(No Model.)

E. ANTHONY.

WEB TURNING APPARATUS FOR PRINTING MACHINES.

No. 302,311. Patented July 22, 1884.

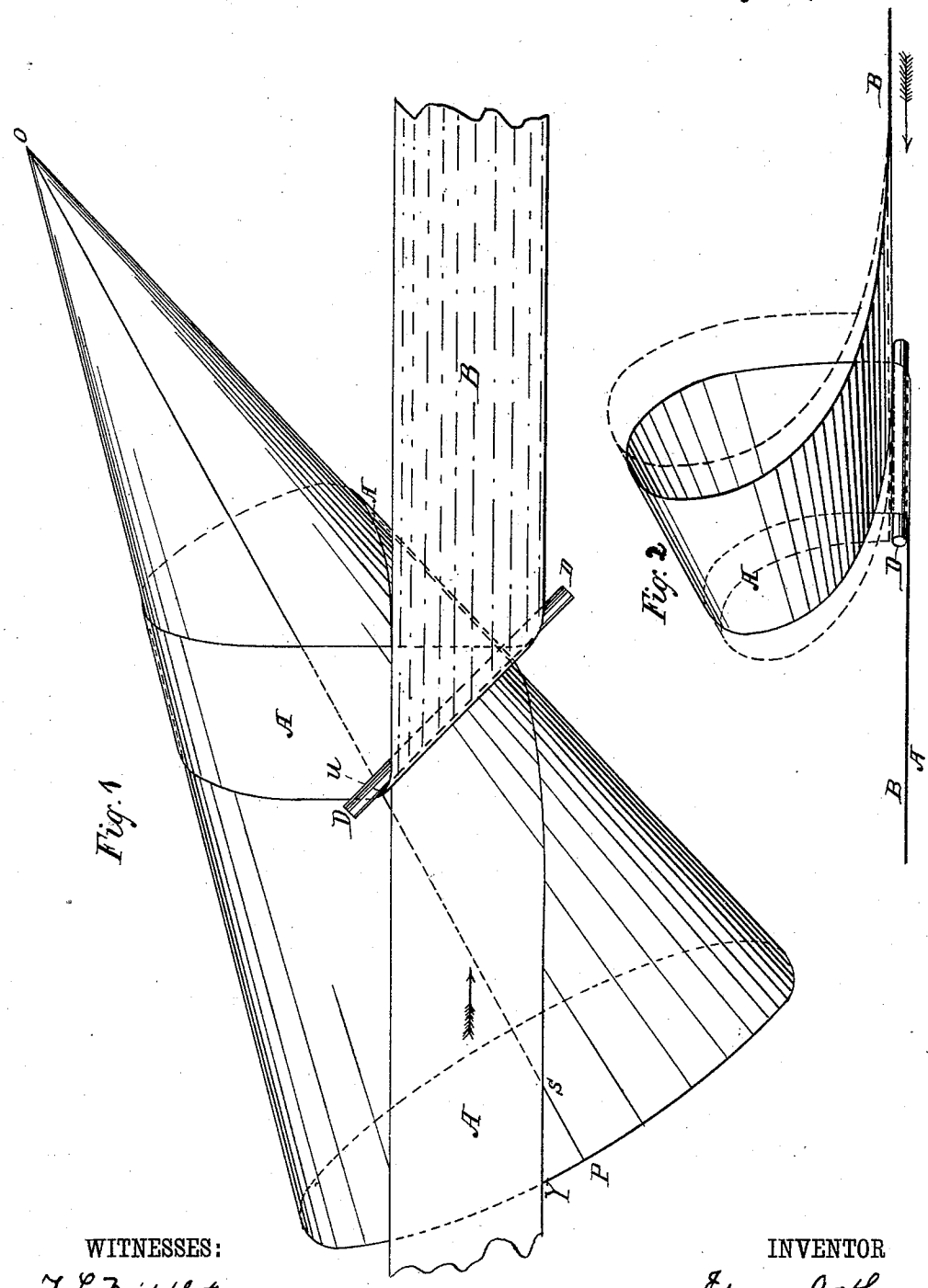


Fig. 1

Fig. 2

WITNESSES:

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WEB-TURNING APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 302,311, dated July 22, 1884.

Application filed May 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWYN ANTHONY, a subject of the Queen of Great Britain, residing at Jersey City, county of Hudson, State of New Jersey, have invented a new and useful Improvement in Web-Turning Apparatus for Printing-Machines, of which the following is a specification.

My invention consists of an improved device for reversing without transferring laterally the sides of a traveling web or of sheets in tapes. The expression "without transferring laterally" requires explanation, or it is liable to be misunderstood. If parallel lines are drawn longitudinally on a web, and the web is passed through any apparatus which reverses it, but so that the web as a whole undergoes no lateral transfer, then it is clear that the central longitudinal line of the web is not transferred laterally, but that all the longitudinal lines to the right of the said central line are transferred to the left of the said line, and all the longitudinal lines to the left of it are transferred to the right of it; hence if a web is passed through the apparatus so that its central line lies to the right or left of the central line of another web going through it without lateral transfer, the first-mentioned web will, when the webs have been reversed, have undergone lateral transfer to the left or right equal to twice the distance between the said central lines. In other words, every device which will reverse without transferring a web may be also used to reverse and transfer it; but the converse proposition is not true, that every reversing and transferring apparatus may likewise be used without modification for the purpose of reversing without lateral transfer. The device herein shown may therefore be also used to reverse a web and transfer it laterally. The means by which I accomplish this result consist in passing the web round a cone or cone-like turner, and thence round a suitably-disposed bar or cylinder.

Figure 1 is a perspective view of the apparatus, and Fig. 2 a perspective view of the turned web.

The vertical angle of the cone in the drawings is about twenty-nine degrees. Cones with different vertical angles may be used instead thereof; but it is convenient to select for the vertical angle of the cone some angle between about eighteen and forty degrees.

O P is the generating-line in which the web enters the cone, and of course it must approach the cone in the plane which touches the cone along the said generating-line O P. The web makes one complete wrap round the cone, and is then conducted to a suitably-placed cylinder, D D. Since the web makes just one wrap round the cone it will leave it along the same generating-line O P at which it entered it. The angle the edge of the web on entering the cone makes with the edge of the web on leaving it is independent of the angle Y S P which the edge of the web makes with the generating-line O P, and it depends only on the vertical angle of the cone. When the said vertical angle is about twenty-nine degrees, the said angle between the edges will be about ninety degrees, as shown in the drawings. In fact, the said angle expressed in degrees equals three hundred and sixty multiplied by the sine of half the vertical angle of the cone; and the angle the cylinder D D makes with the edge of the web also depends only on the vertical angle of the cone; in fact, it equals half the last-mentioned angle—*i. e.*, half the angle between the edge of the web on entering and its edge on leaving the cone. It is convenient to make the angle Y S P not large, and smaller than the vertical angle of the cone. In the drawings, Y S P is about thirty degrees. Thus, in the case illustrated in the drawings, it is easy to fix the relative positions of the cone and cylinder. The cylinder D D must be fixed so that it almost touches the line O P, (allowing sufficient space for the web to pass freely,) and so that its axis makes an angle of seventy-five degrees with O P, and is parallel to the plane touching the cone along O P. If preferred, the contrary side of the web to that shown in the drawings may come in contact with the cylinder, in which case the cylinder must, of course, be fixed so that its upper instead of its under surface is in contact with the tangent plane along O P. When thus fixed, the planes of the webs entering and leaving the apparatus will be co-

incident, instead of, as in the drawings, (see Fig. 2,) parallel, and distant from one another by the diameter of the cylinder. The distance of the cylinder D D from the vertex O of the cone will obviously depend on the breadth of the broadest web which it is designed to reverse, and of course each end of the cone may be suitably cut away, as indicated in Fig. 2. The cone and cylinder being thus fixed, and the edge of the web on entering making an angle of thirty degrees with O P, the web will issue as shown, A denoting one side of the web and B the other.

It is easy to express briefly by the use of elementary mathematical symbols the relative situations of the cone and cylinder for any vertical angle. Let $2a$ = vertical angle of cone and b = angle Y S P; then angle axis of cylinder makes with O P = $b + 180$ sin. a, and O U = O S × cosec. ($b + 360$ sin. a) × sin. b. It is not necessary that the web should make a complete wrap around the cone provided the position of the cylinder is suitably changed, or the side of the cone next the bar or cylinder is cut away; but it is, in general, convenient for it to do so, and I have therefore chosen that case for illustration by the drawings; but in either case the advantage will be gained that results from the curved path of travel thus provided for the web along those portions where the greatest change in its position is effected.

When it is desired to sever the web into sheets before passing it through the apparatus, the sheets must of course travel between tapes in the usual way. The tapes should be passed through the apparatus in the manner previously explained with reference to the web, and since they will not in general come out opposite to the position they had on entering, their ends must be run together by means of guide-pulleys or other suitable devices.

What I herein claim as my invention is—

The combination of a cone-like turner around which the web is lapped, and a cylinder or bar over which said web is led, whereby the sides of a traveling web, or of sheets in tapes, are reversed, all substantially as described.

EDWYN ANTHONY.

Witnesses:

ALBERT BELL,

CHAS. RAETTY.