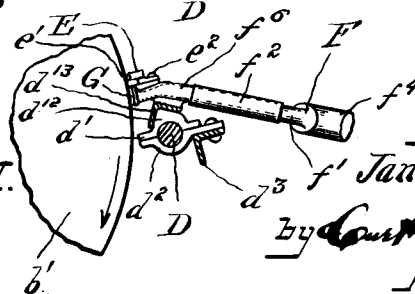
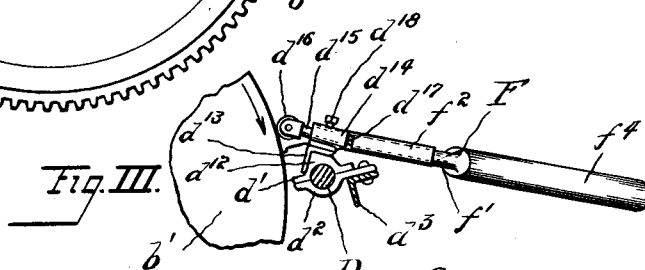
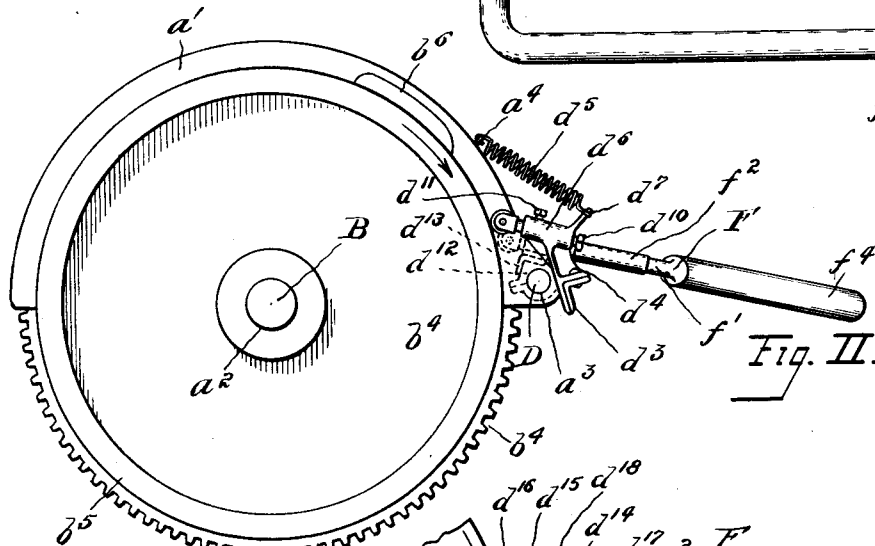
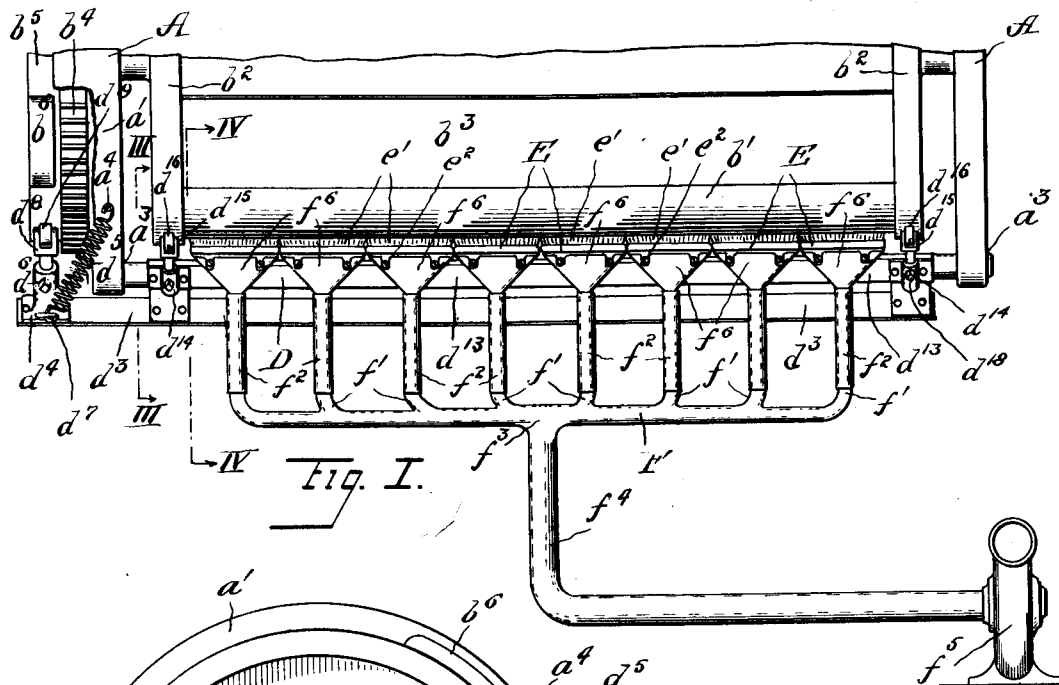


1,196,090.

2 SHEETS--SHEET 1.



Witnesses:
 Herman Esch
 B. P. Furman
 J. C. Bracken

Inventor:
f' James E. Doyle
by Carl B. Mueller,
Attorney

1,196,090.

Fig. VII.

Herman Esch
 B. R. Furson.
 H. C. Backus

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By Geo. W. Mueller,
Attorney

UNITED STATES PATENT OFFICE.

JAMES E. DOYLE, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO CHARLES S. BRITTON, OF CLEVELAND, OHIO.

PRINTING-PRESS APPLIANCE.

1,196,090.

Specification of Letters Patent.

Patented Aug. 29, 1916.

Application filed July 26, 1913. Serial No. 781,306.

To all whom it may concern:

Be it known that I, JAMES E. DOYLE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Printing-Press Appliances, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention is adapted for attachment to any standard press and is a twofold factor contributing to the perfection of the output.

One of its purposes is to insure the presentation of a sheet to the type-form free from all foreign particles. As such the invention is an improvement in respect to various cooperating details of construction upon that shown, described and claimed in United States Letters Patent Number 1,043,812 issued to me Nov. 12, 1912. Its other purpose is to insure the presentation of a sheet to the type-form with its infinitesimal portions maintained in as nearly the same relative position in regard to each other as possible. The object of this particular conception is the attainment of more reliably efficacious results regardless of the character of paper and its speed of travel or of the strength of suction acting upon it.

I have discovered that under certain conditions the operation of the suction duct of my earlier appliance is not uniformly reliable: The deleterious tendency is for the paper to occasionally become warped in the direction of the proximate source of the air current, with an attendant disarrangement of it relative to the surface of the drum. The preferred plural nozzle and manifold reconstruction here shown guarantees in practice the avoidance of any such possibility. All printers are familiar with the occasional disalinement of adjacent lines of type on either single, successive or alternate sheets. It is also known that this is due to a comparatively slight though irregular stretching of those particular sheets during their conveyance. In plural or multi-color work an avoidance of this is likewise insured by my invention, which conditions the paper preparatory to printing thereon and gives a perfect register. As the paper

passes the nozzles the warp and stretch is taken out of it at that point instead of on the "form" of the first color. This does away with the variation from true register between the first and second colors that is caused by the slight stretch of the sheet when the first color is printed under ordinary conditions as heretofore. On second revolution of the press all the dirt left from the under side of the sheet is collected before it has a chance to reach the form. Ordinarily, a great deal of dirt is carried back into the fountain by the rollers after they pass over the type forms, rendering the ink unfit for use. My invention also prevents this and saves a large percentage of ink waste.

The inventive conception is embodied in means which are hereinafter explained and variously combined in the claims, while the annexed drawing and particular description thereof together set forth in detail one certain means constituting my invention the disclosed means however, being but one of various mechanical forms in which the principle of my invention may be applied.

Directing attention to the drawings:—Figure I is a plan of the front part of a printing press showing this appliance attached thereto. Fig. II is an end view of Fig. I. Fig. III is a section on line III—III of Fig. I. Fig. IV is a section on line IV—IV of Fig. I. Fig. V is an enlarged detail as seen from above. Fig. VI is an end view of the same. Fig. VII is a vertical section of the detail of Fig. V as well as of supporting means and a suggestion of the sheet conveying means.

Throughout the drawings the several parts are, when logically feasible, correspondingly designated as the equivalent parts of my patent hereinbefore identified. In consonance, I have deemed it advisable not to employ the letter C either with or without exponents. Also, the use of the letter E will come after the use of the letter F. This particular appliance is, as was the former, shown attached to a press of the cylindrical sheet conveyer type. The supporting frame as a whole is again designated by the reference character A and is provided with a gear guard *a'* a part of which is broken away in Fig. I to disclose such gear which comprises a part of the driving mechanism. The frame A is fur-

thermore provided at opposite ends with primary bearings a^2 for the reception of the cylinder shaft; and with secondary bearings a^3 for the reception of a member forming

one part of this improvement. The driving end of the frame is formed with a lug a^4 .

A driving shaft B is mounted in the bearings a^2 and supports a cylindrical sheet conveyor b' , having annular metal rims b^2 at each end and a peripheral gap b^3 to permit of the movement therethrough at predetermined intervals of the sheet-gripping mechanism. The shaft is provided at one end with a gear b^4 to be connected with power mechanism not shown, though intended to rotate the cylinder in the direction indicated by the arrows. The gear b^4 is formed with an annular extension b^5 and this extension is in turn fashioned with the cam b^6 the function of which corresponds precisely with that assigned the cam of my earlier construction.

Mounted for oscillatory movement in the secondary bearings a^3 is a rod D. This rod is embraced inwardly adjacent each of its journals by upper and lower caps d' and d^2 respectively, and these caps are secured with respect to each other by means of bolts or screws indicated in Fig. I. Affixed in a depending position to the caps d^2 through the medium of rivets is an angle d^3 extending not only the entire length of the cylinder but beyond the same at that end adjacent to which the gear b^4 is located. Such projecting extremity of the angle d^3 in turn supports a member d^4 likewise attached thereto by rivets appearing in Fig. II. This member is of complementary angle shape formation below, and projects upwardly in a direction tangential to the surface of the cylinder. A tension spring d^5 connects this member, whose function is in the nature of a trunnion with the lug a^4 for the purpose of controlling the movement of the former, as will be presently explained. This latter I have marked separately as d^6 , and it has an upwardly projecting ear d^7 to which one end of the spring is actually fastened. Mounted for adjustment in the trunnion d^6 is a forked member d^8 , in the end of which a roller d^9 is mounted. This roller is operatively disposed in the same vertical plane as the cam b^6 and is adapted to be engaged thereby. As will now be apparent, the intermittent engagement of the cam b^6 with the roller d^9 serves to lift the latter, to tilt the members d^4 and d^3 away from the cylinder and hence oscillate the rod D. The adjustment of the member d^8 is accomplished by axial and transverse set screws d^{10} and d^{11} respectively. Extending across so as to rest upon and be secured in any suitable manner to an angular shaped formation d^{12} on the upper surface of the caps d' is another angle d^{13} . This angle

d^{13} supports intermediately of its ends and in fact within the two vertical planes of the annular rims b^2 , construction similar to that just described. Each of the latter comprise trunnion members d^{14} in which forked rods d^{15} are loosely mounted. These last mentioned rods each support a roller d^{16} adapted to engage the annular rims b^2 . The fixing of the rods d^{15} in various positions with respect to the trunnions d^{14} is also suggested as capable of accomplishment by axially and transversely extending set-screws d^{17} and d^{18} respectively. The purpose of the rollers d^{16} is to limit the extent of oscillation toward the cylinder of the rod D and necessarily whatever structure may be carried thereby, according to the precise demands of successful operation.

A manifold F (so designated because it corresponds most closely with the pipe F of my original construction) extends substantially parallel with the shaft B and has a plurality of, and in this instance eight, branch inlets f' projecting in the direction of the cylinder. Inclosing the ends of these inlets are a corresponding number of hose lengths f^2 . The other or rear side of the manifold F is provided with a single medial outlet f^3 with which a duct f^4 connects, while an electrically operated suction fan f^5 is connected with the other open extremity of this duct f^4 . Connected with the opposite ends of these hose-lengths are a corresponding number of nozzles f^6 . These nozzles are of flared formation having a circular constricted portion f^7 with which the hose-lengths directly connect. The flared inlet ends of the nozzles f^6 are of flattened laterally elongated formation to present an elongated opening f^8 . Surmounted over this inlet opening f^8 in each case is a flange f^9 having a plurality of transverse screw-threaded openings. The upper surface of each of the nozzles f^6 is also fashioned near opposite ends with a boss f^{10} and each of these bosses is provided with a screw-threaded opening for the useful purpose soon to be manifested. All the nozzles f^6 are rigidly secured to the angle d^{13} by means of screws passing upwardly through the latter as represented in dotted lines in Fig. II.

An elongated bracket E, adapted to carry the elongated brush or bristle cluster e' , corresponding in length with the length of the cylinder b' , is adjustably secured to the bosses f^{10} through the joint agency of screws e^2 and a pair of rearwardly extending ears e^3 provided with elongated slots e^4 which register with the screw-threaded openings in the bosses. The forward edge of the bracket E is fashioned with a correspondingly elongated recess in which the brush e' is seated. It is this brush which is intended to contact the paper sheets

which are being carried around on the surface of the cylinder, and by removing or sufficiently loosening foreign particles chancing to have settled thereon, make possible the conveyance by suction into the nozzles immediately beyond.

The real essence of this improvement, aside of the manifold and nozzle branches, resides in the provision of means interposed between the passing sheets and the inlet openings of the nozzles proper. These means consist in this particular exemplification of caps G. These caps are each provided with an elongated opening g' precisely registering with the inlet openings f^s . A strengthening partition g^2 is incidentally shown in Fig. VI. These caps G are screwed to the flanges f^s as a close mechanical fit by a plurality of screws g^3 passing through the screw-threaded openings which have already been mentioned as put therein. Those portions of the cap G which are disposed above their respective openings have their exposed or forward faces provided with a plurality of closely alined diagonally extending grooves g^4 . These are clearly represented from three different view-points in Figs. V-VI and VII. Each set extends obliquely downward from the front upper edge of the caps to communicate with the opening g' and indirectly therefore with the nozzle. While they are in the present instance shown to be parallel, they need not necessarily be so, nor must they necessarily have to be straight, nor all alike as to any one or every dimension.

In operation, the character and relative adjustment of the cam b^6 is such that the roller d^9 will be lifted just prior to the instant when the front edge of the moving sheet P is to be taken hold of by gripping mechanism adapted to reach through the gap b^3 in the manner well known to the art. Directly, the roller d^9 has passed over the cam b^6 , the entire nozzle supporting structure is oscillated back toward the periphery of the cylinder by the action of the tension string d^5 until the rollers d^{16} again engage the rims b^2 , and simultaneously the brushes e' again contact the sheet immediately beyond such gripping mechanism. Thereafter the loosened sediment is continuously drawn into the grooves g^4 to pass through the nozzles, manifold and suction duct f^4 . Meanwhile any particular portion of the sheet has been subjected to suction exerted in a direction other than substantially perpendicular thereto, with the desired result that no displacement of the sheet occurs.

All paper sheets are capable of being stretched to a varying extent and in certain instances this extent may exceed a quarter of an inch. When this happens in even less appreciable measure, the uniformity of the type to be subsequently impressed there-

on is seriously interfered with. I have noted as an incidental feature of my invention its efficacy in overcoming this deleterious propensity of paper which till now ever occasioned concern because of the likelihood of defective results upon specific sheets. During the operation of a press supplied with my invention, the sheets are stretched by their incalculable retardation while passing the nozzles, the paper being drawn toward these as shown in Fig. VII, and such stretching is moreover as uniformly distributed as possible throughout the extent of that dimension which is substantially transverse to the course of travel. My present construction permits of the employment of a lineal suction of sufficient force to accomplish this, without itself becoming the cause of any disarrangement of some portion of the sheet with respect to another portion thereof.

My invention being thus described with sufficient thoroughness, what I desire to secure by Letters Patent and therefore claim specifically, is:

1. A printing press appliance comprising the combination with a sheet conveyer, of a suction nozzle mounted adjacent and having an opening opposed thereto, one side edge of said opening being provided with a communicating surface groove oblique with reference to the direction of movement of the conveyer.

2. A printing press appliance comprising the combination of sheet conveying means, a manifold, suction means in communication therewith, a plurality of nozzles in communication with said manifold and extending toward said conveying means, the openings of said nozzles being elongated and transversely alined in opposition to the direction of movement of the sheet, said nozzles furthermore formed with a plurality of grooves intersecting the advance surface thereof and communicating with said openings respectively.

3. A printing press appliance comprising the combination of a sheet conveyer, a suction nozzle having its intake opening in operative proximity thereto, and a brush carried by said nozzle, said nozzle being provided with a groove intersecting said opening and extending toward said brush.

4. A printing press appliance comprising the combination of sheet conveying means, a nozzle having an opening opposed thereto, a brush removably attached to said nozzle and in advance of said opening with reference to the direction of movement of said sheet, said nozzle being provided intermediately of its opening and said brush with a plurality of obliquely extending surface grooves, and suction means operatively connected with said nozzle.

5. A printing press appliance comprising the combination of sheet conveying means, a

nozzle having a transversely elongated opening opposed thereto, the advanced edge of said opening with respect to the direction of movement of the sheet being provided with a plurality of grooves in communication with the nozzle opening, and suction means in communication with the latter.

6. A printing press appliance comprising the combination of a sheet conveyer, a nozzle provided with an elongated opening having a major dimension transversely opposed thereto, the advance edge of said nozzle with respect to the direction of movement of said conveyer having diagonal grooves in communication with said opening, and suction means in communication with said nozzle.

7. A printing press appliance comprising the combination of sheet conveying means, a nozzle provided with an elongated opening opposed thereto, and a correspondingly elongated member secured at said opening and provided with a plurality of diagonally extending grooves in communication with said nozzle opening, said grooves being disposed in advance with reference to the direction of movement of said sheet, and suction means in communication with said nozzle.

8. A printing press appliance comprising the combination of a cylindrical sheet conveyer a nozzle provided with an opening opposed to the surface thereof, a brush adapted to contact said sheet, a cap surrounding said opening and itself provided with an elongated opening registering with said first mentioned opening, said cap furthermore provided on one side with grooves in communication with said registering openings, said grooves being positioned beyond said brush with reference to the direction of movement of said conveyer, and means for establishing a suction within said nozzle.

9. A printing press appliance comprising the combination of sheet conveying means, a manifold mounted thereacross, nozzles

connected with said manifold and disposed in operative proximity to, said sheet, the edges of said nozzles being provided with a plurality of ducts extending diagonally with respect to the direction of movement of said sheet, and suction means operatively connected with said manifold.

10. A printing press appliance comprising the combination with a sheet-conveyer, of a nozzle having an intake opening elongated transversely with reference to the direction of movement of the passing sheet, said nozzle furthermore formed with a plurality of diagonal intake grooves intersecting the advance edge of said opening and communicating with the latter, opposite ends of adjacent of said grooves intersecting a given line of the sheet in the direction of its movement, and suction means operatively connected with said nozzle.

11. A printing press appliance comprising the combination of a sheet conveyer, a suction nozzle having an elongated intake opening in operative proximity thereacross, and a brush supported in advance of said nozzle with reference to the direction of movement of the sheet, the side edge of said intake opening nearest said brush being provided with a plurality of obliquely aligned surface grooves.

12. A printing press appliance comprising the combination of a nozzle provided with an opening, a cap surrounding said opening and itself provided with an elongated opening registering with said first mentioned opening, said cap furthermore provided on one side with grooves in communication with said registered opening, and means for establishing a suction within said nozzle.

Signed by me, this 19th day of July, 1913.

JAMES E. DOYLE.

Attested by—

B. R. FREESON,
HERBERT HAASE.