

Aug. 27, 1957

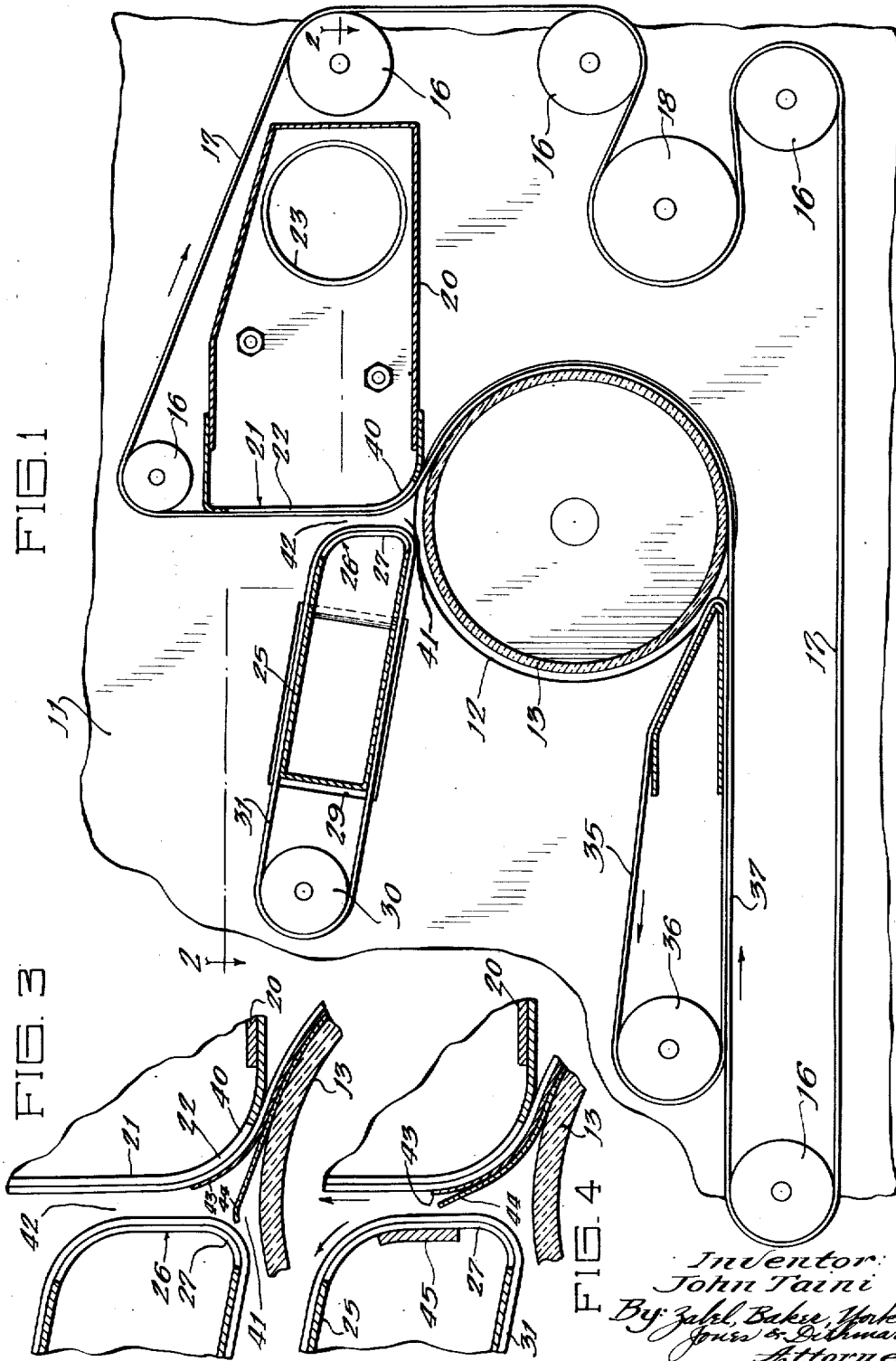
J. TAINI

2,804,304

PRINT SEPARATOR

Filed Oct. 6, 1954

2 Sheets-Sheet 1



Inventor:
 John Taini
 By: Zabel, Baker, York,
 Gross & DeLamar
 Attorneys

Aug. 27, 1957

J. TAINI

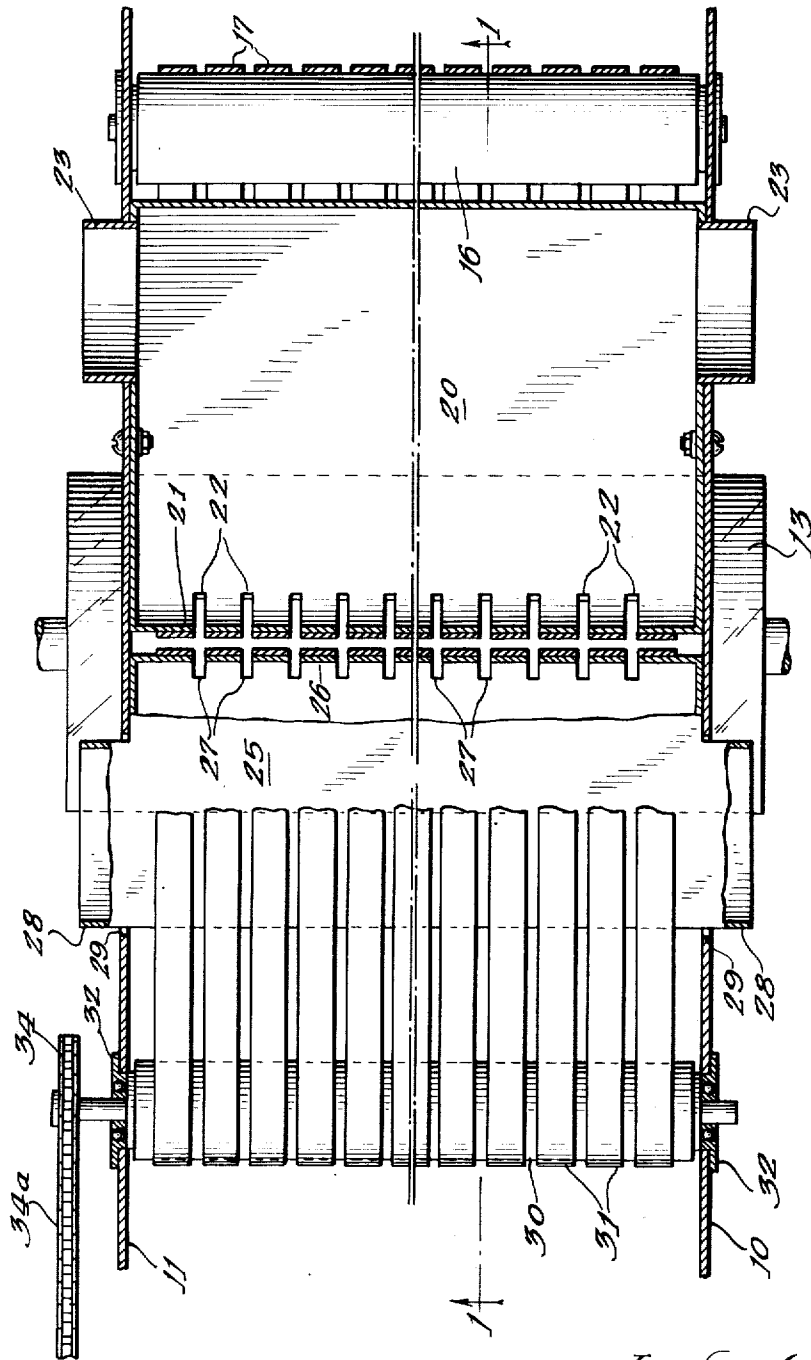
2,804,304

PRINT SEPARATOR

Filed Oct. 6, 1954

2 Sheets-Sheet 2

FIG. 2



Inventor:
John Taini
By: Zafel, Baker, Yank,
Jouss & Othman
Attorneys

1

2,804,304

PRINT SEPARATOR

John Taini, Chicago, Ill., assignor to The C. F. Pease Company, Chicago, Ill., a corporation of Delaware

Application October 6, 1954, Serial No. 460,557

9 Claims. (Cl. 271—64)

This invention relates to separating means for separating the tracing from the print in a photographic printing machine or the like.

Machines of this type comprise a rotating cylinder which is partially surrounded by tapes, which move with the cylinder. A superimposed print and tracing are fed into the bite of the tapes and the cylinder at one point of the cylinder's periphery and are discharged at the point where the tape breaks contact with the cylinder.

It is an object of the present invention to provide improved separating means in which the separating action is materially assisted by an air stream.

It has heretofore been proposed as shown, for instance, in Brunk Patent No. 2,641,980 dated June 16, 1953, to cause the tapes to pass over the perforated wall of a suction box. The suction causes the print to adhere to the tapes, and hence, at the point of discharge from the cylinder, the print path diverges upwardly and across the perforated wall of the suction box. The lower portion of the perforated wall is curved, thus providing a curved print path of relatively small radius, this curved print path being effective to cause separation, depending upon the stiffness of the tracing.

This arrangement also tends to produce an air blast which contributes to the separating action. However, the air blast ends to extinguish itself as the print progresses along a curved print path, due to the fact that the slots or perforations are blocked by the print. Of course, when the print is in the form of a web, the effect of the air blast is missing, except along the side marginal portions.

It is an object of the present invention to provide separating means in which the elements are so arranged that the air blast is not self-extinguishing.

A further object is to provide means for creating an air stream which is directed toward the leading edges of the print and tracing, and which is characterized by the fact that the air stream separates into two parts.

Still another object is to provide an arrangement of parts such that a comparatively narrow throat is provided, together with means for causing an air stream on the one hand, and the print and tracing on the other hand to move through this throat in opposite directions, the constricted dimensions of the throat serving to increase the velocity of the air stream to the end that separation may be effected in the throat by means of a relatively high velocity air stream.

A still further object is to provide separating means which avoid any jamming of the tracing due to the tendency of the leading edge of the tracing to curl downwardly, that is, away from the print.

Still another object is to provide improved separating means which, from its construction, can be located at the point of discharge from the cylinder, thus eliminating the use of additional print and tracing transporting elements which are necessary when the point of separation is located remotely from the point of discharge.

2

Other objects, features and advantages will become apparent as the description proceeds.

With reference now to the drawings in which like reference numerals designate like parts:

5 Fig. 1 is a vertical section through a photographic printing machine, taken along line 1—1 of Fig. 2, and showing a preferred embodiment of my invention;

Fig. 2 is a plan view, partly in section, taken along line 2—2 of Fig. 1;

10 Fig. 3 is an enlarged detailed view of a portion of Fig. 1, illustrating one type of separating action, and

Fig. 4 is a view similar to Fig. 3, but showing another type of separating action.

The embodiment shown in Figs. 1 and 2 comprises a suitable supporting structure including side plates 10 and 11 which are connected by suitable cross members.

The side plates are provided with suitable aligned circular openings 12 which receive the ends of a transparent printing cylinder 13. The cylinder may be rotatably supported by suitable rollers, not shown. A light source 14 is located within the cylinder 13.

Various rollers 16 are suitably journaled in the side plates 10 and 11 and provide a path for a set of tapes 17 which engage the cylinder 13 and serve to hold a print and tracing in superimposed relationship against the surface of the cylinder. The tapes may be driven by a drive roller 18 with the result that the cylinder is caused to rotate by the movement of the tapes, and the print and tracing are advanced around the cylinder. The drive roller 18 may be driven by a suitable sprocket chain, not shown.

Disposed above the cylinder 13 is a suction box 20 having a slotted or perforated wall 21, the slots being indicated by the reference numeral 22. Outlet collars 23 are provided at one or both ends of the suction box for connection with a suitable conduit connecting with the inlet of a blower. The suction box is mounted between the side plates 10 and 11 by suitable bolts 24, the collars 23 passing through suitable apertures formed in the side plates.

45 Disposed in front of the main suction box 20 is an auxiliary suction box 25 having a slotted or perforated wall 26 which is disposed closely adjacent the main suction box 20. The slots are designated by the reference numeral 27. The auxiliary suction box is provided with outlet collars 28 at one or both ends which extend through apertures 29 in the side plates 10 and 11 for connection to a suitable conduit, not shown. The auxiliary suction box is supported from the side plates by suitable means, not shown.

A roller 30 is disposed forwardly of the auxiliary suction box and cooperates with the suction box to provide a path for a set of pick-off tapes 31. The roller 30 is journaled in side plates 10 and 11 by means of flanged bearing units 32, and the shaft 33 is extended at one end to carry a sprocket 34 so that the roller 30 may be driven by means of a suitable chain, 34a.

A set of feeding tapes 35 and a drive roller 36 therefore is provided for cooperation with the horizontal span 37 of the tapes 17, immediately in front of the bite.

65 The lower portion of the perforated wall 21 of the main suction box 20 is curved as indicated by the reference numeral 40, thus providing a curved print path. Directly in front of the curved portion 40 is a partially enclosed area referred to herein as chamber 41, this area being bounded by the curved portion 40 to the rear, by the lower portion of perforated wall 26 to the front, and by the cylinder 13 to the bottom.

70 Above the chamber 41, the perforated walls 21 and 26 are substantially parallel to each other for a short distance, thus providing a throat 42. The width of the throat is greater than the combined thickness of the print and

3

tracing, and may be of the order of an eighth of an inch.

Above the throat, the slotted wall 21 extends upwardly to provide a straight print path, and the perforated wall 26 curves forwardly to provide a curved tracing path.

Fig. 3 shows the relationship of the chamber 41 to the leading edges of a print 43 and a tracing 44, the dimensions of which have been somewhat exaggerated for the purpose of illustration. The tracing paper normally used tends to curl downwardly, at its leading edge, away from the print, as shown in Fig. 3. This would normally tend to fold over the leading edge of the print as it is advanced through the throat 42, and in extreme cases, it will cause the print to jam in the chamber 41, or in the throat 42.

The present arrangement provides means to overcome this undesirable tendency. In this connection, the pick-off tapes 31 are driven at a substantially faster linear speed than the tapes 17 with the result that as soon as any portion of the tracing 44 engages the pick-up tapes 31 the curl will be straightened out, and the leading edge will be advanced into the throat 42.

In operation, a superimposed print 43 and tracing 44 when fed between the tapes 35 and 17, will be advanced into contact with the cylinder 13, and will be moved with the cylinder and the tapes until the leading edges emerge into the chamber 41. The normal position of the parts at this time will be as shown in Fig. 3, assuming that the tracing is possessed of a certain degree of stiffness. In other words, the initial separation takes place in the chamber 41, and the separation is effected by the combination of the curved print path 40 and the air stream which moves downwardly through the throat 42 and engages the leading edges. The slots 22 extend well down into the chamber as shown in Figs. 2 and 3 with the result that the print will adhere to the tapes 17. The effect of the curved print path is to peel the print away from the tracing, and this peeling operation is assisted by the air stream.

The slots 27 of the slotted wall 26 also extend well into the chamber 41 with the result that as soon as the tracing 44 engages the pick-off tapes 31, the tracing will be caused to adhere to those tapes and will be carried upwardly through the throat. Of course, there will be slippage between the tracing 44 and the pick-off tapes 31 due to the fact that the pick-off tapes are moving at a greater speed than the tracing, since the speed of the tracing is controlled by the speed of the cylinder 13 and the print tapes 17. However, this slippage does not impair the separating action. Thus, under the conditions indicated, the print and the tracing will have been separated by the time they have moved from the chamber 41 into the throat 42.

Where the tracing is of exceedingly thin or compliant material, the provision of the curved print path 40 has somewhat lesser effect on the initial separation than when the tracing is of somewhat stiffer material. Under these conditions, as shown in Fig. 4, the initial separation is due primarily to the air stream flowing downwardly through the throat 42. The fact that the slots 27 of the auxiliary suction box 25, extend down into the chamber 41 assures a continued air stream through the throat 42 even though the slots 22 are blocked by the print 43 (Fig. 4). Furthermore, this air stream will be of substantial velocity due to the narrowness of the throat in comparison with the slot area. Thus, as the leading edge of the tracing 44 approaches the throat, it will be subjected to an air blast of constantly increasing velocity with the result that at some point initial separation will be effected.

The velocity of the air stream through the throat may be augmented by the provision of a transverse blocking member 45 which may be welded to the rear surface of the slotted wall 26, this modification being shown in Fig. 4.

4

The separating action above described can best be explained by pointing out that the air stream passing through the throat causes the leading edge of the tracing to flutter back and forth like a vibrating reed, this fluttering being only momentary since as soon as the tracing engages the pick-off tapes 31 it will adhere thereto.

However, it can be pointed out that at the time the print and tracing first emerge into the chamber 41, the air stream is divided, due to the fact that the sets of slots 22 and 27 are both uncovered. This divided air stream, and the turbulence caused thereby within the chamber 41, are believed to be the effective agent in causing initial separation to take place within the chamber 41 in the majority of instances.

Thus, the present invention is effective in providing initial separation irrespective of the stiffness or compliance of the tracing. It is also effective in causing separation when the print is in the form of a continuous web, in which the slots 22 are blocked, since the air stream is maintained by the slots 27, as pointed out in connection with Fig. 4.

Although only a preferred embodiment of my invention has been shown and described herein, it will be understood that various modifications and changes can be made herein without departing from the spirit of the invention as pointed out by the appended claims.

I claim:

1. In a printing device of the type including a rotatable cylinder, a set of tapes passing therearound, and roller means defining a path for said tapes, the combination of print separating means comprising a suction box having a perforated wall over which said tapes slide, the major portion of said wall being disposed substantially radially to the axis of said cylinder, an auxiliary suction box disposed in front of said main suction box and having a perforated wall disposed opposite to said first-mentioned perforated wall, said two perforated walls being spaced from each other to provide a throat at a point spaced from the surface of said cylinder and cooperating with each other to provide a chamber disposed between said throat and the surface of said cylinder, suction means communicating with said suction boxes to cause an air stream to flow through said throat in a direction toward the surface of said cylinder and into said chamber so as to effect separation of said print and tracing in said throat and chamber, and a set of pick-off tapes passing around said second-mentioned perforated wall.

2. In a printing device of the type including a rotatable cylinder, a set of tapes passing therearound, and roller means defining a path for said tapes, the combination of print separating means comprising a suction box having a perforated wall over which said tapes slide, the major portion of said wall being disposed substantially radially to the axis of said cylinder, and the lower portion thereof being curved to provide a curved print path, an auxiliary suction box disposed adjacent to said main suction box and having a perforated wall disposed opposite to said first-mentioned perforated wall, said two perforated walls cooperating with each other to provide a throat at a point spaced from the surface of said cylinder and a chamber disposed between said throat and the surface of said cylinder, suction means communicating with said suction box to cause an air stream to flow through said throat in a direction toward the surface of said cylinder so as to effect separation of a print and tracing in said throat and chamber, a set of pick-off tapes passing around said second-mentioned perforated wall, and means for driving said pick-off tapes at a speed greater than said first-mentioned tapes so as to avoid jamming of said tracing within said chamber.

3. In a printing device of the type including a rotatable cylinder, a set of tapes passing therearound, and roller means defining a path for said tapes, the combination of print separating means comprising a suction box

5

having a perforated wall over which said tapes slide, the major portion of said wall being disposed substantially radially to the axis of said cylinder, and the lower portion thereof being curved to provide a curved print path, an auxiliary suction box disposed adjacent to said main suction box and having a perforated wall disposed opposite to said first-mentioned perforated wall at said major portion, said two perforated walls being spaced from each other to provide a throat at a point spaced from the surface of said cylinder and cooperating with each other to provide a chamber disposed between said throat and the surface of said cylinder, suction means communicating with said suction boxes to cause an air stream to flow through said throat in a direction toward the surface of said cylinder and into said chamber so as to effect separation of a print and tracing in said throat and chamber, and a set of pick-off tapes passing around said second-mentioned perforated wall, said second-mentioned perforated wall extending through said throat and into said chamber so that said air stream through said throat will be maintained even through the openings in said first-mentioned perforated wall are blocked by said print, and said first-mentioned tapes and said pick-off tapes being spaced from each other in said throat by a distance greater than the combined thickness of said print and tracing.

4. In a printing device as claimed in claim 3, the combination of a blocking member overlying said second-mentioned perforated wall at said throat whereby the velocity of said air stream through said throat will be augmented.

5. In a printing device of the type including a rotatable cylinder, a set of tapes passing therearound, and roller means defining a path for said tapes, the combination of print separating means comprising a suction box having a slotted wall over which said tapes slide, the major portion of said wall being disposed substantially radially to the axis of said cylinder, and the lower portion thereof being curved to provide a curved print path, an auxiliary suction box disposed adjacent to said main suction box and having a slotted wall disposed opposite to said first-mentioned slotted wall, said two slotted walls cooperating with each other to provide a throat at a point spaced from the surface of said cylinder and a chamber disposed between said throat and the surface of said cylinder, suction means communicating with said suction boxes to cause an air stream to flow through said throat in a direction toward the surface of said cylinder so as to effect separation of a print and tracing in said throat and chamber, a set of pick-off tapes passing around said second-mentioned slotted wall, the slots in said first-mentioned slotted wall extending through said throat and into the curved lower portion of said slotted wall so that the leading edge of a print as it emerges into said chamber will be caused to adhere to said first-mentioned tapes, and the slots in said second-mentioned slotted wall extending through said throat and into said chamber so that said air stream through said throat will be maintained even though the openings in said first-mentioned slotted wall are blocked by said print, and means for driving said pick-off tapes at a speed greater than that of said first-mentioned tapes so that the leading edge of said tracing, as it is initially separated from the leading edge of the print, in said chamber, will be engaged by

6

said pick-off tapes and moved upwardly into said throat at a greater speed than that at which the remaining portions of said print and tracing are advanced, so that any curl of said leading edge of said tracing will be straightened out as said leading edge moves into said throat.

6. In a photographic printing device, means for separating a tracing from a print comprising two sets of tapes which are oppositely disposed from each other so as to define a throat, means providing a path for each of said sets of tapes, driving means for said tapes to advance the same in a given direction through said throat, means for establishing and maintaining an air stream through said throat in a direction opposite to said given direction, a chamber disposed adjacent said throat and in advance thereof in respect to the direction in which said tapes are advanced, said chamber being bounded in part by said two sets of tapes, said tape driving means including means to advance one of said tapes faster than the other so as to prevent jamming within said throat, due to the tendency of said tracing to curl away from said print.

7. In a photographic printing machine, means for separating a tracing and a print comprising two sets of tapes disposed opposite to each other and spaced from each other to define a throat, means providing a path for each of said tapes, means for driving both of said tapes in the same direction, and means for establishing and maintaining an air stream through said throat in the direction opposite to the direction in which said tapes are driven so that as a print and a tracing is advanced through said throat by one of said sets of tapes, the air stream passing through said throat will separate said tracing from said print, and cause said tracing to engage the other of said sets of tapes and be advanced thereby, said tape driving means including means to drive said last-mentioned set of tapes at a speed greater than said first-mentioned set of tapes so as to prevent jamming within said throat, due to the tendency of said tracing to curl away from said print.

8. Separating means as claimed in claim 7 in which said path providing means comprises, in each instance, a perforated wall, so that a portion of the air of said air stream will pass between the adjacent tapes of each set and through said perforated wall, thereby causing said print to adhere to said first-mentioned set of tapes and said tracing to adhere to said second-mentioned set of tapes.

9. Separating means as claimed in claim 8 in which said means for establishing and maintaining an air stream through said throat comprises two separate suction boxes, each of said perforated walls forming a part of one of said suction boxes, said perforated walls, in each instance, extending through said throat and beyond said throat in the direction from which said tapes are advanced, and means disposed beneath said throat to block movement of air upwardly into the lower end of said perforated walls, thus causing an air stream to move downwardly through said throat.

References Cited in the file of this patent

UNITED STATES PATENTS

| | | |
|-----------|------|---------------|
| 1,968,941 | Hall | Aug. 7, 1934 |
| 2,292,521 | Horn | Aug. 11, 1942 |