J. NUTTALL & C. R. SEDDON.

APPARATUS FOR PILING PAPER.

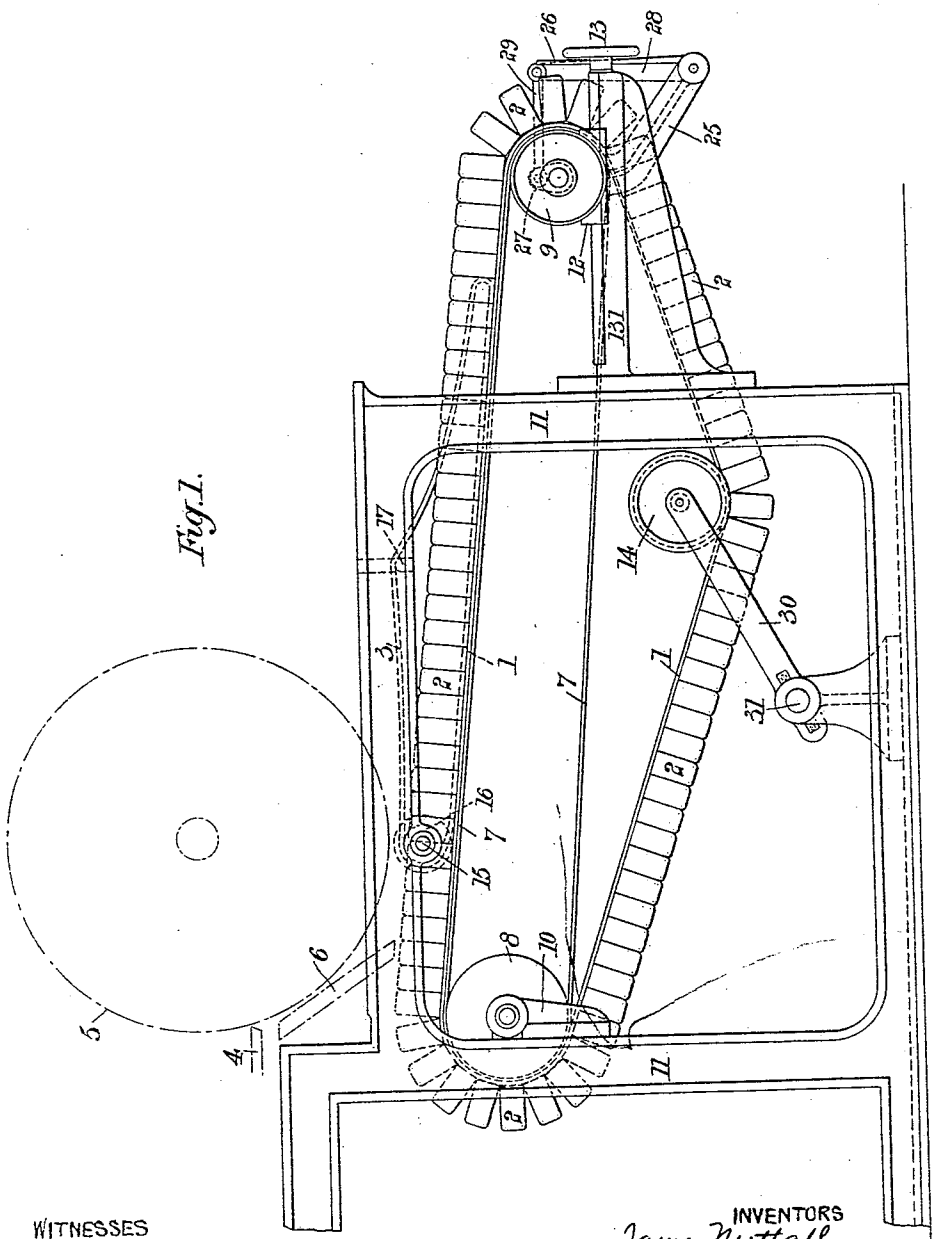
APPLICATION FILED DEC. 30, 1907.

920,079.

Patented Apr. 27, 1909.

5 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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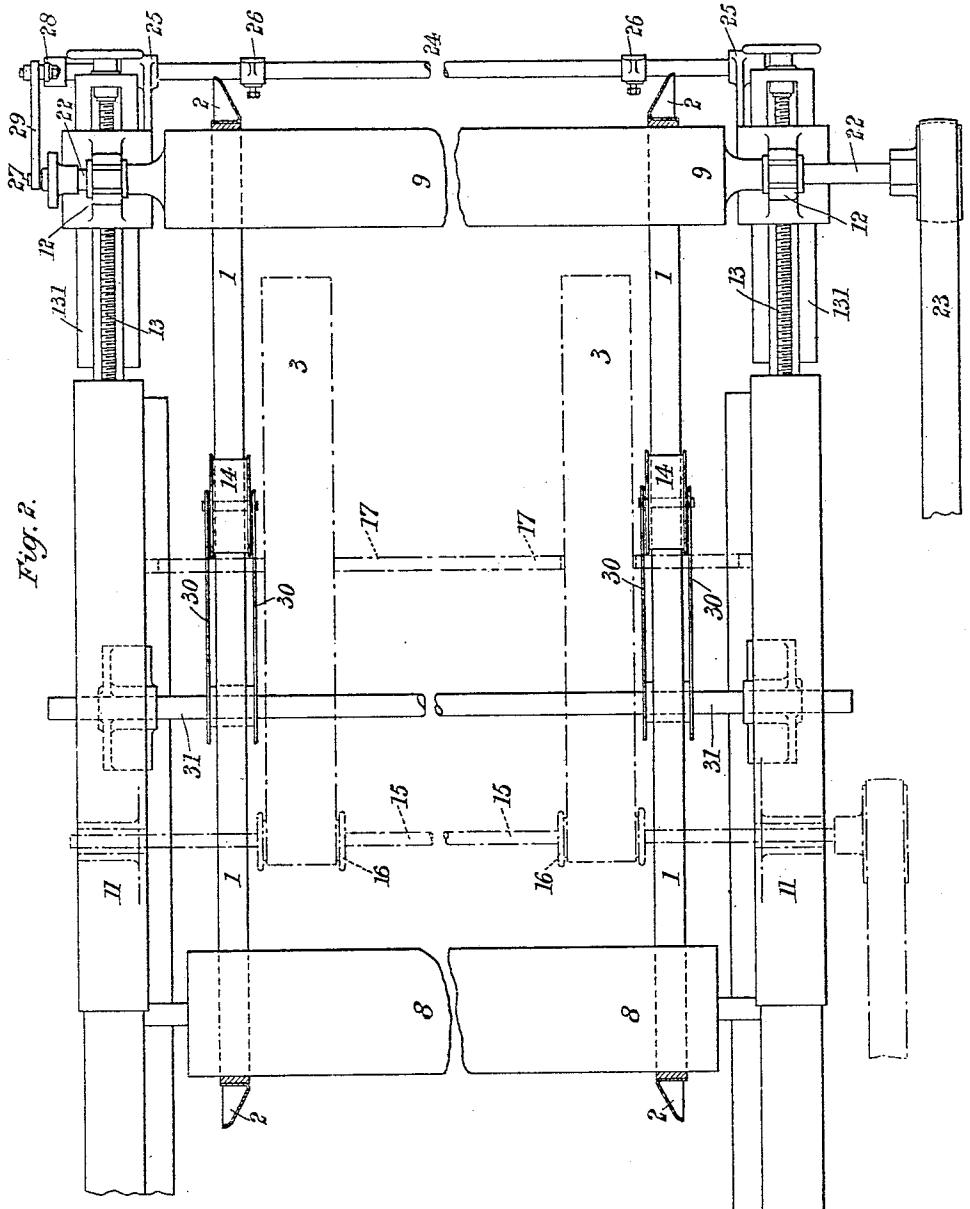

Fig. 2.

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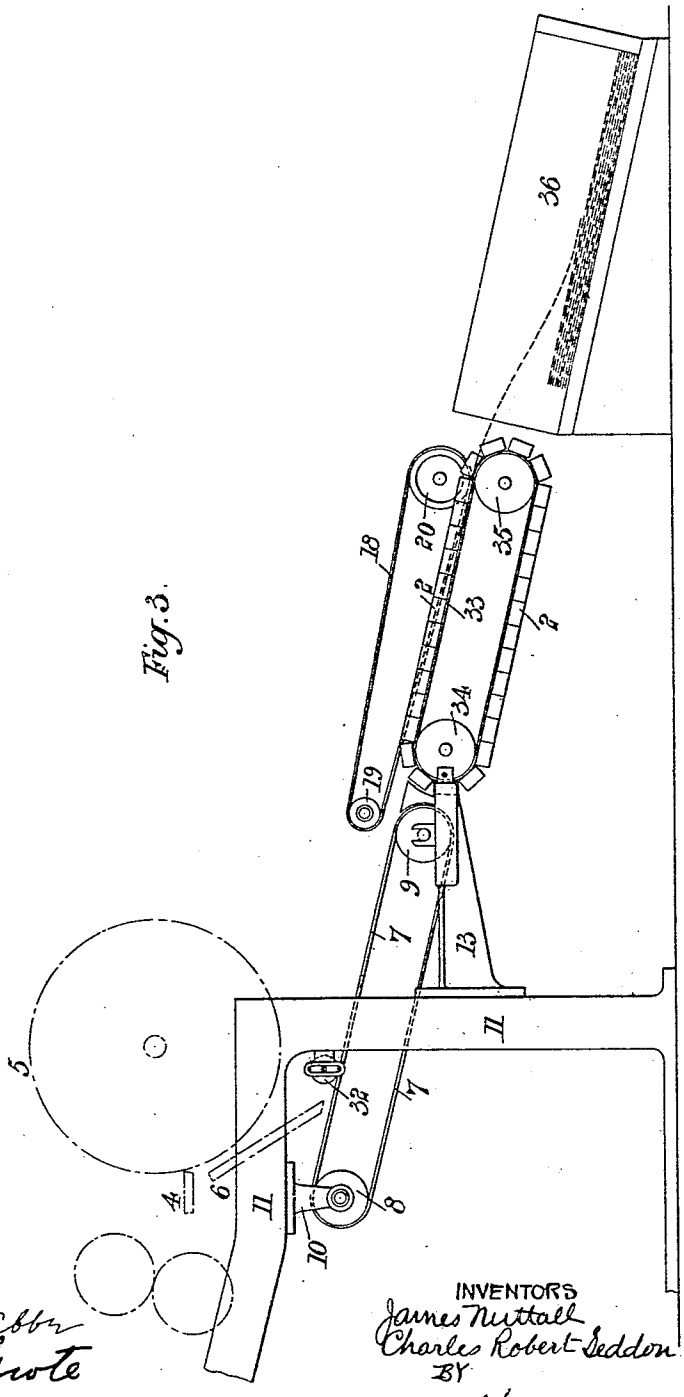
5 SHEETS—SHEET 3.

Fig. 3.



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5 SHEETS—SHEET 4

Fig. 4.

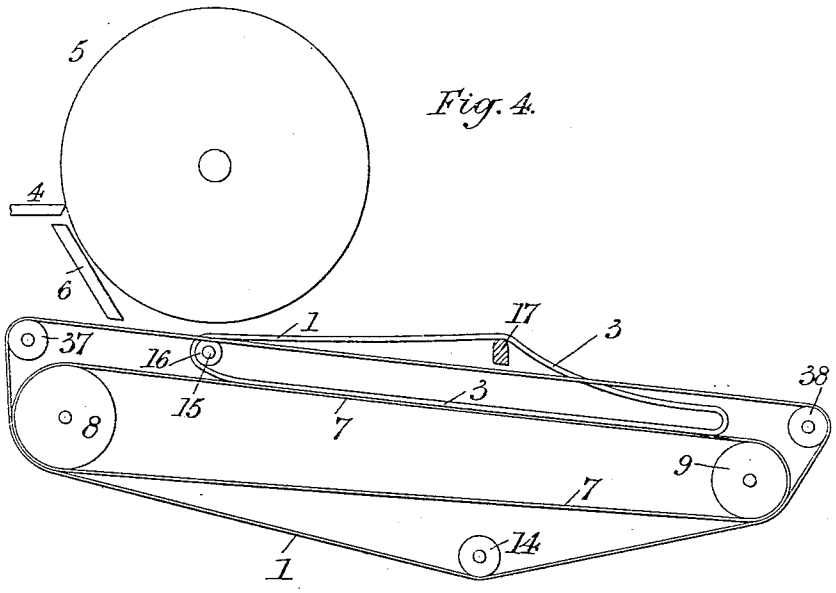
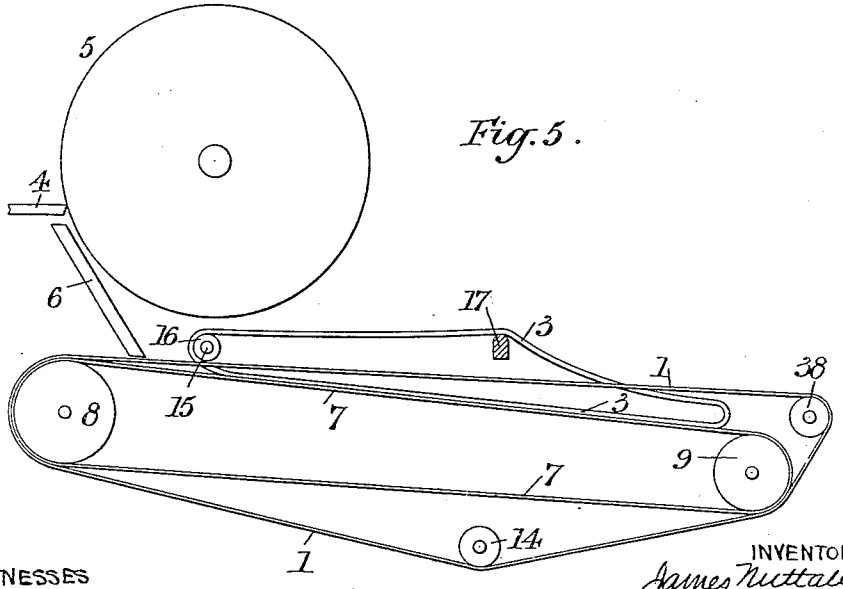


Fig. 5.



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5 SHEETS—SHEET 5.

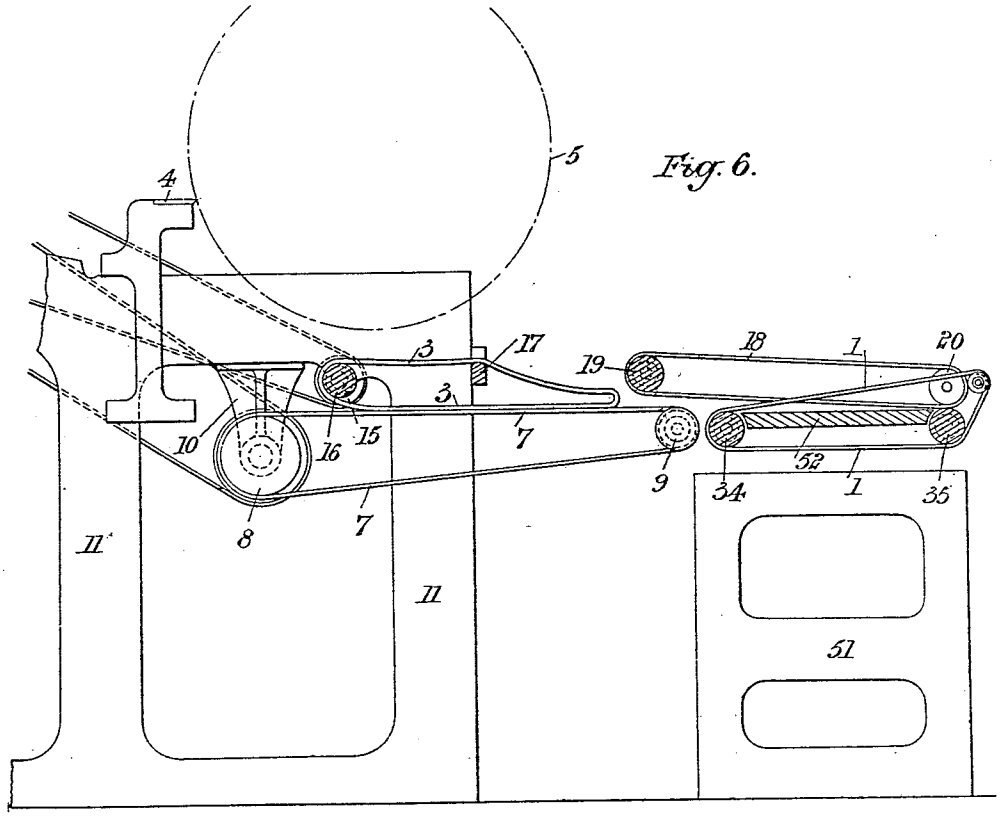

Fig. 6.

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UNITED STATES PATENT OFFICE.

JAMES NUTTALL, OF BURY, AND CHARLES ROBERT SEDDON, OF WHITEFIELD, NEAR MANCHESTER, ENGLAND.

APPARATUS FOR PILING PAPER.

No. 920,079. Specification of Letters Patent. Patented April 27, 1909.

Application filed December 30, 1907. Serial No. 408,646.

To all whom it may concern:

Be it known that we, JAMES NUTTALL, a subject of the King of Great Britain and Ireland, of Park View, Walmersley Road, Bury, in the county of Lancaster, England, engineer, and whose post-office address is Park View, Walmersley Road, Bury, aforesaid, and CHARLES ROBERT SEDDON, a subject of the King of Great Britain and Ireland, of Beechwood, Whitefield, near Manchester, in the said county, paper-mill manager, and whose post-office address is Beechwood, Whitefield, near Manchester, aforesaid, have invented new and useful Improvements in Apparatus for Piling Paper, of which the following is a specification.

The object of this invention is to provide improvements in connection with apparatus for laying, or piling, sheets of paper leaving printing, ruling, or cutting, machines, or the like, the said apparatus being of the class in which the edges of the sheets of paper are curled, curved, or bent, upward, parallel to the line of the creeper to prevent doubling or bending downward, as the sheets leave the support of the delivery creeper, the said improvements effecting in a better manner than hitherto the delivery of the sheets of paper from the cutters of the said machines to the apparatus for laying, or piling, the sheets of paper.

According to this invention we provide beneath, or at a lower level than the place where the sheets issue from the machine, and at each side of the machine, traveling bands, belts, or cords, upon which, or upon projections carried by which, the parts of the sheets toward the side edges are received. These bands, belts, or cords, whether they have projections on them, or not, are hereinafter and in the claims referred to as "bands." In combination with the said bands we provide a device which depresses the portions of the sheets between the said edges so as to cause the aforesaid bands to curl, or curve, upward the said edges. The arrangements may, for example, consist of a traveling creeper passing over pulleys, or rollers, on a driven shaft, and over supporting pulleys, or rollers, and having along it the aforesaid bands, of any suitable height and shape, and in such positions that the parts of the sheets toward the side edges fall upon them and the said sheets are carried forward beneath an upper trailing band, or bands, of felt, or the like. This trailing band is supported at the end nearest the cutters by a roller, or by rollers mounted one over the other and positively driven, or not, but in any event raised above the support for the sheets, so that said sheets may freely pass beneath the same, the rear and main part etc., of the trailing band, trailing upon the creeper, with the sheets of paper between and pressing down the parts of the sheets between the side edges, so that the raised bands on the creeper cause the said side edges to curl, or curve, upward, as the sheets pass toward and into the receptacle, or receptacles, the upper edges of the sides of the said receptacle, or receptacles, being preferably curved to receive the edges of the sheets and assist in retaining the said edges curled, or turned up, until the sheets are released and fall into the receptacle, or receptacles; or we may attach equivalent straight, or curved, pieces in any suitable manner, (for instance to the parts which carry the roller at the delivery end of the creeper), so that they will rise and fall with the creeper and keep their proper relative position thereto when the creeper is capable of being raised either by hand, or automatically. The creeper and the trailing band, may be horizontal, or inclined downward, or upward, from the position where the sheets are received thereby, and the receptacle, or receptacles, may also be horizontal, or inclined in either direction. In place of a creeper we may use a stationary board, or plate, and the raised bands be of such width as to carry the sheets along in conjunction with the trailing band to press down the portions of the sheets between the edges so that the said edges are curled, or turned up, by the said raised bands.

By the employment of the trailing band, the receiving end of which is raised above the support so as to permit the sheets to freely slide beneath it, the objections incidental to the use of a roller, hitherto proposed for receiving the sheets of paper between the said roller and the creeper, are overcome, as the roller causes considerable vibration by jump-

ing and having a tendency to pluck at the sheets while it is also necessary to have the sheets fed precisely to the nip of the rollers, since otherwise they will not pass through, but are badly creased or crumpled up. The roller, or the upper one of the rollers, supporting the trailing band, or both such rollers, is, or are, capable of being adjusted so that the roller can be brought near the cutters whereby it is practically impossible for sheets to get onto the top of the trailing band which the sheets of paper would otherwise be liable to do when they have in them curl at right angles to the line of travel of the creeper.

The aforesaid creeper, bands, and trailing band may be of any suitable material, such as felt, leather, or woven fabric, and of any suitable thickness and section, and the bands may have on them projections consisting of pieces of wood, or metal, or other suitable material, the arrangement being such as to enable them to turn around the pulleys, or rollers. The apparatus may be made to deal with one sheet issuing at a time from the machine, or with two, or more, sheets issuing side by side from the machine, and the construction may be such that the parts can be adjusted to suit sheets of different widths.

We may employ a preliminary creeper for receiving the sheets of paper which feed them to a second creeper, which may be provided with the aforesaid devices for curling, or curving upward, the side edges, but we may use, in substitution for the aforesaid trailing band for depressing the portions of the sheets of paper between the side edges, compression bands, such as tapes, or ropes, passing over pulleys on shafts above the said second creeper and raised above the creeper at the receiving end in like manner as in the case of the trailing band above mentioned; or we may dispense with such compression bands, or the like, if the weight of the paper be sufficient to curl, or curve, the edges of the paper as required. Adjustable flanged pulleys, or belt guides, may be used in any suitable position for guiding the depressing bands, or belts, along, or around, the creeper, or board, or plate.

In order that our invention may be fully understood, we will describe arrangements according thereto with reference to the accompanying drawings.

Figures 1 and 2 illustrate respectively in side elevation and plan (partly in section) an apparatus provided with bands having projections thereon. Fig. 3 represents a modification in which the trailing band is dispensed with and Figs. 4, 5 and 6 are modifications as hereinafter described.

Referring to Figs. 1 and 2, the bands 1 have projections 2 thereon, with which the side edges of the sheets, or the parts of the sheets toward the side edges, come into contact, and a trailing band 3 which depresses the portions of the sheets between the said edges so as to curl, or curve, them upward. The paper is presumed to have been cut between a dead knife 4 and a revolving knife 5 and the cut papers descend a guide 6 onto an endless traveling creeper 7 which carries and delivers the paper to a suitable collecting receptacle. The said endless traveling creeper 7 is carried by two transverse rollers 8 and 9, the axes of the roller 8 being mounted in fixed bearings 10 on each side of the rear ends of the side frames 11 of the machine, and the axis of the roller 9 being mounted in bearings 12 longitudinally adjustable by screws 13 on brackets 131 secured to each side of the forward ends of the side frames 11. The aforesaid bands 1 with projections 2 thereon, with which the side edges of the paper come into contact as aforesaid, are situated at a suitable distance from the side edges of the said traveling creeper 7 and are carried thereby. The said projections 2 may be secured in any convenient manner to the bands 1 and be of any suitable shape, and may be made of metal as shown, or of wood, or any other suitable material. Swinging guide pulleys 14 may be employed for guiding the bands 1 and may be suitably weighted to take up slack and cause the said bands to grip the upper run of the creeper 7 and insure its traveling therewith.

Above the projections 2 on the bands 1 is mounted, in bearings on the side frames 11 of the machine, a transverse shaft 15 carrying a pulley, or pulleys, 16 around which the endless trailing bands 3 are passed, being raised at their forward or receiving ends as previously described to freely admit the sheets of paper while the body of the bands 3 depress the portion of the sheets between the projections 2 on the bands 1 into frictional contact with the creeper 7 and consequently cause the said trailing bands 3, (which may be independently driven,) and the creeper 7 to carry the sheets forward between them (while the side edges, in contact with the projections 2 on the bands 1, are curled, or curved, upward) and deliver them to the receiving box. The said trailing band 3 can be guided, in its upper run, by a bar 17 which, when several bands of felt are used, can be recessed, or provided with projections, to keep the bands of felt in proper position. The said trailing band will keep the sheets of paper practically flat between itself and the creeper, and take out a certain amount of any curl at right angles to the line of travel of the creeper, and the said trailing band will accommodate itself to any sag in the creeper and give a gentle action in drawing the paper straight onto the cutters and objection due to vibration will be obviated. Any suitable means for imparting rotary motion to one of the transverse rollers (8 or 9), may be em-

ployed, for example, as shown, a belt-pulley 21 keyed to the axis 22 (see Fig. 2) of the transverse roller 9, to which pulley 21 a belt 23 transmits rotary motion from any suitable source. A rocking shaft 24, carried in bearing brackets 25 secured to the longitudinally adjustable bearings 12, may have fingers 26 secured thereto to engage and straighten, or push forward, any protruding portion of the paper in the receptacle. Rocking motion may be imparted to the said shaft 24 from the driven shaft 22 by a crank 27 (see Fig. 2) secured to the end of the shaft 22 and an arm 28 secured to the end of the rocking shaft 24 and coupled together by a connecting rod 29. In order that the apparatus may be adaptable for curling, or curving, paper of various widths, the bands 1 with their projections 2 thereon can be moved nearer to, or farther from, each other when the weighted guide pulleys 14 are swung out of contact with the underside of the said bands 1, the swinging arms 30 carrying the said guide pulleys 14 being capable of being slid along their supporting shaft 31 to the adjusted position of the bands 1. The trailing bands 3, if more than one be used, can also be moved nearer to, or farther from, each other by sliding the pulleys 16, over which the said trailing bands pass, along the shaft 15.

Fig. 3 shows, in side elevation, an arrangement in which the trailing band is dispensed with and compression tapes are employed. According to this modified arrangement of apparatus, the sheets of paper to be curled, or curved, at their edges are fed, between a laying roller 32 and the traveling creeper 7, to a traveling creeper 33, with projections 2 thereon (like those described with reference to Figs. 1 and 2) and carried by rollers 34 and 35, one of which has rotary motion imparted thereto by any suitable means. Over the rollers, or pulleys, 19 and 20, mounted above the creeper 33, are passed endless compression tapes 18, which may be in frictional contact with the creeper 33 only at its forward, or delivery, end, so that the edges of the sheets of paper as they are drawn forward between the creeper 33 and the tapes 18 are curled, or curved, gradually. The said sheets are shown as being delivered into a receptacle, or catching box, 36 inclined downward. The other parts in this figure which correspond with those shown in Figs. 1 and 2 are marked with the same reference numerals.

Figs. 4 and 5 illustrate diagrammatically arrangements of apparatus where, in substitution for the bands 1 with projections 2 thereon, as hereinbefore described with reference to Figs. 1, 2 and 3, traveling bands, 1 without the said projections 2 are employed, the said traveling bands 1 being supported by rollers 37 and 38 at a suitable height and in such transverse position in respect to the traveling keeper 7 that the parts of the sheets of paper toward the side edges fall upon them and they carry the said sheets forward beneath the trailing bands 3, passing over a roller 16 on the supporting shaft 15 above the traveling creeper 7. The said trailing bands 3 press down the portion of the sheet between the side edges so that the upper rims of the bands 1 cause the said side edges to curl, or curve, upward. In the arrangement shown in Fig. 5, the bands 1 are shown raised above the traveling creeper 7 at the forward, or delivery end so that the side edges of the sheets of paper are curled, or curved, gradually in a manner similar to that hereinbefore described with reference to Fig. 3. The parts in Figs. 4 and 5 which correspond with those shown in the other figures are marked with the same reference numerals.

Fig. 6 illustrates a modification of the arrangement Fig. 3, but with a trailing band 3 above the creeper 7. The sheets of paper are fed between the traveling creeper 7 and the trailing band 3 to the bands 1, carried on a secondary frame 51, and are curled, or curved, by the compression tapes 18 which pass over pulleys 19 and 20, the creeper 33 shown in Fig. 3 being substituted by a stationary board 52 and bands 1 at each side to perform the same function as the projections 2 in Fig. 3, the said bands being carried by rollers 34, 35 and 57, these rollers and the board 52 and rollers 9, 19 and 20 being carried in any suitable framework.

We claim as our invention—

1. Apparatus for laying sheets of paper, comprising a support for the sheet, traveling bands arranged on each side thereof to carry and curl up the edges of the sheet, in combination with a traveling band above said support, said band at the receiving end of said support being elevated to permit the sheets to freely pass beneath the same, substantially as and for the purpose described.

2. Apparatus for laying sheets of paper, comprising a support for the sheet, traveling bands arranged on each side thereof to support and curl up the edges of the sheet, in combination with a compression band passing over rollers, said band at the receiving end of the support being elevated to permit the sheets to freely pass beneath the same while at the delivery end said band is depressed to engage said sheets and positively feed the same, substantially as and for the purpose described.

3. Apparatus for laying sheets of paper, comprising a support for the sheet, traveling bands arranged on each side thereof to support and curl up the edges of the sheet, said bands being inclined upward from the receiving to the delivery end of said support, in combination with a compression band passing over rollers, said band at the receiving

end of the support being elevated to permit the sheets to freely pass beneath the same while at the delivery end said band is depressed to engage said sheets and positively feed the same, substantially as and for the purpose described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAMES NUTTALL.
CHARLES ROBERT SEDDON.

Witnesses:
GILBERT FLETCHER TYSON,
EDWARD GEORGE DAVIES.