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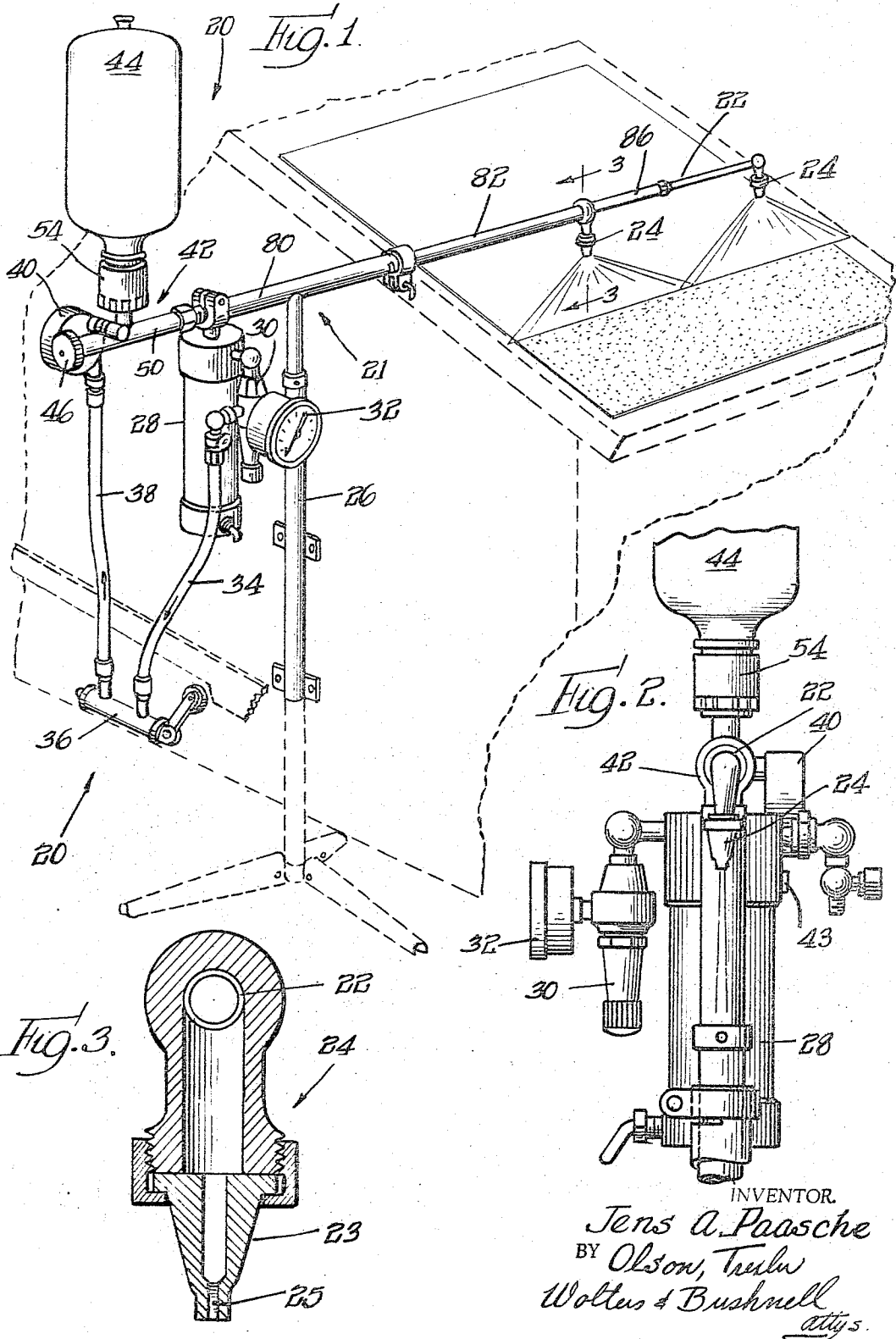
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3,333,570

ANTI-INK OFFSET POWDER ASSEMBLY

Filed Oct. 9, 1964

3 Sheets-Sheet 1



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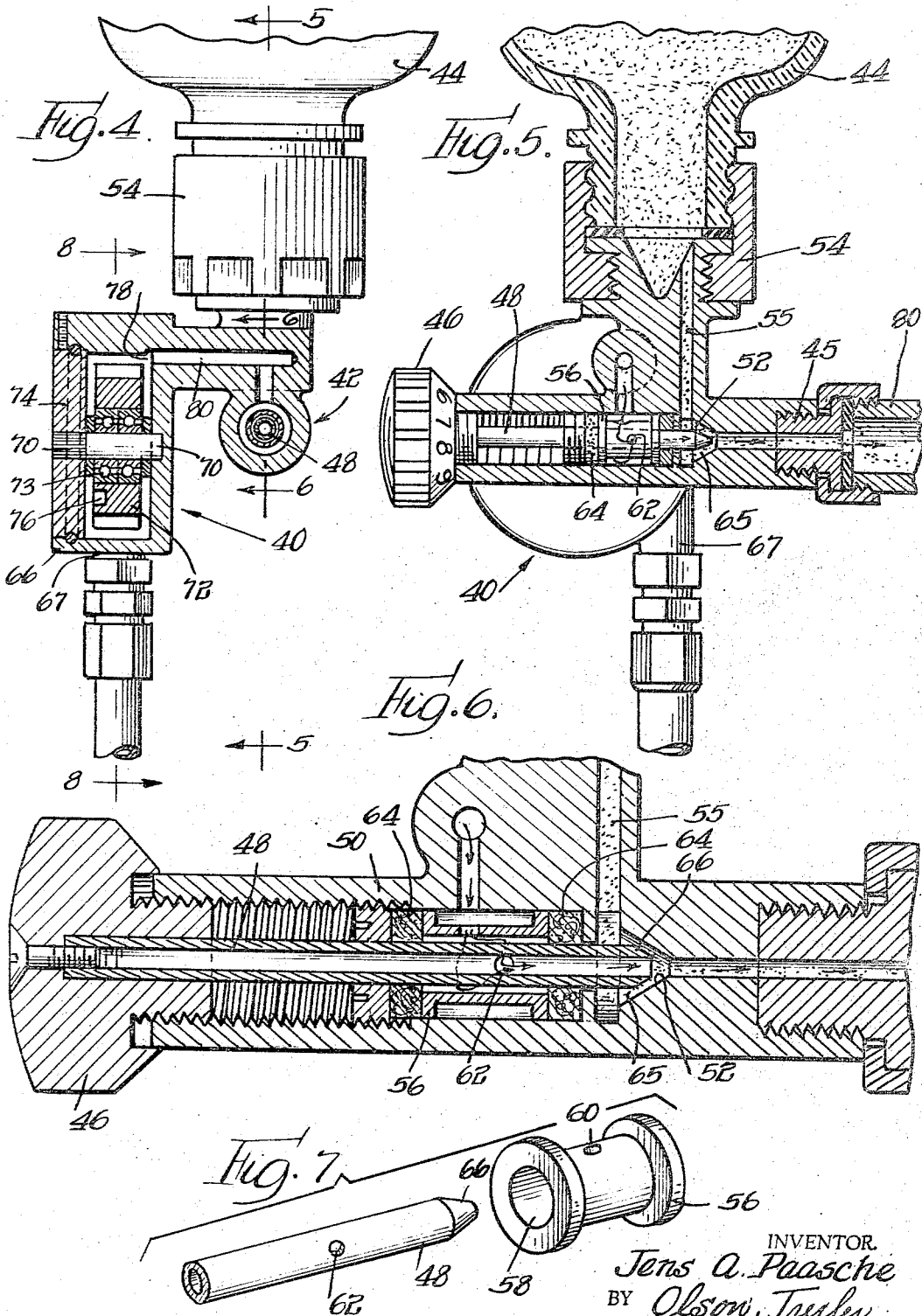
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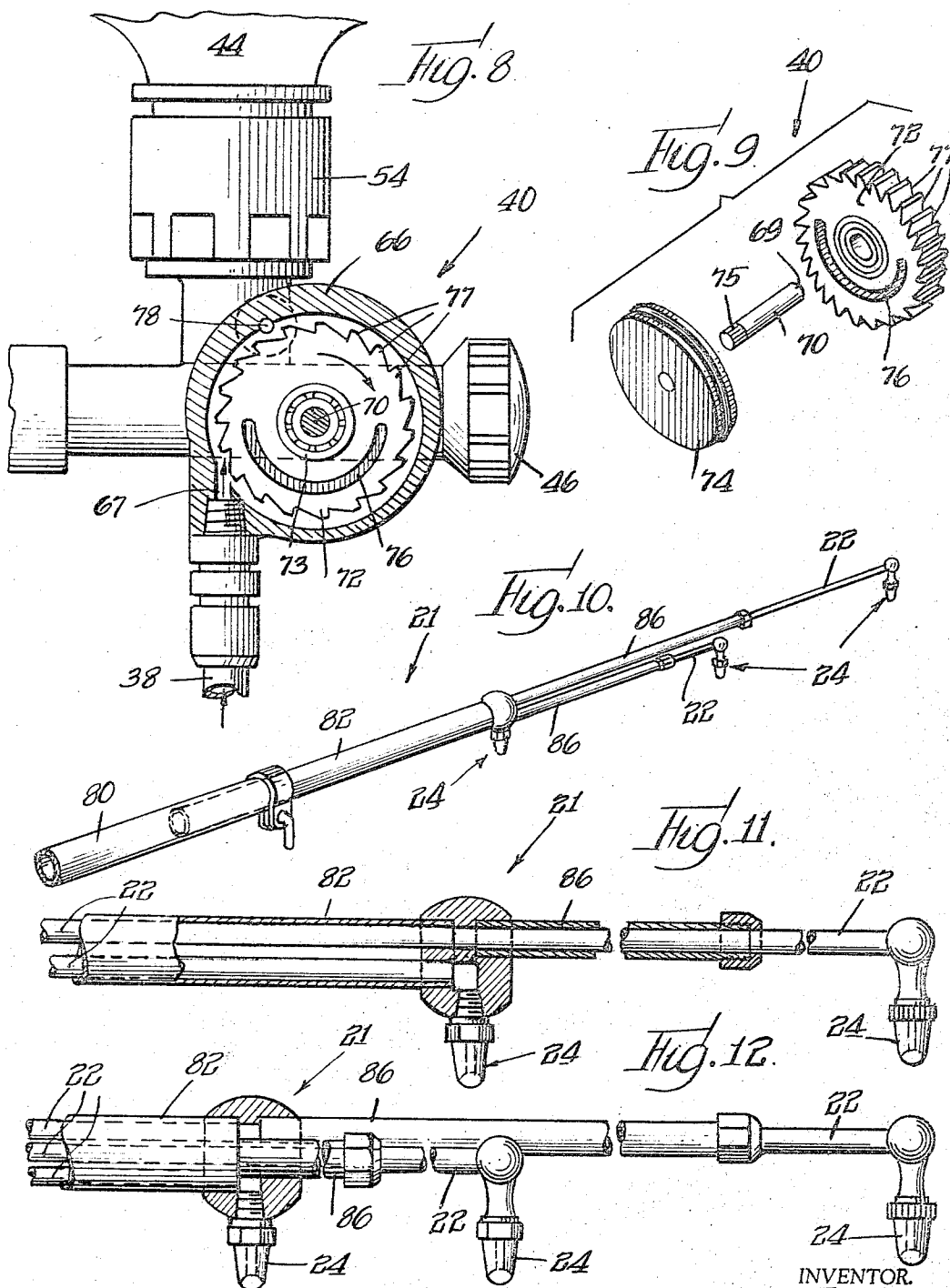
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3 Sheets-Sheet 3



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ANTI-INK OFFSET POWDER ASSEMBLY

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1 Claim. (Cl. 118—308)

The present invention relates generally to printing. More particularly, the invention relates to an apparatus for spraying a finely atomized powder on freshly printed sheets to prevent ink offset from one freshly printed surface to the next superimposed surface.

In stacking sheets of freshly printed paper, it has been the practice to treat each sheet as it leaves the printing press with a finely atomized spray of powder to prevent the offset of freshly applied ink from one surface to the next surface and to discharge static electricity building up between sheets which causes sheets to adhere and thus prevent proper stacking.

Powder assemblies to supply such atomized sprays of powder to a freshly printed sheet of paper are well known in the art. Thus, it is a general object of this invention to provide an improved powder assembly for use in the printing and stacking of printed sheets.

Another object is to provide a compact powder assembly to supply finely divided atomized powder to a freshly inked sheet uniformly in the precise areas desired.

Still another object is to provide an improved anti-ink offset powder assembly wherein powder is fed uniformly and without clogging from a source to an atomizer nozzle.

Yet another object is to provide an improved powder assembly having a means for precisely controlling the feed and delivery of powder to the atomizing nozzles.

A more specific object is to provide an improved powder assembly ensuring a lump-free and uniform flow of powder from a source and to overcome powder clogging and packing problems.

Another object is to provide an aerodynamic powder regulator suitable for precisely controlling the amount of powder atomized.

A further object is to provide an improved powder assembly having a new and improved gravitational supply of powder.

These and other objects and advantages of the invention will become apparent from the following disclosure and drawings forming a part thereof wherein:

FIG. 1 is a front perspective view of a preferred embodiment of the invention;

FIG. 2 is a rear elevational view of the embodiment shown in FIG. 1;

FIG. 3 is a sectional view taken along lines 3—3 of FIG. 1;

FIG. 4 is a front elevational view in section of an embodiment of an automatic vibrator unit and powder regulator of the invention;

FIG. 5 is a sectional view on an enlarged scale of the air regulator of FIG. 4 taken along lines 5—5 of FIG. 4;

FIG. 6 is an enlarged and simplified sectional view taken along lines 6—6 of FIG. 4;

FIG. 7 is a perspective view of the components of an air valve of the air regulator of FIGS. 5, 6;

FIG. 8 is an enlarged sectional view of the vibrator unit taken along lines 8—8 of FIG. 4;

FIG. 9 is a perspective view showing the relationship of some of the components of the vibrator of FIG. 8;

FIG. 10 is a perspective view of a modification of the extensible powder atomizer arm assembly of FIG. 1;

FIG. 11 is an enlarged sectional view of the extensible arms and atomizer nozzles of FIG. 1; and

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FIG. 12 is a fragmentary side elevational view of the atomizer arm assembly of FIG. 10 in retracted position.

Referring to the drawings, FIG. 1 shows a powder assembly designated generally by the numeral 20 constructed in accordance with the invention and having a powder atomizer arm assembly designated generally by the numeral 21 connected thereto. The powder atomizer arm assembly 21 includes a sleeve 80 which is secured in a cantilevered substantially horizontal position to a generally upright press mount 26, the sleeve being adapted to receive a telescopically extensible and retractable tube or slidable hollow arm 82 provided with a plurality of tubes in communication with atomizer nozzles 24. A fixed hollow extension arm 86 is secured to slidable arm 82 and has a slidable tube or hollow arm 22 therein leading to an atomizer nozzle 24 at the end of the assembly.

The generally upright press mount 26, forming a base for the assembly, may be secured to the side of a printing press or positioned adjacent the press by suitable base supports. An air conditioner 28 is mounted in depending position from a rearmost portion of the sleeve 80, the conditioner serving to clean the air utilized in the assembly. An air regulator 30 with pressure gauge 32 is connected in line with the air conditioner to regulate the pressure of air issuing from the conditioner to minimize variations of powder supply in the air-actuated powder assembly.

An air line 34 provides a passage for air from the air regulator to timing valve 36 operated by a press timing mechanism, with an exit air line 38 leading from an outlet end of valve 36 to an automatic jet vibrator assembly 40, a powder regulator 42 and then through the arms 22 and 82 to the atomizer nozzles 24.

A powder container 44, advantageously formed of a transparent material for ease in determining the amount of powder within the container, is mounted over powder regulator 42 with its outlet positioned downwardly for a gravitational flow of powder from the container.

The general relationship of the various components of the powder assembly is seen best in FIG. 2 which is an end elevation view of the assembly showing an atomizer nozzle 24 mounted at an end of arm 22 which is telescopically extensible and retractable. An inlet 43 connected to a source of air, not shown, is seen at the top of air conditioner 28 which cleans the air and then delivers it to air regulator 30. The air regulator 30 is adjusted to deliver a predetermined air pressure to vibrator assembly 40 and powder regulator 42.

The pressurized air and powder is supplied through arms 22 and 82 to the atomizer nozzles 24. Atomizer nozzle 24, FIG. 3, has an elongated nozzle 23, having a central passageway 25 progressively smaller in diameter toward its tip. That is, the nozzle is progressively stepped down toward its tip. The opening at the very tip of the nozzle is advantageously flared out somewhat from the immediately preceding portion of the opening as may best be seen in FIGS. 11 and 12 thereby resulting in a fan-shaped spray downwardly on the printed paper.

The powder feed regulator 42, FIGS. 4—7, is provided in the powder assembly of the invention, to precisely control or regulate the feed of powder from the powder container to the nozzles. The powder regulator is fixedly secured in line with the sleeve 80. Suitable powder regulator attachment means, FIG. 5, are provided at one end of the sleeve 80, with a threaded adapter 45 and knob 46 shown. The powder regulator, FIGS. 6, 7, includes a micrometer valve adjusting knob 46 with an elongated valve tube 48, secured at its one end to the knob, the other end 66 of the tube being tapered. The micrometer valve adjusting knob 46 and the valve tube 48 are adjustably positioned within a housing or air valve 50, the tapered end 66 of the valve tube being positioned

adjacent a complementary frusto-conically shaped or tapered surface 52 within the housing with a space or channel 65 therebetween. An upper part of the housing 50, FIG. 5, has a container mounting or bracket 54 adapted to receive the open end of the container of powder; and the housing has a substantially vertical channel 55 leading from the powder container opening into the valve 50 at a position adjacent the tapered end of the valve tube, that is, opening into the space 65.

A spacer 56 having an opening 58 therein adapted to receive the valve tube 48 is positioned within the housing 50 to space the valve tube from the inner portion of the housing and to serve as an air inlet means to the valve tube comprising an opening 60 within the circumference of the spacer. Air at a predetermined pressure is supplied to the powder regulator and to the opening 60 in the valve spacer 56 and from there to a space within the valve spacer comprising a clearance between the outer surface of the valve tube and an inner surface of the spacer. The direction in which the air flows is indicated by the arrows in FIGS. 5, 6. An opening 62 is provided in the valve tube for receipt of air from the spacer air inlet 60 with means provided at both ends of the spacer comprising packings 64 to prevent air movement in any other direction except through opening 62 into the valve tube.

For a better understanding of the invention, it is advantageous to provide at this time a functional description of the mode in which the components thus far identified operate.

Air entering the valve tube is directed forwardly toward the tapered end of the valve tube and thence through the arm conduit means provided to the atomizer nozzles. The tapered valve tube end is spaced apart from a complementary shaped surface 52 with a micrometer valve tube adjusting knob 46 provided to move the valve tube 48 forwardly or rearwardly within the valve housing with respect to the surface 52.

The space or channel 65 provided between the tapered valve tube end 66 and the surface 52 is open to a passageway 55 leading to a powder container opening; air is directed forwardly from the valve tube creating a jet of air which draws powder from the powder container and carries the powder forwardly through the arms to the atomizer nozzles.

The amount of powder drawn from the powder container is proportional to the space provided between the tapered end of the valve tube and the frusto-conically shaped surface 52; thus, minor spacing adjustments between the valve tube and the surface 52 by means of the micrometer valve adjusting knob 46 results in precisely controlled changes in the quantity of powder drawn from the powder container. In practice, the micrometer knob 46 is adjusted to the point where the spray of powder from the nozzles is barely visible, that is, the powder is delivered in an extremely finely divided mist. Since the amount of powder delivered to the nozzles may be precisely controlled, excess powder usage resulting in powder waste and problems created by excess powder escaping into the printing press room is avoided.

The automatic jet vibrator assembly 40, FIGS. 1, 4, ensures a free flowing movement of powder from the powder container to avoid any clogging or packing of powder in the atomizer arms or atomizer nozzles, and ensures that a predetermined setting of the micrometer valve adjusting knob delivers exactly the right amount of powder from the container.

The vibrator assembly is positioned in the powder assembly between air line 38 and the powder regulator 42. The vibrator assembly is actuated by the same air utilized in drawing the powder from the powder container and in spraying powder from the atomizer nozzles; and causes the entire assembly to vibrate.

The vibrator assembly 40, FIGS. 8, 9, includes a vibrator housing 66 which is generally cylindrical in

shape with an opening 67 in its circumference connected to air line 38 for receipt of air. Vibrator housing 66 has a generally circular closure plate 68, FIG. 4, provided with an inner seat for one end 69 of a pin 70 supporting a wheel 72 for rotation about the pin. A bearing 73 is provided between the pin and the wheel to ensure free rotation of the wheel. A closure plate 74 having an inner seat for the other end 75 of pin 70 is secured to the other side of the vibrator housing with suitable seals provided to ensure an air tight closure.

The wheel 72, FIGS. 8, 9, comprises an air rotated turbo wheel having a plurality of rearwardly directed teeth 77 which are positioned generally tangentially to the wheel, rather than extending radially outwardly, so as to best catch the air provided by air line 38, the air causing the wheel to rotate in the direction of the arrow, FIG. 8.

The wheel 72 rotates in an unbalanced vibrating fashion by reason of the fact that the wheel is eccentrically weighted, that is, it is weighted more on one circular sector than on the remainder thereof. One preferred means to weight the wheel eccentrically comprises an arcuate groove or cut out portion 76, FIG. 8, on one side of the wheel.

An air outlet 78 is provided in the vibrator housing 66 connected by a passageway 80, FIG. 4, to the powder regulator assembly.

From the above description of the vibrator, its operation should be clear. Pressurized air is admitted to the vibrator housing, the air being directed against the teeth of the rotatably mounted turbo wheel. The air causes the wheel to rotate within the housing, but because the wheel is eccentrically weighted, it vibrates and causes vibration of the entire vibrator assembly which vibration is transmitted to the powder regulator, the powder container, the passageways within the telescopically extensible arms and the atomizer nozzles, effectively preventing any lumping or caking of powder and promoting a regulated free flow of powder from the container.

To ensure that a fine mist of powder is delivered to exactly the area desired, an arm assembly, FIGS. 1, 11 is provided permitting telescopic extension or retraction of the atomizer nozzles 24.

A modified form of the telescopically extensible and retractable powder atomizer arm assembly is illustrated in FIGS. 10 and 12, the assembly being shown in extended position in FIG. 10 and on an enlarged scale in retracted position in FIG. 12.

A sleeve 80, FIG. 10, is secured in a generally horizontal position to the upright press mount. Telescopically extensible and retractable tubes or arms, 82 and 22 are provided, arm 82 being movable within sleeve 80 and arms 22 being slidably movable within fixed extension arms 86 fixedly secured to arm 82. Three atomizer nozzles 24 are provided, one each on the ends of tubes 22 and one at an end of tube 82. As should be apparent, by merely extending or retracting the arms 82, 22, a spray of powder is delivered to exactly the area desired.

Suitable conventional fittings are provided at the ends of the sleeve, the extension arms and the tubes leading to the atomizer nozzles to ensure that no air escapes except through the atomizer nozzles.

From the above description it is clear that the objects have been accomplished in a unique manner. An improved powder assembly has been provided suitable for preventing ink offset of freshly printed paper and for preventing buildup of static electricity between printed sheets. Means have been provided in the assembly for causing a flow of powder gravitationally from a container to a powder regulator which precisely controls the quantity of powder to be sprayed. A vibrator assembly has been provided to ensure that the powder remains in a free flowing condition and to ensure that the powder does not cake or clog in the container, the various powder passageways or the atomizer nozzles.

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Since modifications of the invention described above and illustrated in the various figures may be made, the invention should be limited only by the scope of the appended claim.

The invention is claimed as follows:

An anti-ink offset unit for applying powder to printed sheets moving adjacent said unit including a housing having a chamber therein, a source of powder rigidly attached to said housing, means for connecting said source of powder to said chamber, a source of fluid under pressure, means for connecting said source of fluid under pressure to said chamber, valve means in said chamber for entraining powder from said source of powder in fluid from said source of fluid, distribution means connected to said housing for applying the fluid entrained powder to printed sheets, said distribution means including hollow telescopically mounted arm means rigidly connected to said housing and communicating with said valve and chamber means, and nozzle means supported by said telescopically mounted arms means to direct a flow of fluid entrained powder from the hollow arm means onto the printed sheets, vibrator means connected to said housing to vibrate said source of powder, said telescopically mounted arm means, and said nozzle means to ensure a smooth flow of powder, said means for connecting said fluid under pressure to said chamber including an air line leading to said vibrator means from said source of fluid pressure and a passageway in said housing leading from said vibrator to said chamber so that said vibrator means is powered by the flow of fluid from said source of

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fluid to said chamber, said vibrator means comprising an enclosure attached to said housing and having an unbalanced wheel therein having a plurality of blades about its circumference, said wheel being mounted for free rotation, said air line leading to said vibrator from said source of fluid pressure being attached to said enclosure such that fluid from said air line will cause rotation of said wheel, and means in said air line from said source to said vibrator for controlling the flow of fluid.

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