip comprising a plurality of superimposed layers of material (e. g. layers of creped paper with or without interposed layers of absorbent material), and also includes means to grip that portion of the web or the sheet which is to be severed from the web or the sheet, or to grip the severed strip whilst the strip is moved towards the forming mechanism and before it has moved for any substantial distance, whereby the layers of material are held in position relatively to one another, whilst the strip is fed to the wad forming mechanism.

One form of apparatus for carrying the invention into effect will now be described with reference to the accompanying drawings in which:

Figs. 1a and 1b are side elevations of a machine for making plugs or wads;

Figs. 2a and 2b show a plan of Fig. 1a and a plan of Fig. 1b respectively;

Fig. 3 is an elevation drawn to an enlarged scale, looking in the direction of the arrow A, Fig. 2b, and shows strip feeding apparatus;

Fig. 4 is a sectional view of a part of Fig. 3;

Fig. 5 is a view showing a detail of Fig. 4;

Fig. 6 shows a detail of Fig. 3;

Fig. 7 is a view of Fig. 3 looking in the direction of arrow B;

Fig. 8 is a plan of Fig. 7.

Like references refer to like parts throughout the specification and drawings.

Referring to Fig. 3 of the drawings, the material from which the plugs or wads are to be formed is fed as a web 23 from a reel of material (not shown). The web of material comprises three superimposed layers of crepe paper, interleaved with two layers of absorbent cellulosic material, and the width of the reel is approximately 66 centimetres.

The web is fed intermittently towards a cutting device, described below, and it is found that there is a tendency for the lower layers of the web to lag behind the upper layers during the feeding operation. To reduce this tendency the web is passed over a roller 24, which is rotated continuously and is provided at intervals along its length with roughened surfaces 25, Fig. 6, which feed the lower layers of the web forwardly, thus keeping the superimposed layers of material in their desired relative position.

The roller 24 is rotated so that the surface of the roller which engages with the web 23 moves in the same direction as the direction in which

the web is being moved and operates to tension the web in the direction of movement of the web. The roughened surfaces 25 are provided by strips of emery cloth secured to the roller.

5 The web 23 is moved over a guide plate 26 and between the side guides 27, Fig. 8, which are of U shape and enclose the longitudinal edges of the web so as to control the web laterally whilst it is being moved towards the cutting device.

10 Feeding elements 28, Figs. 3 and 4, mounted on arms 29 secured to a shaft 30 are reciprocated to move the web 23 intermittently towards the cutting device. The shaft 30 is oscillated about its longitudinal axis by an eccentric strap 31 mounted on a shaft 32, driven from the main drive of the machine. A link 33 connects the shaft 30 with the eccentric strap 31. At each cutting operation a strip approximately 44 millimeters wide is severed therefrom, and it will be seen, therefore, that each strip severed from the web is approximately 66 centimeters long and 44 millimeters wide. As will be seen in Fig. 3, the link 33 is provided with a slot and the eccentric strap 31 carries a pin 31a which engages with the slot in the link 33. If it is desired to alter the width of the strips being severed from the web, it is only necessary to alter the position of the eccentric strap and consequently that of the pin carried thereby relatively to the slot in the link 33.

30 The cutting device for severing strips from the web 23 comprises a knife 34, Fig. 4, which is secured to the bed 35 of the machine by a resilient connection, described below, and a knife 36 mounted for reciprocation in a vertical plane and arranged to co-operate with the knife 34. The cutting edges of the knives 34 and 36 are arranged at an angle one to the other, so that one edge of the web 23 is first cut by the co-operating knives and the cut gradually extends across the web until a strip has been severed therefrom, the cutting action of the knives being similar to that of a pair of scissors. The knife 34 is mounted on a block 37, which is fixed to flat spring plates 38, two of said plates being attached to each end of the block 37 and spaced apart from each other and extending lengthwise of the cutting edge of the knife 34. The spring plates are fixed at their lower ends to rigid members shown as blocks 39 secured to the bed 35 of the machine.

50 Those portions of the knives 34 and 36 which first cooperate with each other are provided with a lead or chamfer so that the knives may be moved past each other and not tend to jam at the commencement of the cutting operation as they would do if such provision were not made. When the reciprocable knife 36 is moved into engagement with the yieldably mounted knife 34, the cutting edge of the knife 36 engages with the edge of the knife 34 and gradually causes the knife 34 to move to the right, as viewed in Figure 4. Since the knives are angularly inclined to one another that end of the knife 34 which is first engaged by the knife 36 first moves to the right the other parts of the knife 34 moving as they are in turn engaged by the knife 36. When setting the apparatus the spring plates 38 are given an initial tension as shown in Figures 3 and 4 and by this means the cooperating edges of the knives 34 and 36 are automatically maintained in correct relationship with respect to each other during the cutting operation. In order to provide the initial tension in the springs 38 angle pieces 40 are secured to each end of the block 37 and adjusting screws 41, carried in angle pieces

fixed to the blocks 39, are provided and are operative upon the angle pieces 40 to effect the adjustment.

The knife 36 is secured to an angle piece 42, which is connected with levers 43 pivoted at 44. A pair of eccentric straps 45, see Figures 7 and 8, are connected with the shaft 32 and with the levers 45.

As the web 23 is fed forwardly to the cutting position, the leading portion of the web is supported by a plate 46, Fig. 3, the supporting surface of the plate during this time being arranged at substantially the same level as the surface of the plate 26, over which the web 23 is being moved. Before the cutting operation takes place the plate 46 is moved downwardly out of the range of action of the cooperating knives 34 and 36. To enable the plate 46 to be moved downwardly out of the range of action of the knives 34 and 36 one end of the plate 46 is pivoted at 49, Fig. 5, and the other end is slidably mounted on a vertical rod 47 fixed to the bed 35 of the machine, and springs 48 are provided to urge the plate towards the position shown in Fig. 3 of the drawings. At that end of the plate 46 which is slidably mounted, a projection 50 secured to the angle piece 42 engages with and depresses the plate 46, Fig. 5. The projection 50 is arranged so that as the knife 36 descends, it engages with the plate 46 before the knife 36 cooperates with the knife 34.

In order to prevent the web 23 from moving forwardly during the cutting operation, a pressure member 51, Fig. 4, is provided and is connected with a link 52 pivoted at 53 to the bed of the machine. The pressure member 51 is oscillated by the knife 36, a projecting member 54 being secured to the angle piece 42 to which the knife 36 is secured, and engaging with a cam 55 connected with the link 52. As the knife 36 descends, the projection 54 engages with the depression in the cam 55, and a spring 56, Fig. 3, causes the pressure member 51 to engage with and grip the web 23 between the member and the upper surface of the knife 34. As the knife 36 moves upwardly, the projection 54 engages the surface 57 of the cam 55, thereby causing the pressure member 51 to release the web 23 ready for the next feeding action.

Before the knives 34 and 36 operate to sever a strip from the web 23, a gripping device comprising a plurality of gripping units is arranged to grip the leading end of the web 23. Each of the gripping units comprises a pair of opposed co-operating elements of which one is movable relatively to the other. One of the cooperating elements is a fixed element 58, and the other is a resiliently mounted element 59. The resiliently mounted part 59 consists of a flat spring which is connected at one end to the fixed element 58. The fixed element 58 and the resilient element 59 are connected with an arm 60 secured to a shaft 61. A projection 62 is secured to the resilient member 59 and projects through an aperture in the fixed member 58 for a purpose which will be described below. The arm 60 is oscillated about the axis of the shaft 61 so that the units forming the gripping device are movable in an arcuate path which is transverse to the length of the strip of material which is severed from the web 23. An arm 63 is secured to the shaft 61 and to a link 64, the link 64 being also connected with one arm of a bell crank lever 65, the other arm of the bell crank lever carrying a roller 66 which engages with a cam 67. The cam 67 causes the arm 63 to move in an arcuate path about the

axis of the shaft 61, and as the grippers move into position to grip the leading end of the web 23, a roller 68 carried on an arm 69 fixed to a spindle 70 moves downwardly and engages with the projection 62, thus depressing the projection and causing the gripper to open, so that the end portion of the web 23 is inserted between the resilient member 59 and the fixed member 58. The roller 68 is then lifted out of engagement with the projection 62 so that the end portion of the web 23 is held by grippers at points along the width of the web. When, therefore, the strip is severed from the web, the strip will be gripped at points along its length. The arm 69 is operated by a link 71, one end of which is connected with the spindle 70, the other end being connected with a further link 72, Fig. 8, which is connected to one arm of a bell crank 73, the other arm of the bell crank carrying a cam roller 74, Fig. 7, which engages with a cam 75 on the shaft 32.

When a strip has been severed from the web 23 the arm 60 moves to the left, as viewed in Figs. 3 and 4, and the strip of material which is carried by the grippers is located against an abutment formed by the side 76 of a trough 77. When the strip has been located against the abutment formed by the side 76 of the trough, the continued movement of the grippers to the left in these figures causes the strip to be withdrawn from between the members 58 and 59.

As the strip is moved towards the side 76 of the trough 77 it passes beneath a pressure element 78, the purpose of which is described below. It is sometimes found in practice that the strip buckles between the points at which it is gripped and that when this occurs there is a tendency for the strip to foul the pressing element 78. To remove this objection the strip is passed over a bottom guide 176 and beneath top guides shown as small weights 78a. The top guides 78a, Fig. 4, are arranged freely to slide in bearings 78b carried by the angle piece 42, and are disposed so that they engage the material at points between the gripping units. The top guides 78a engage the end portion of the web as the knife 36 moves downwardly and through a lost motion device remains in contact therewith after the strip has been severed from the web and whilst the grippers are moving the strip towards the side 76 of the trough 77. The top guides 78a are lifted out of the path of the web as the knife moves upwardly, the bearings 78b engaging with collars 78c fixed to the top guides 78a.

When the material comprising the web consists of layers of crepe paper interposed with layers of cellulosic material it is found that the strips are more easily deposited in the trough 77 if the gripping units are arranged to grip the strip at different distances from the longitudinal edges of the strip and to operate in succession lengthwise of a strip starting at one end thereof to release the strip. In the construction being described, the gripping device is arranged so that the gripping unit shown on the left of Fig. 8 is the first to release the strip, the central unit being the next and the unit at the right of the figure the last to release the strip. Each strip thus deposited in the trough 77 is engaged by a pressing member 78, which is connected to arms 79 fixed to a shaft 80. The pressing member 78 is provided with a slot or aperture the purpose of which appears below. Whilst the strip is being inserted into the trough 77, the pressing member 78 is held in a position such that it does not impede the strip

when the strip is substantially flat, but when the strip is in the trough, the pressing member is lowered into engagement with the strip. The arms 79 to which the pressing member 78 is connected is operated by a link 81, one end of the link being fixed to the shaft 80, whilst the other is connected with a further link 82, which link is in turn connected with one arm of a bell crank lever 83, the other arm of the bell crank lever carrying a roller 85 which engages with a cam 86.

When the pressing member 78 has engaged the strip in the trough 77, the strip is engaged and gripped by a conveyor which moves the strip lengthwise out of the trough. The conveyor which engages and grips the strip comprises two elements disposed above and below the strip respectively, and movable relatively to one another to grip the strip in timed relationship with the gripping device above described. One of the elements comprises a projection 87, Fig. 4, on a carriage 88, which carriage is slidably mounted on a shaft 89. The projection 87 protrudes through an aperture 90 in the bottom of the trough 77, and that surface of the projection 87 which engages with the strip of material is provided with a roughened surface, for example, a piece of emery cloth is secured to the surface. The carriage 88 is provided with an arm 91, and an element 92 which cooperates with the projection 87 is pivoted at 93 to the arm 91. The element 92 is arranged to project through an aperture in the pressing member 78, and that surface of the element 92 which engages with the strip of material is roughened in a manner similar to that in which the projection 87 is roughened. A roller 94 mounted for rotation about a pin 95 is connected with the element 92, and the roller 94 engages with a cam surface 96, which is formed on or secured to the upper surface of the pressing member 78. The roller 94 and cam 96 cause the element 92 to pivot about the point 93 and thereby to grip and release a strip at the desired times. The carriage 88 is reciprocated along the shaft 89 by a link 97, Fig. 8, one end of which is connected with the carriage 88, the other end being connected with a further link 98, which is also connected to a bracket 99, the bracket 99 being provided with a slide 100. A roller 101 is connected with a disc 102, the disc being secured to a shaft 103 which is driven from the main drive of the machine. As the roller 101 rotates with the disc 102, it moves in the slide 100 and imparts to the carriage 88 the desired reciprocating movement. The carriage 88 after a strip has been gripped by the projection 87 and the element 92 is moved to the left of Figs. 7 and 8, thereby conveying the strip lengthwise out of the trough 77 and delivering it to a feed conveyor 104.

In an alternative construction, instead of the members 87 and 92 for feeding the strips lengthwise to the feed conveyor 104, there may be provided a finger or other device which is arranged to engage with the rear end of the strip in the trough 77, the finger being operated by suitable cam mechanism to move the strip in the direction of its length towards the conveyor 104.

The feed conveyor 104 moves the strips received thereby to forming mechanism indicated generally by the reference 105, and to wrapping mechanism indicated generally by the reference 106. The mechanisms 105 and 106 may be similar to those shown and described in application Serial No. 97,683, filed August 24, 1936.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other to permit the strip to be gripped by and released from said gripping device, and members corresponding in number to the number of said units, each of the members being movable in timed relationship with the gripping device to engage a resiliently mounted element of a unit and effect relative movement between the opposed elements of such unit.

2. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped by and released from said gripping device, a projection carried by each resiliently mounted element, and a member movable in timed relationship with the gripping device to engage said projection and effect relative movement between the opposed elements.

3. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is movable relatively to the other to permit the strip to be gripped by and released from said gripping device, said units being arranged to grip the strip at different distances from the longitudinal edges of the strip so that the units operate in succession from end to end of the strip, considered in the direction of the length thereof, to release the strip.

4. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped by and released from said gripping device, said units being arranged to grip the strip at different distances from the longitudinal edges of the strip so that the units operate in succession from end to end of the strip, considered in the direction of the length thereof, to release the strip.

5. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising at least two opposed

elements, one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped by and released from said gripping device, and means to engage the strip moved by the gripping device and arrest the movement of the strip while the movement of said device is continued so that the strip is released from the gripping device.

6. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped by and released from said gripping device, and means to engage the strip moved by the gripping device and arrest the movement of the strip while the movement of said device is continued so that the strip is released from the gripping device.

7. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped by and released from said gripping device, and an abutment against which a longitudinal edge of the strip is moved by the gripping device to arrest the movement of the strip while the movement of said device is continued so that the strip is released from the gripping device.

8. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped by and released from said gripping device, and an abutment against which a longitudinal edge of the strip is moved by the gripping device to arrest the movement of the strip while the movement of said device is continued so that the strip is released from the gripping device.

9. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said gripping device comprising at least two opposed elements one of which is movable relatively to the other to permit the strip to be gripped by and released from said gripping device, and a pair of guides between which the strip is moved by the gripping device, one of said guides being movable in timed relationship with the gripping device to permit the entry of the strip between the guides.

10. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a cutting device to sever strips from the material, a gripping device to move a severed strip away from the cutting device, said

gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is movable relatively to the other to permit the strip to be gripped by and released from said gripping device, and guides between which the strip is moved by the gripping device, said guides comprising a bottom guide over which the strip passes and top guides disposed between said units, said top guides being movable in timed relationship with the gripping device to permit the entry of the strip between the top and bottom guides.

11. In combination with mechanism to feed material comprising a plurality of superimposed layers of material, a reciprocating cutter to sever strips from the material, a gripping device to move a severed strip away from the cutter, said gripping device comprising a plurality of units arranged at intervals along the length of the strip, each of said units comprising at least two opposed elements one of which is movable relatively to the other to permit the strip to be gripped by and released from said gripping device, and guides between which the strip is moved by the gripping device, said guides comprising a bottom guide over which the strip passes and top guides disposed between said units, said top guides being connected through a lost motion device with the cutter so as to be movable in timed relationship with the gripping device to permit the entry of the strip between the top and bottom guides.

12. In combination with a cutting device, means to feed towards the cutting device a web of material comprising a plurality of layers of material, and means to tension the lower layers of the web to maintain the relative positions of the layers forming the web.

13. In combination with a cutting device, means to feed towards the cutting device a web of material comprising a plurality of layers of material, and an element having a roughened surface movable in the direction of movement of the web with a surface speed greater than that of the web, said surface engaging the underside of the web to tension the lower layers of the web to maintain the relative positions of the layers forming the web.

14. In combination with a cutting device, means to feed towards the cutting device a web of material comprising a plurality of layers of material, and an element having a roughened surface continuously movable in the direction of movement of the web, said surface engaging the underside of the web to tension the lower layers of the web to maintain the relative positions of the layers forming the web.

15. In combination with a cutting device, means to feed towards the cutting device a web of material comprising a plurality of layers of material, and a roller having roughened areas at intervals considered in the direction of the axis of rotation of the roller, said roller having a surface speed greater than that of the web and being arranged so that the roughened areas engage the underside of the web to tension the lower layers of the web to maintain the relative positions of the layers forming the web.

16. In combination with a cutting device, means to feed towards the cutting device a web of material comprising a plurality of layers of material, guides between which the longitudinal edges of the web are moved, and an element having a roughened surface movable in the direction of

movement of the web with a surface speed greater than that of the web, said surface engaging the underside of the web to tension the lower layers of the web to maintain the relative positions of the layers forming the web.

17. In combination with a cutting device, means to feed towards the cutting device a web of material comprising a plurality of layers of material, guides between which the longitudinal edges of the web are moved, and a roller having roughened areas at intervals considered in the direction of the axis of rotation of the roller, said roller having a surface speed greater than that of the web and being arranged so that the roughened areas engage the underside of the web to tension the lower layers of the web to maintain the relative positions of the layers forming the web.

18. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a conveyor to receive the strips and move them lengthwise in succession towards said mechanism, and a gripping device to engage the strips along their length to retain the layers of material in position and deliver them to said conveyor.

19. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a trough extending lengthwise towards the forming mechanism, a gripping device to engage the strips along their length and deliver them to the trough, and a conveyor to move a strip from said trough lengthwise towards said mechanism.

20. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a trough extending lengthwise towards the forming mechanism, a gripping device comprising a plurality of units arranged to engage a strip at intervals along its length and to deliver the strip transversely of its length to the trough, each of said units comprising at least two opposed elements one of which is movable relatively to the other to permit the strip to be gripped by and released from the gripping device, and a conveyor to move a strip from said trough lengthwise towards said mechanism.

21. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a trough extending lengthwise towards the forming mechanism, a gripping device comprising a plurality of units arranged to engage a strip at intervals along its length and to deliver the strip transversely of its length to the trough, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped and released from the gripping device, and a conveyor to move a strip from said trough lengthwise towards said mechanism.

22. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a trough extending lengthwise towards the forming mechanism, a gripping device comprising a plurality of units arranged to engage a strip at intervals along its length and to deliver the strip transversely of its length to the trough, each of said units comprising at least two opposed elements one of which is resiliently

- mounted so as to be movable relatively to the other element to permit the strip to be gripped and released from the gripping device, an abutment on said trough to engage the strip and locate it above the trough while the movement of the gripping device is continued so that the strip is released from the gripping device, and a conveyor to move a strip from said trough lengthwise towards said mechanism.
23. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a trough extending lengthwise towards the forming mechanism, a gripping device comprising a plurality of units arranged to engage a strip at intervals along its length and to deliver the strip transversely of its length to the trough, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped and released from the gripping device, a projection connected with a reciprocable carriage and arranged to protrude through an aperture in the bottom of the trough, and an element mounted on said carriage for movement therewith, said element being movable relatively to said projection so as to cooperate therewith when a strip is in the trough to grip and convey the strip lengthwise from the trough towards said mechanism.
24. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a trough extending lengthwise towards the forming mechanism, a gripping device comprising a plurality of units arranged to engage a strip at intervals along its length and to deliver the strip transversely of its length to

the trough, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped and released from the gripping device, an abutment on said trough to engage the strip and locate it above the trough while the movement of the gripping device is continued so that the strip is released from the gripping element, a projection connected with a reciprocable carriage and arranged to protrude through an aperture in the bottom of the trough, and an element mounted on said carriage for movement therewith, said element being movable relatively to said projection so as to cooperate therewith when a strip is in the trough to grip and convey a strip lengthwise from the trough towards said mechanism.

25. In apparatus for use with wad forming mechanism, a cutting device to sever strips from material comprising a plurality of superimposed layers of material, a trough extending lengthwise towards the forming mechanism, a gripping device comprising a plurality of units arranged to engage a strip at intervals along its length and to deliver the strip transversely of its length to the trough, each of said units comprising at least two opposed elements one of which is resiliently mounted so as to be movable relatively to the other element to permit the strip to be gripped and released from the gripping device, an abutment on said trough to engage the strip and locate it above the trough while the movement of the gripping device is continued so that the strip is released from the gripping device, a pressing member to position the strip in the bottom of the trough, and a conveyor to move a strip from said trough lengthwise towards said mechanism.

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