Dec. 19, 1933. F. SCHWARTZ 1,939,925

PAPER SLITTING APPARATUS

Filed April 29, 1931 3 Sheets-Sheet 1

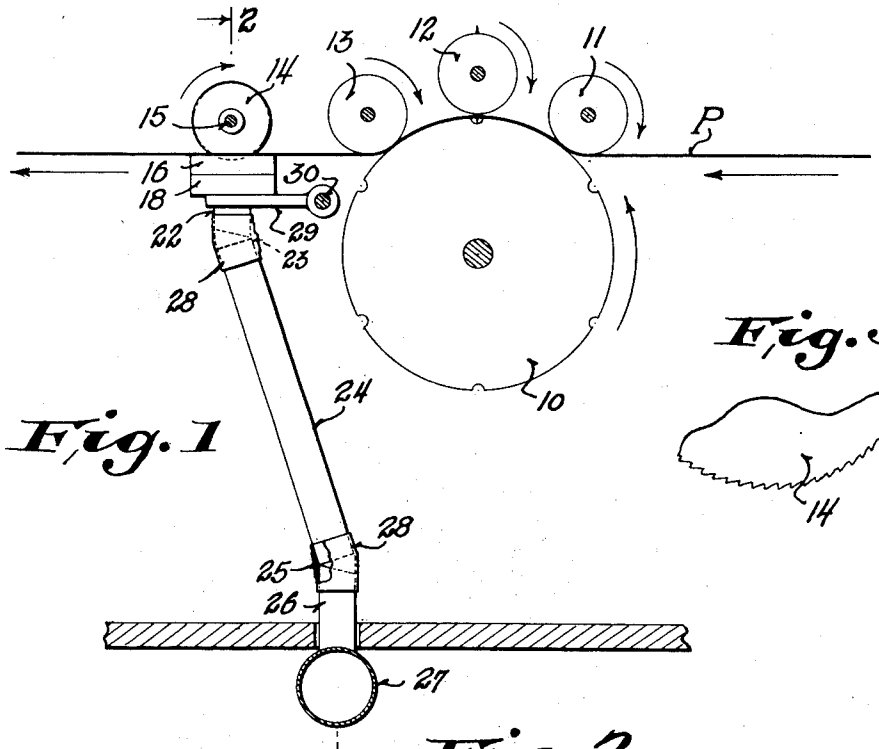


Fig. 1

Fig. 3

Fig. 2

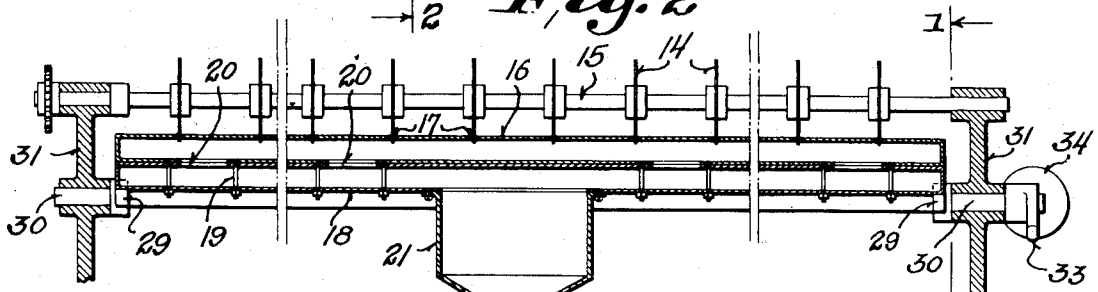
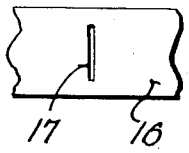
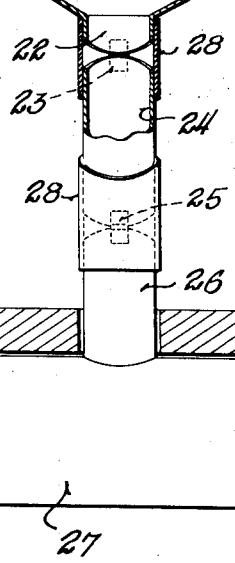


Fig. 4





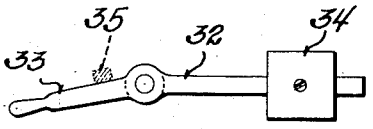


Fig. 5

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PAPER SLITTING APPARATUS

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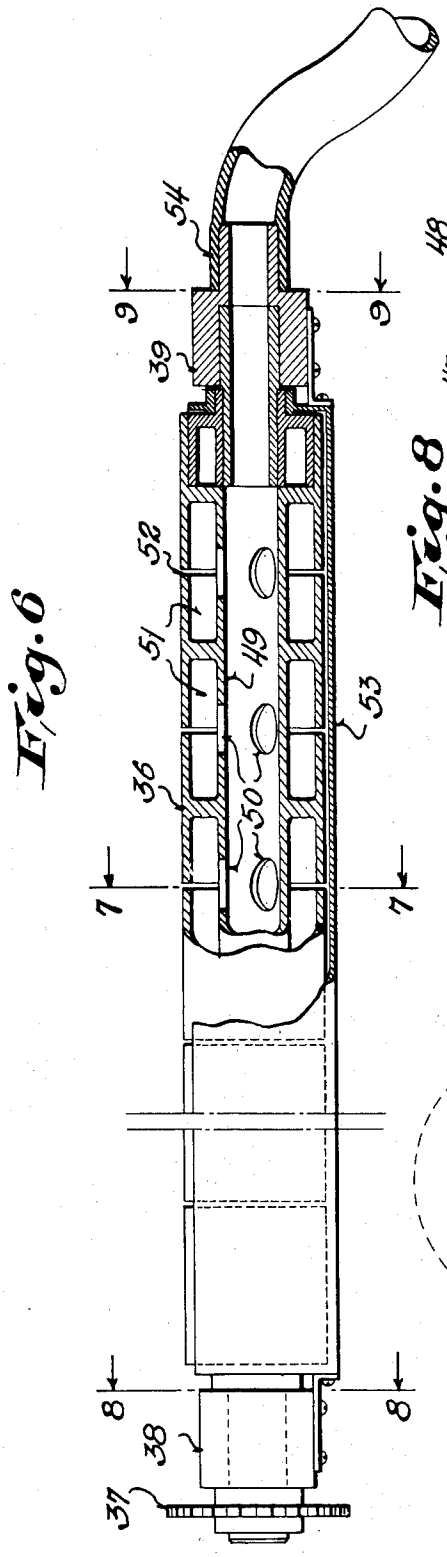


Fig. 6

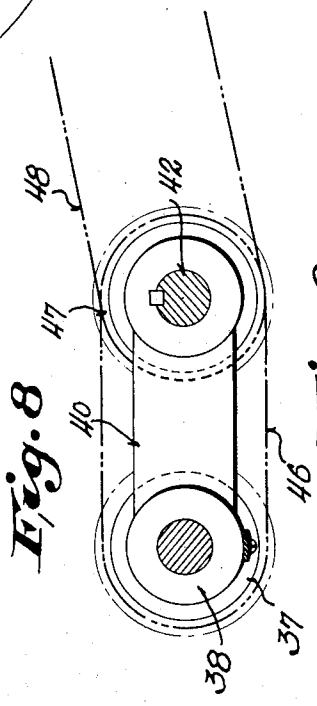


Fig. 8

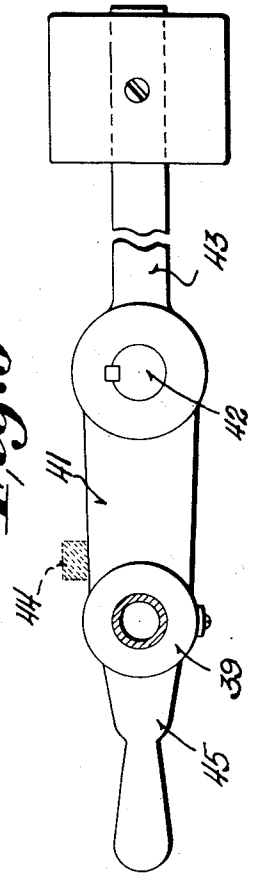


Fig. 9

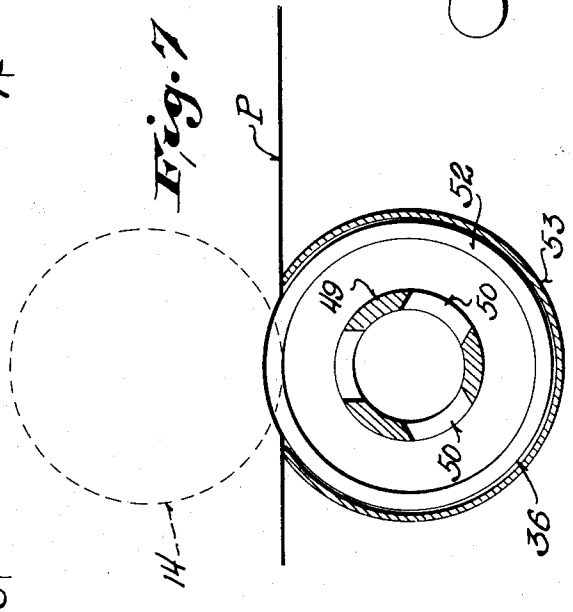


Fig. 7

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Fig. 10

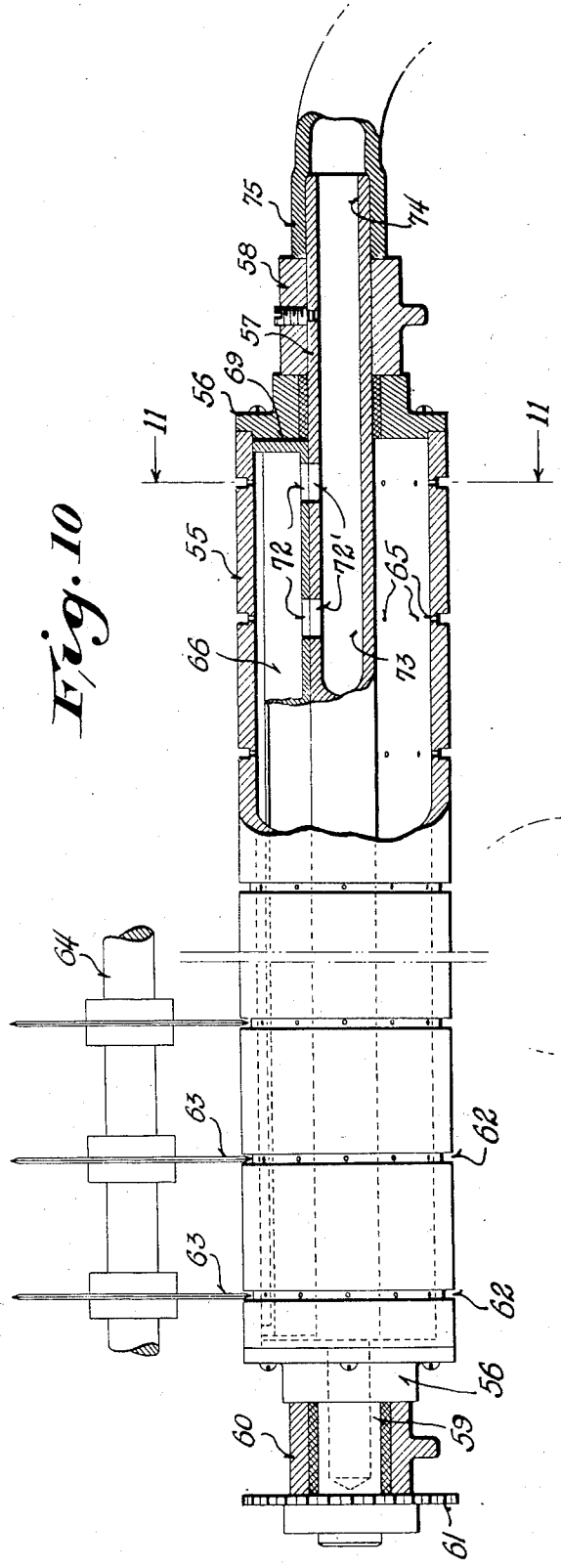
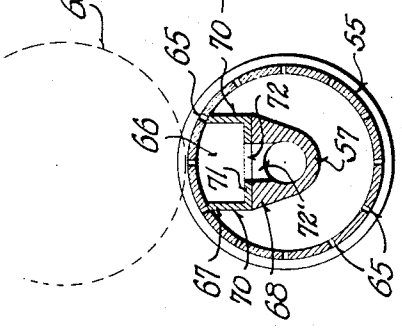


Fig. 11



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UNITED STATES PATENT OFFICE

1,939,925

PAPER SLITTING APPARATUS

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Application April 29, 1931. Serial No. 533,703

2 Claims. (Cl. 164—65)

The invention relates to paper slitting apparatus.

Heretofore paper slitters have had solid slitter boards provided with shallow slits in which saw tooth slitters projected slightly and as the paper, such as toilet paper or other thin tissue papers were drawn over the board, the paper was slit lengthwise and then these lengths were wound upon tubes into rolls. With such prior apparatus the paper had a tendency to creep up the back edge of the slitters after being cut and the slitted edges would run together and interweave when the rolls were wound so that it was often necessary to break the rolls apart after they came off the winders and many times these rolls would stick together to such an extent that considerable waste resulted. The present invention has overcome the difficulties above pointed out and a considerable saving is effected and a better product is produced by the provision of a hollow slitter board or support and a maintenance of a vacuum through the slots into which the saw tooth slitters protrude. This vacuum serves to carry away the dust that results from the slitting of the paper and also any loose fibres that might cause trouble and it also holds the sheets firmly so that all stretch is eliminated, the paper is prevented from climbing the back edge of the slitter and a good clean cut edge is obtained.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

Referring to the drawings, Fig. 1 is a side elevation view of a slitter mechanism embodying the invention, the same being taken along the line 1—1 of Fig. 2.

Fig. 2 is a detail sectional view taken on the broken line 2—2 of Fig. 1;

Fig. 3 is a detail side elevation view of one of the saw tooth slitters;

Fig. 4 is a detail plan view of a portion of the slitter board;

Fig. 5 is a detail end elevation view of a part of the support for the board;

Fig. 6 is a view partly in elevation and partly in section of a modified form of board;

Fig. 7 is a detail sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a detail sectional view taken on the line 8—8 of Fig. 6;

Fig. 9 is a detail sectional view taken on the line 9—9 of Fig. 6;

Fig. 10 is a view partly in elevation and partly in section of another modified form of apparatus;

Fig. 11 is a detail sectional view taken on the line 11—11 of Fig. 10.

Referring to Figs. 1 to 5 of the drawings, the numeral 10 designates a bed roll, 11 a backfeed roll, 12 a perforating head, and 13 a front feed roll arranged in a well known manner for transversely feeding a relatively wide sheet of thin paper, such as toilet paper and feeding it to the mechanism that rewinds it into separate rolls after this sheet is slit lengthwise at spaced intervals by the slitting apparatus which includes a plurality of saw tooth slitters or cutters 14 mounted in spaced relation on a suitably driven shaft 15.

In accordance with the present invention, the slitter board is formed of a hollow upper section 16 having a series of slits or slots 17 spaced to aline with the slitters 14 and into which said slitters project slightly. The bottom part of the section 16 is bolted to another hollow section or manifold 18 by screw bolts or studs 19 and these sections communicate with each other through a series of spaced openings 20 and the bottom of the manifold 18 has an elongated conduit section 21 secured thereto and terminating in a tubular pipe portion 22, which is connected by a suitable hinge 23 to one end of a pipe 24 whose other end is connected by a hinge 25 to a pipe 26 that communicates with a large pipe 27 whose large end is connected to a static pressure exhauster or other suitable device for producing a vacuum in the slitter board. The hinge portions of the above pipes described are each covered over or sealed by a section of rubber or other suitable flexible tubing 28 and it will be noted that by reason of these hinged connections the slitter board may be moved upwardly into operative position relative to the cutters 14 or downwardly to an inoperative position.

The slitter board may be supported in operative position in any suitable manner and by way of illustration the same is shown as mounted on a pair of spaced arms 29 mounted on a transversely disposed shaft 30 journalled in suitable framework 31 and carrying a lever 32 at one end provided with a handle 33 for oscillating said shaft to swing said arms 29 and hence move the slitter board into or out of operative position to the cutters, and for maintaining the board in operative position the lever 32 is shown as provided with a weight 34 which acts on the same to move the handle 33 up against a fixed stop 35.

With the above construction, as the wide paper sheet P passes from the bed roll 10 it is drawn over the slitter board on its way to the rewinders and as it runs across this board the saw tooth slitters cut it longitudinally. As it passes over the board it is subject to the action of the vacuum within the slitter board and this vacuum acts to carry away dust and loose fibres that may result from the cutting and it also acts to spread the paper out very effectively upon the board during the cutting operation so that the stretch is taken out of the paper and it is prevented from climbing the back edge of the slitters and a good clean cut is obtained.

As a modified form of invention I have shown in Figs. 6 to 9 the slitter board as formed by a roller 36 which is positively driven by a suitable power drive connection with a sprocket 37 and is mounted to revolve in bearings 38 and 39 which are carried or formed in arms 40 and 41 that are secured to a pivotally mounted supporting shaft 42 which as in the first described construction may be provided with a weighted arm 43 to bring one of the arms 41 up against a fixed stop 44, this arm also being shown as provided with a handle extension 45. The sprocket 37 is also shown as connected by a chain 46 with a sprocket 47, loose on the shaft 42, and in turn connected by a chain drive 48 with any suitable source of power.

The roller 36 is provided with a centrally disposed manifold or tubular portion 49 provided with radially disposed spaced sets of openings 50 communicating with outer annular compartments 51, each of which communicate with the exterior through narrow slots or slits 52 into which the saw tooth slitters 14 may project in the same way as the first described construction. In order that the vacuum may act directly at the slitters, a cylindrical shield 53 surrounds all that portion of the roll except that adjacent the slitters and is secured to the bearing portions 38 and 39.

The bearing member 39 is hollow and connected through suitable flexible tubing 54 with a source of suction. This construction functions generally similar to the first described construction though in addition the rollers 36 being driven act to feed the paper past the slitters 14.

In Figs. 10 and 11, I show another modified form of construction in which the slitter board is formed by a roller including a hollow cylinder 55 suitably secured to end plates 56 which are journalled on portions of a shaft 57 that is fixed adjacent one end to a suitable frame member 58 and extends through the sleeve and into the end plate 56 at the other end, which plate at this end has an extension 59 journalled in a frame member 60 and adapted to be turned in any suitable manner and here shown as carrying a driven gear 61 at its outer end whereby rotation of the gear 61 through any suitable drive will rotate the roller upon the shaft 57. The sleeve portion 55 of this roller is provided at spaced intervals with a series of annular grooves 62 which cooperate with the rotary slitters 63 on the shaft 64 in a manner similar to the slitters 14 cooperating with the slots 52 in the previously described construction. Each of the grooves 63 are brought into communication with the interior of the sleeve 55 through a series of openings 65 that extend from the bottoms of said grooves to the inner side of said sleeve.

A vacuum chamber or conduit 66 is formed by a channel shaped member 67 secured to a longitudinally extending boss 68 on the shaft 57 and having end walls 69, side walls 70 and a bottom portion 71, the end walls 69 being disposed adjacent to the end plates 56 and the side walls 70 extending from the base to operating association with the interior surface of the sleeve 55 so as to substantially cut off the vacuum source from that portion of the sleeve 55 that is not disposed adjacent the conduit 66. The bottom 71 of the member 67 is provided with a plurality of spaced openings 71 alined with a similar series of openings 72 in the wall of the shaft 57 to communicate with the hollow interior portion 73 of said shaft whereby when a connection is made with the outer end 74 of said shaft through its connection by flexible tubing 75 with a suitable vacuum producing device, a vacuum will be produced in the conduit 66 so as to cause the paper to be spread out as it passes over sleeve portion 55 of the rotating roll and so that as the slitters 63 cut the paper longitudinally the dust and foreign matter will be taken from the groove 62 through the openings 65 then in register with the conduit 66 and thence through said conduit 67 and the openings 71 and 72 into the interior 73 of the shaft and thence through the piping connecting the shaft with the vacuum source.

While it has been stated that the device is applicable to the slitting of paper for the rewinding of the same on to separate tubes, it may also be used where it is desired to divide relatively wide sheets of paper stock into two or more divisions for other purposes.

It is to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

What I claim as my invention is:

1. In an apparatus of the character described, the combination of a rotary slitter, means for continuously feeding paper as a continuous web past said slitter to divide said web longitudinally, a support, over which the paper moves, having a slot into which the slitter projects, said support having a hollow interior portion communicating with said slot, and means for reducing the pressure in said interior below normal atmospheric pressure to produce a suction at said slot to act on the paper to spread the same as it moves past said slitter, to prevent creeping of the paper up the back edge of the slitter after being cut and to remove dust and fine fibres resulting from the slitting operation.

2. In an apparatus of the character described, the combination of a rotary slitter, means for continuously feeding paper as a continuous web past said slitter to divide said web longitudinally, a rotary support, over which the paper moves, having a slot cooperating with said slitter, said support having a hollow interior portion communicating with said slot, and means for creating a suction through said support at the slot to spread the paper while being cut, to prevent creeping of the paper up the back edge of the slitter after being cut and to remove dust and fine fibres.

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