Dec. 23, 1941. A. N. KIMBALL ET AL 2,266,869

MEANS FOR TREATING PRINTED SHEETS

Filed Aug. 17, 1939 3 Sheets-Sheet 1

Fig. 1.

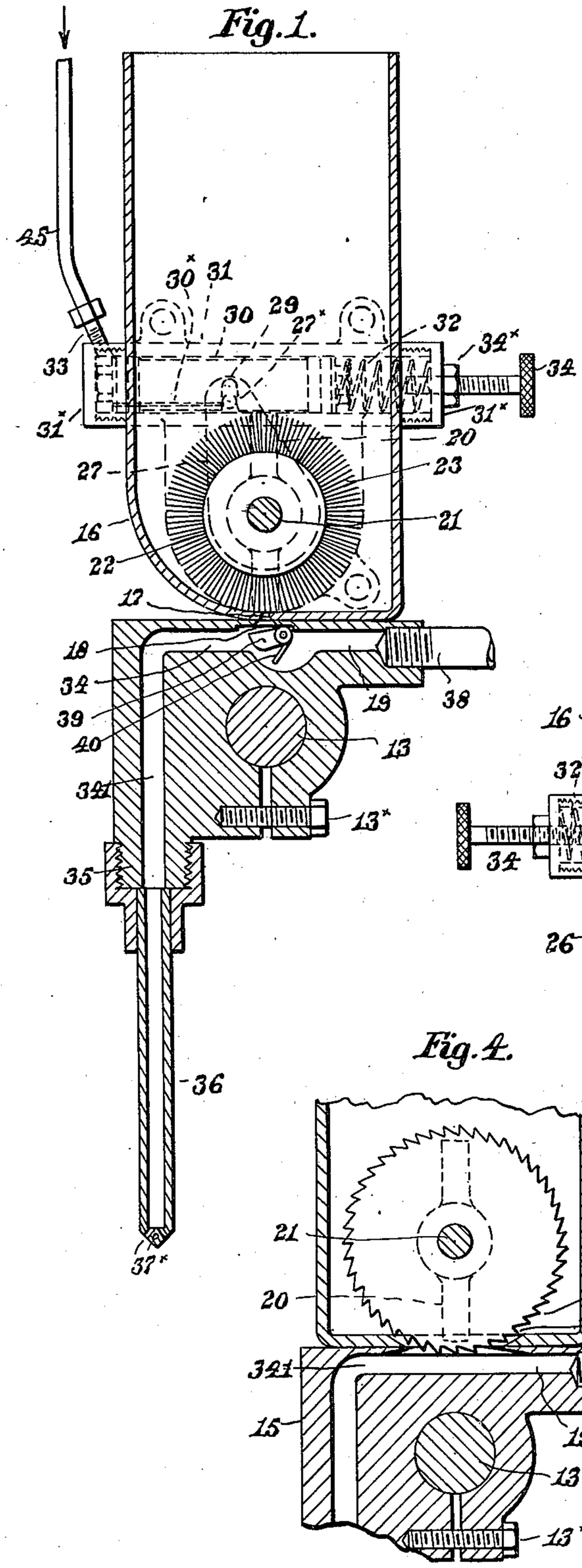

Fig. 2.

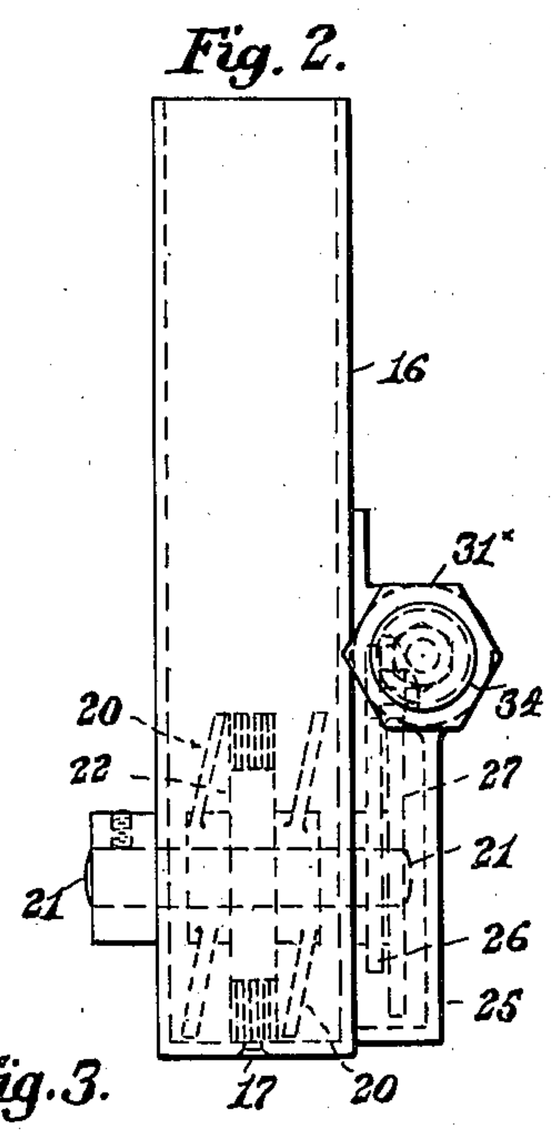

Fig. 3.

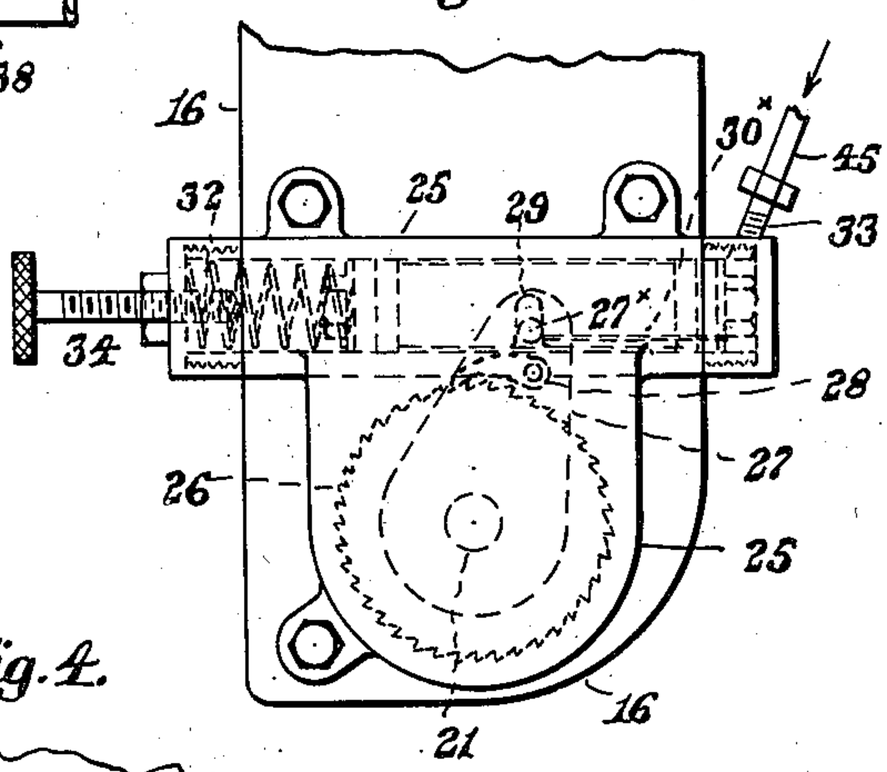

Fig. 4.

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MEANS FOR TREATING PRINTED SHEETS

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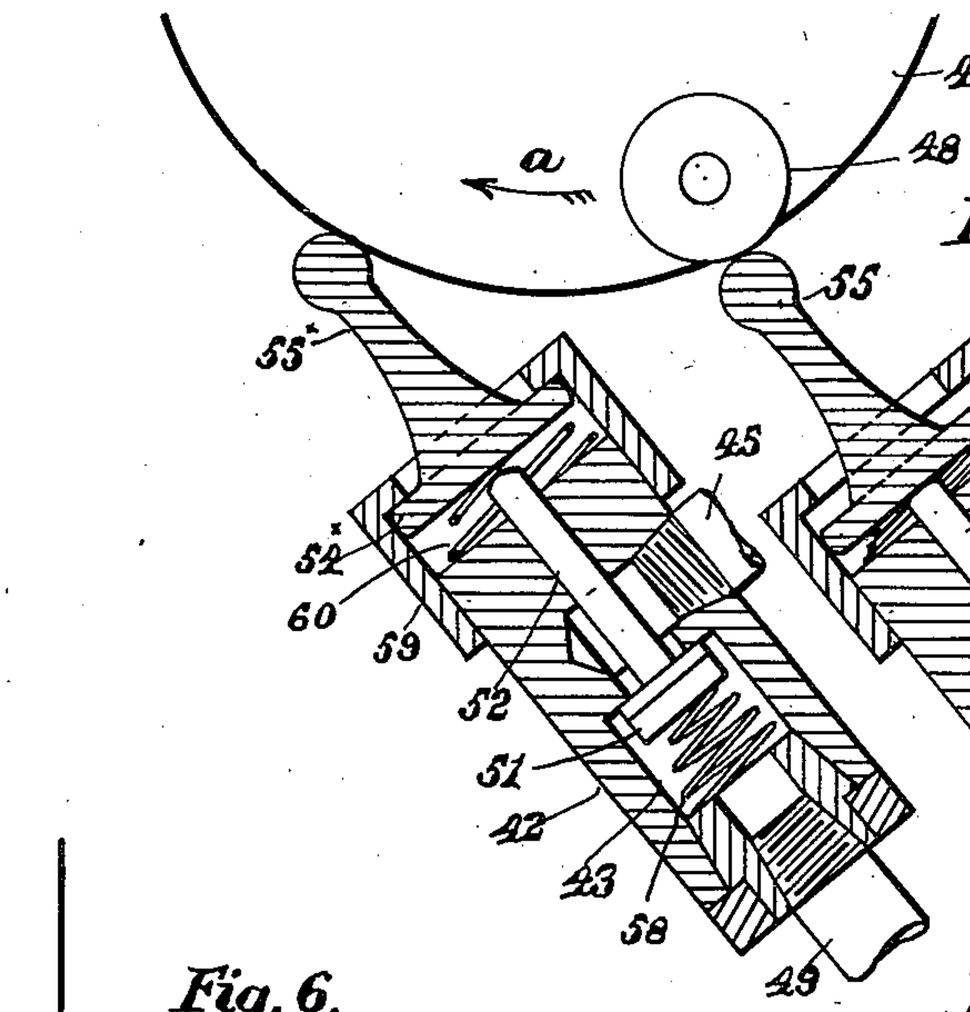

Fig. 7.

Fig. 6.

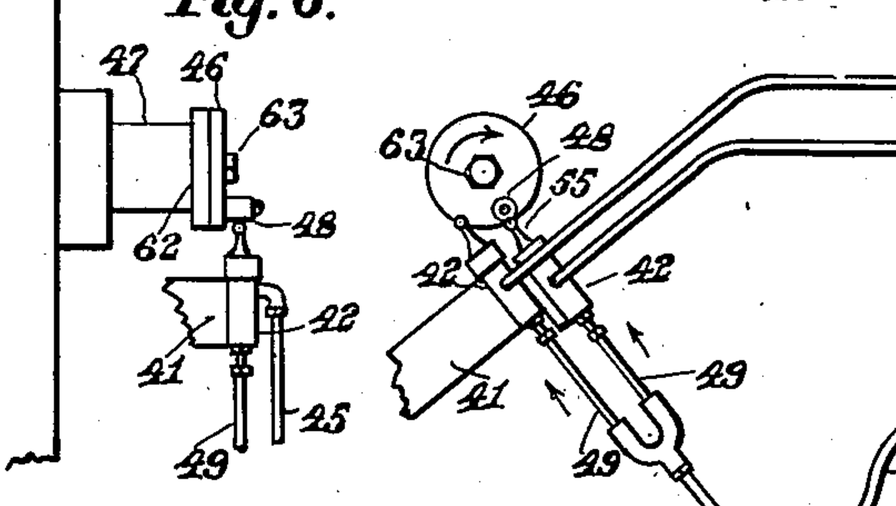

Fig. 5.

Fig. 8.

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Fig. 9.

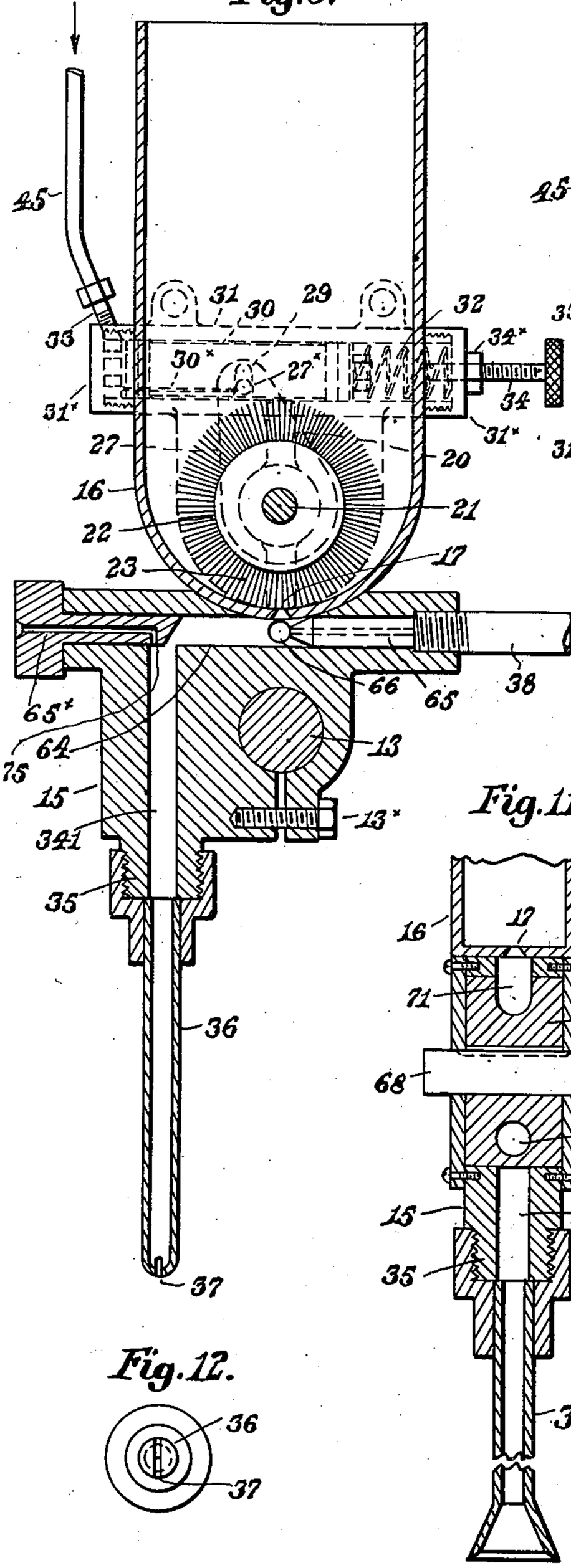

Fig. 10.

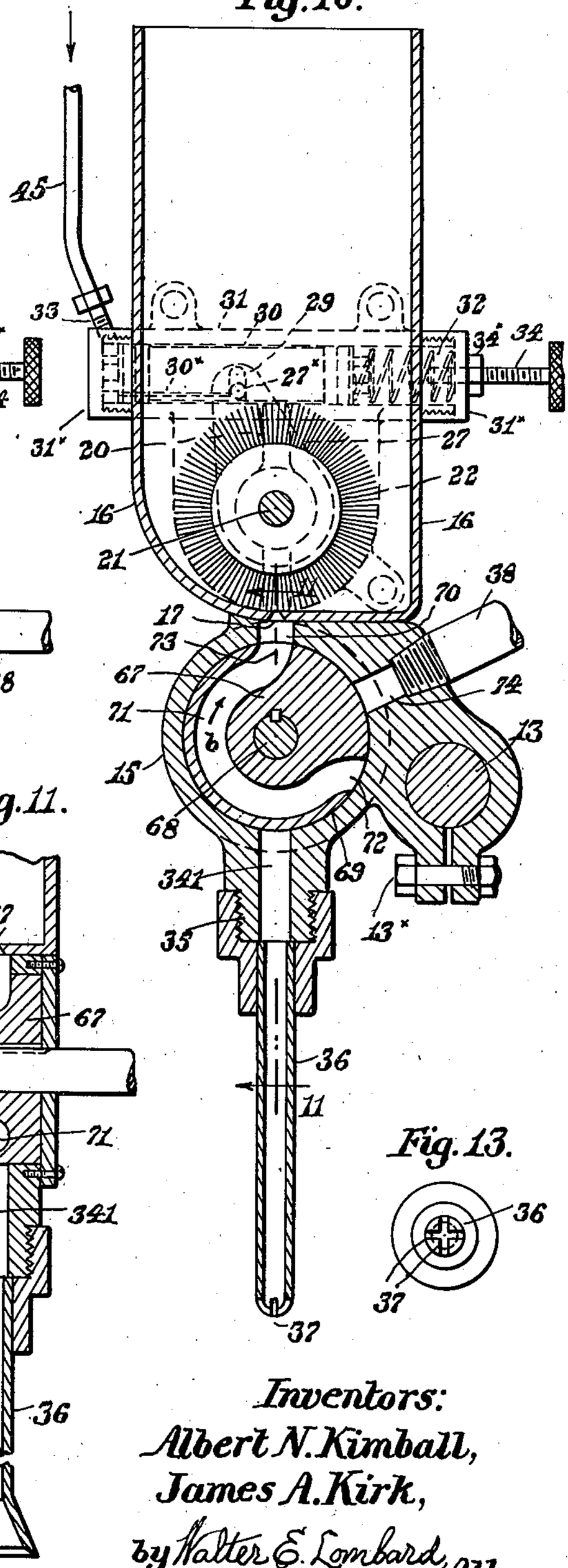

Fig. 11.

Fig. 12.

Fig. 13.

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UNITED STATES PATENT OFFICE

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MEANS FOR TREATING PRINTED SHEETS

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7 Claims. (Cl. 91—44)

This invention relates to the art of printing and more especially to an apparatus adapted to be operated by a printing press to treat a freshly printed sheet delivered from said press to prevent the printing from being offset onto another sheet subsequently delivered thereon.

The object of the invention is to produce a simple apparatus by which a limited quantity of powdered material may be delivered from a magazine into a gun disposed beneath and secured to said magazine, said gun having combined therewith means for delivering compressed air thereto to force the delivered material through a mixing chamber and from a nozzle connected with said gun, said material in this delivery operation being spread in fine particles over the surface of the printing.

The invention consists primarily in providing the magazine containing the powdered material, preferably cornstarch, with a mixing device and a revoluble disk having peripheral projections thereon adapted during the rotation of said disk to force a limited quantity of the powdered material through an orifice in the bottom of said magazine and into the interior of the gun.

The invention further consists in providing the gun with a check valve which is adapted to close the orifice from the magazine when compressed air is admitted to said gun.

The invention further consists in providing means whereby the rotation of said revoluble disk is actuated by compressed air at a predetermined time.

The invention further consists in means operable by a device secured to the printing press whereby the compressed air for actuating the rotating disk is first brought into operation for a limited time and then another quantity of compressed air is admitted to the gun to force any powdered material therein through a mixing chamber and nozzle onto the printed sheet.

The invention further consists in providing means whereby any one of a plurality of forms of nozzles may be utilized in connection with said gun to spread the material on the sheet, each nozzle being adapted to spread this material in a different manner.

The invention further consists in means for controlling the amount of powdered material delivered to the gun.

The invention further consists in means operable after each delivery of powdered material from the magazine for removing from the gun every particle of powdered material therein by a blast of compressed air.

The invention further consists in a gun having no moving parts except a check valve controlling the admission of powdered material thereto.

The invention further consists of a gun provided with an oscillating member having a curved passage therethrough forming a mixing chamber, one end of said passage in one position of said member communicating with a source of supply of powdered material and in another position of the member communicating with a compressed air inlet while the other end of said passage communicates with the delivery nozzle.

The invention further consists in a gun having one or more jets operated by compressed air and a delivery nozzle, said gun having a blast chamber therein to which the powdered material is delivered and mixed with the air and carried thereby to said nozzle.

The objects desired are obtained by the mechanism illustrated in the accompanying drawings.

For the purpose of illustrating the invention, one preferred form thereof is illustrated in the drawings, this form having been found to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described except as required by the scope of the appended claims.

Of the drawings

Figure 1 represents a vertical section of a powder magazine and gun embodying the principles of the present invention.

Figure 2 represents a side elevation of the magazine.

Figure 3 represents a rear elevation of the lower portion of the said magazine.

Figure 4 represents a detail of said magazine and gun to be hereinafter described.

Figure 5 represents a diagrammatic view of the entire installation of the mechanism embodying the principles of the present invention.

Figure 6 represents a detail to be hereinafter referred to.

Figure 7 represents a section of the valve mechanism for regulating the flow of compressed air and showing in elevation the means for actuating said valves.

Figure 8 represents a sectional detail of one form of nozzle used in the gun.

Figure 9 represents a vertical section of a modified form of magazine and gun.

Figure 10 represents a similar section of another modified form of magazine and gun.

Figure 11 represents a vertical transverse section on line 11, 11 on Fig. 10

Figure 12 represents an end elevation of the form of nozzle shown in Fig. 9, and

Figure 13 represents an end elevation of another form of nozzle as shown in Fig. 10.

Similar characters indicate like parts throughout the several figures of the drawings.

In the drawings, 10 is a portable base having extending upwardly therefrom a tubular member 11, in the upper end of which is adjustably mounted a cylindrical member 12 having secured thereto a laterally extending cylindrical rod 13.

The member 12 may be clamped in adjusted position relatively to the tubular member 11 by means of the clamping screw 14.

Mounted on the cylindrical rod 13 and clamped thereto by a clamp screw 13x is a gun 15 on which is superimposed a powder magazine 16.

This magazine 16 has a discharge orifice 17 in its lower end communicating with an inlet 18 to the bore 19 of the gun 15.

In the magazine 16 is disposed a stirring or mixing device 20 mounted on a revoluble shaft 21, said shaft also having secured thereto a disk 22 having a width equal to the width of the orifice 17.

This disk 22 has extending from the periphery thereof a plurality of projections 23 adapted in the rotation of said disk to force the powder contained within said magazine 16 through the orifice 17 and into the gun 15.

Preferably these projections 23 on the periphery of the disk 22 are bristles as shown in Figs. 1, 2, 9 and 10 of the drawings.

The projections 23, however, could be shouldered teeth 24 as shown in Fig. 4 of the drawings, the outer ends of these teeth projecting into the bore 19 of the gun 15.

Secured to the side of the magazine 16 is a housing 25 into which extends one end of the revoluble shaft 21, and on this end a ratchet wheel 26 is secured.

Movable about the shaft 21 is an arm 27 having pivotally mounted thereon a pawl 28 which engages with the teeth of said ratchet wheel 26.

The free end of the arm 27 is provided with a lateral pin 27x disposed in a recess 29 of a slidable member or piston 30 mounted in a cylindrical member 31 forming a part of the housing 25.

This member 31 is closed at both ends by caps 31x threaded thereto.

Disposed at one end of the slidable member 30 and within the cylindrical member 31 is a spring 32 which is adapted to force the slidable member or piston 30 to the opposite end of the cylindrical member 31.

This opposite end has an inlet 33 thereto through which compressed air may be admitted to the cylindrical member 31 to force the slidable member 30 endwise in said cylindrical member 31 and against the tension of the spring 32 located therein.

The spring-containing end of said cylindrical member 31 has threaded thereto a stop member 34 which is adapted to limit the movement of the slidable member 30 in the cylindrical member 31.

The stop member 34 has a lock nut 34x threaded thereto.

The opposite end of the slidable member 30 has a vent passage 30x for the escape of compressed air when the member 30 is forced by spring 32 toward the inlet 33.

Every time that compressed air is admitted to the cylindrical member 31 it will move the slidable member 30 a predetermined distance and cause the arm 27 to move about the shaft 21, and in so doing by means of the pawl 28 engaging the teeth of the ratchet wheel 26, the stirring device 20 and the revoluble disk 22 will be moved a predetermined distance about the axis of the shaft 21.

During this operation the powdered material in the magazine 16 will be thoroughly mixed by the device 20 and a portion of the powder will be carried by the projections 23 or 24 on the revoluble disk 22 into the orifice 17, and from said orifice into the bore 19 of the gun 15.

This bore 19 of the gun 15 is cylindrical and of considerable length and a portion thereof forms a mixing chamber 341.

At the delivery end of the gun 15 this mixing chamber 341 extends downwardly and through a boss 35 having its outer end threaded to receive any one of a plurality of tubular nozzles 36.

The lower ends of these nozzles 36 may have one or more slits 37 therein or a plurality of perforations 37x therethrough, as shown in Figs. 9, 10, 12 and 13.

In some cases it may be desirable to have the lower end of the nozzles 36 forked with discharge passages extending therethrough as shown in Fig. 8.

The inlet end of the gun 15 has a tubular pipe 38 extending therefrom through which compressed air from a source of supply is adapted at a predetermined time to be admitted to the bore 19 of said gun.

At one side of the inlet 18 to the bore 19 of the gun 15 is pivotally mounted a check valve 39, preferably having a thin wing 40 radiating from the pivot thereof against which the compressed air admitted to the bore 19 will act to force the check valve 39 about its pivot to close the inlet 18 to the gun 15.

When the admission of compressed air to the bore 19 of gun 15 is stopped, the weight of the body of the check valve 39 will be sufficient to move it downwardly and open the inlet 18 to permit another charge of powdered material to enter said bore 19.

This powdered material preferably is cornstarch but it is obvious that other powdered materials may be used substantially as well.

Secured to a portion of the frame 41 of a printing press are two housings 42 each having a valve chamber 43 or 44 therein, one of said chambers, 44, being connected to the tubular pipe 38 while the other chamber 43 is connected by a tubular pipe 45 to the inlet 33 of the cylindrical member 31.

The valve housings 42 are mounted fixedly on the frame 41 of a printing press at a point adjacent to a revoluble disk 46 forming part of the press and secured to the cylinder shaft 47, said disk 46 having secured thereto a roller 48 on the outer face thereof.

The chambers 43, 44 in the housings 42 communicate by a system of piping 49 with a source of supply of compressed air 49x which may be of any well known construction, and the valves 50, 51 in said housings 42 have upwardly extending members 52, 53.

Coacting with the members 52, 53 are tiltable valve-actuating members 54, 54x having upward projections 55, 55x extending above the housings

42 with their upper ends both in the path of movement of the roller 48 so that when the disk 46 is rotating, the roller 48 on said disk 46 will first come into contact with the valve actuating member 54, 55 and cause the valve 52 to be opened permitting the compressed air from pipe 49 to enter the bottom of the chamber 44 and then through the pipe 38 to the bore 19 of the gun 15 and force from said bore any powdered material therein.

As soon as the roller 48 passes the valve-actuating member 54, 55, said roller 48 will contact with valve-actuating member 54x, 55x and open the valve 51 permitting compressed air to pass from the pipe 49 to the pipe 45 which extends to the inlet 33.

The pipe 49 has a valve 56 therein and said pipe is supported at 57 on the adjustable member 12.

Within the chambers 43 and 44 of the housings 42 are springs 58 which bear against the under side of the valves 51 and 52 and normally retain these valves on their seats preventing compressed air from passing from said chambers 43, 44 into the pipes 45 and 38 respectively.

Secured to the upper ends of the housings 42 are cup-shaped members 59 which enclose the disk-like portions of the valve-actuating members 54, 54x.

Within each of these cup-shaped members is disposed a spring 60 which forces said valve-actuating members 54, 54x outwardly and normally retain said members 54, 54x in their outward position.

The periphery of the roller 48 extends beyond the periphery of the disk 46 and as the said disk 46 rotates in the direction of the arrow a in Fig. 7 of the drawings, it will come first into contact with the ball shaped end of the projection 55 on member 54 and force the valve-actuating member 54 downwardly to open the valve 52 and permit compressed air from the source of supply 49x to pass through the pipe 38 to the inlet of the gun.

As soon as this compressed air has been admitted to the gun and cleared the bore 19 thereof, from any powdered material therein, the roller 48 in the continuation of the rotation of the disk 46 will contact with the valve-actuating member 54x, 55x and open the valve 51 thereby permitting compressed air to pass from the pipe 49 to the pipe 45 leading to the inlet 33.

When the compressed air is admitted to the inlet 33 it will force the slidable member 30 endwise in the cylindrical member 31 and during this movement of the slidable member 30 the arm 27 will be oscillated causing the pawl 28 to rotate the ratchet wheel 26 a predetermined distance.

As this ratchet 26 is secured to the shaft 21 it will, during its rotation, rotate the stirring device 20 and disk 22 thereby forcing a predetermined quantity of powdered material into the bore 19 of the gun 15.

This rotation of the disk 22 will continue until the admission of compressed air to the inlet 33 is discontinued.

Ample time is given for the operation of the feeding disk 22 during the rotation of the disk 46 after the roller 48 has passed the valve-actuating member 54x, 55x, as no more powdered material will be admitted to the bore 19 of the gun 15 until the roller 48 in the rotation of said disk 46 again comes into contact with the valve-actuating member 54x, 55x.

The printing press is so constructed that the disk 46 with its roller 48 thereon in its cycle will be free from contact with the ends of the projections 55, 55x of the valve-actuating members 54, 54x, and before the second cycle of said disk 46, the disk 46 will be lowered in the operation of the press so that the roller 46 thereon will come into contact with the projections 55, 55x of the valve-actuating members 54, 54x and operate them.

As this means of raising and lowering the disk 46 forms no part of the present invention and is common practice in cylinder printing presses, it is believed that it is unnecessary to illustrate how this raising and lowering operation is accomplished.

It will be understood, however, that the operation of the valves 51, 52 is perfectly synchronized with the rotation of the press cylinder and the disk 46 revoluble therewith, so that when the press cylinder delivers a freshly printed sheet upon a rack the gun will immediately operate to spread over the printed face of said sheet minute particles of powdered material, this spreading operation being completed before the press cylinder in its rotation can deliver another sheet onto that previously delivered.

The base 10 is mounted on rollers 61 so that it may be readily moved over the floor of the press room so that the powder magazine 16 may be located at any desired point relatively to the printed sheet.

For different classes of work different forms of nozzles 36 are desired, some to spread the powdered material over the whole surface of the printed sheet while others may be utilized to advantage to spread powdered material on portions of the sheet most likely to have its printed characters offset onto a subsequently delivered sheet superimposed thereon.

The quantity of powdered material admitted to the gun 15 may be regulated by adjusting the member 34 which limits the sliding movement of the member 30 and consequently limits the amount of rotation of the feeding disk 22.

Rotatable with the cylinder shaft 47 of the press is a disk 62 against which is clamped the disk 46 by means of a clamp screw 63.

By loosening this clamp screw 63 the disk 46 carrying the roller 48 may be adjusted into any desired position about the axis of the cylinder shaft 47.

When the saw tooth projections 24 on feed disk 22 are used the check valve 39 is omitted.

In Fig. 9 of the drawings is shown a modified form of gun having a blast chamber 64 therein and one or more small orifices 65 communicating with said blast chamber 64.

When compressed air is admitted to the chamber 64 through the jets 65, 65x at the opposite ends of the gun, the powdered material from the magazine will be drawn into the chamber 64 and forced through said chamber 64 to the downward passage 341 and through the nozzle 36.

At the same time that the powdered material is being admitted from the magazine into the chamber 64 air will be admitted to the chamber 64 through outwardly extending passages 66, said air mixing with the powdered material prior to its discharge through the nozzle 36.

In the operation of this form of gun air is supplied to the gun in three ways, two of the ways being through the jets 65, 65x at the opposite ends of the gun and the other through the air inlets 66. These suction inlets 66 are direct-

ly beneath the delivery orifice 17 of the powder magazine 16.

Simultaneously with the delivery of the powdered material through the delivery orifice 17, the jet 65 of compressed air sets up an ejector action through the blast channel 64, thereby carrying the air from the suction inlet 66 and the powdered material mixed therewith toward the delivery nozzle 36.

The inner end of the passage 65x extends downwardly in alinement with the passage 341 as shown at 75 in Fig. 9 of the drawings, and when compressed air is admitted through this passage 65 and downwardly through the inner end 75 thereof, this jet will increase the pull at the air suction inlet and the starch inlet 17, thereby increasing the velocity and volume through the blast channel 64 to the nozzle 36.

In this form of gun a single valve housing 42 may be used to force compressed air in both jets 65, 65x.

Another modification is shown in Fig. 10 of the drawings in which the gun has an oscillating member 67 mounted on a shaft 68, said oscillating member being confined within a cylindrical chamber 69 having a passage 70 therefrom normally communicating with the orifice 17 of the powder magazine 16 and through which powdered material may be discharged into a curved cylindrical passage 71 in the member 67.

The opposite end 72 of this passage is adapted in the oscillation of the member 67 to be brought into register with the outlet 341 of the gun 15, while the opposite end 73 of said passage 71 will be brought into register with the inlet 74 communicating with the compressed air pipe 38.

The member 67 oscillates in the direction of the arrow b on Fig. 10 of the drawings.

This passage 71 forms a mixing chamber and after powdered material is delivered thereto in sufficient quantities by any suitable means, the member 67 may be rotated so that the compressed air from the pipe 38 will be forced into the end 73 of the passage and force all powdered material in said passage outwardly through the downwardly extending passage 341 and through the nozzle 36.

The member 67 mounted on the shaft 68 is oscillated clockwise through an angle of 60°.

Any well known means may be provided for properly effecting this oscillation but as the mechanism for accomplishing this object forms no part of the present invention, it is deemed unnecessary to illustrate and describe the same.

It is believed that the operation and many advantages of the invention will be understood without further description.

Having thus described our invention, we claim:

1. An apparatus for preventing offsetting in printing consisting of an immovable magazine containing a powdered material and having a discharge orifice in the bottom wall thereof, a gun below said magazine and communicating therewith, a delivery nozzle on said gun, a rotatable shaft horizontally disposed in said magazine, means for intermittently rotating said shaft, a disk rotatable with said shaft and having peripheral radially-disposed projections the outer ends of which force material through the orifice of the magazine into said gun when said disk is rotated, and means for admitting compressed air to said gun from a source of supply and forcing through its nozzle the material delivered to the gun from the magazine.

2. An apparatus as set forth in claim 1 in which the peripheral radially-disposed projections on said rotatable disk consist of stiff bristles.

3. An apparatus as set forth in claim 1, in which the revoluble material-feeding disk in said magazine is provided with radial peripheral projections in the same plane as said discharge orifice, a cylindrical casing on one side of said magazine having an inlet thereto for compressed air, a slidable member in said casing movable in one direction by compressed air, a spring to move said member in the opposite direction, means operable by the slidable movement of said member to impart intermittent rotation to said disk, and means for admitting compressed air through said casing inlet prior to the admission of compressed air to said gun.

4. An apparatus as set forth in claim 1, in which the revoluble disk installed in said magazine is provided with radial peripheral projections in the same plane as said orifice, a cylindrical casing on one side of the magazine, a ratchet wheel revoluble with said disk, a pivoted arm having a lateral pin at its free end, a pawl on said arm coacting with said ratchet wheel, a slidable member in said cylindrical casing provided with a notch in which the pin on the free end of said arm is disposed, an inlet for compressed air to said cylindrical casing to move said slidable member in one direction, a spring to move said slidable member in the opposite direction, and means for admitting the compressed air through said casing inlet prior to the admission of compressed air to said gun.

5. An apparatus as set forth in claim 1, in which two valves are provided to control the admission of compressed air to the gun and to a cylindrical casing on one side of the powder magazine, mechanism actuated by compressed air admitted to said casing for imparting rotation to the disk shaft; a pipe from one valve to said cylindrical casing, a pipe from the other valve to the gun, and means extending from said valves in the path of a movable member on a printing press and adapted to be actuated by said member at predetermined times to open said valves.

6. An apparatus for preventing offsetting in printing consisting of a magazine containing a powdered material and having a discharge orifice in the bottom thereof, a disk within said magazine rotatable about a horizontal axis and provided with radial peripheral projections adapted to force material into said orifice during the rotation of said disk, a gun below said magazine, an oscillating disk within said gun provided with a curved cylindrical passage forming a mixing chamber, the inlet end of said passage in one position communicating with said orifice and adapted to receive from said magazine a predetermined amount of said material, a delivery nozzle on said gun, and means for subsequently oscillating said disk and admitting compressed air to the inlet end of said passage and forcing the previously discharged material through said passage to and through said nozzle.

7. An apparatus as set forth in claim 1, in which the radially disposed projections on said rotatable disk are formed integral with said disk and extend through said discharge orifice, said projections being so constructed and arranged that during the rotation of said disk they will force said powdered material through said orifice.

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