Feb. 23, 1932. E. J. FERNEDING 1,846,547

METHOD AND APPARATUS FOR RECOVERING GOLD DUST

Filed Feb. 23, 1929 4 Sheets-Sheet 1

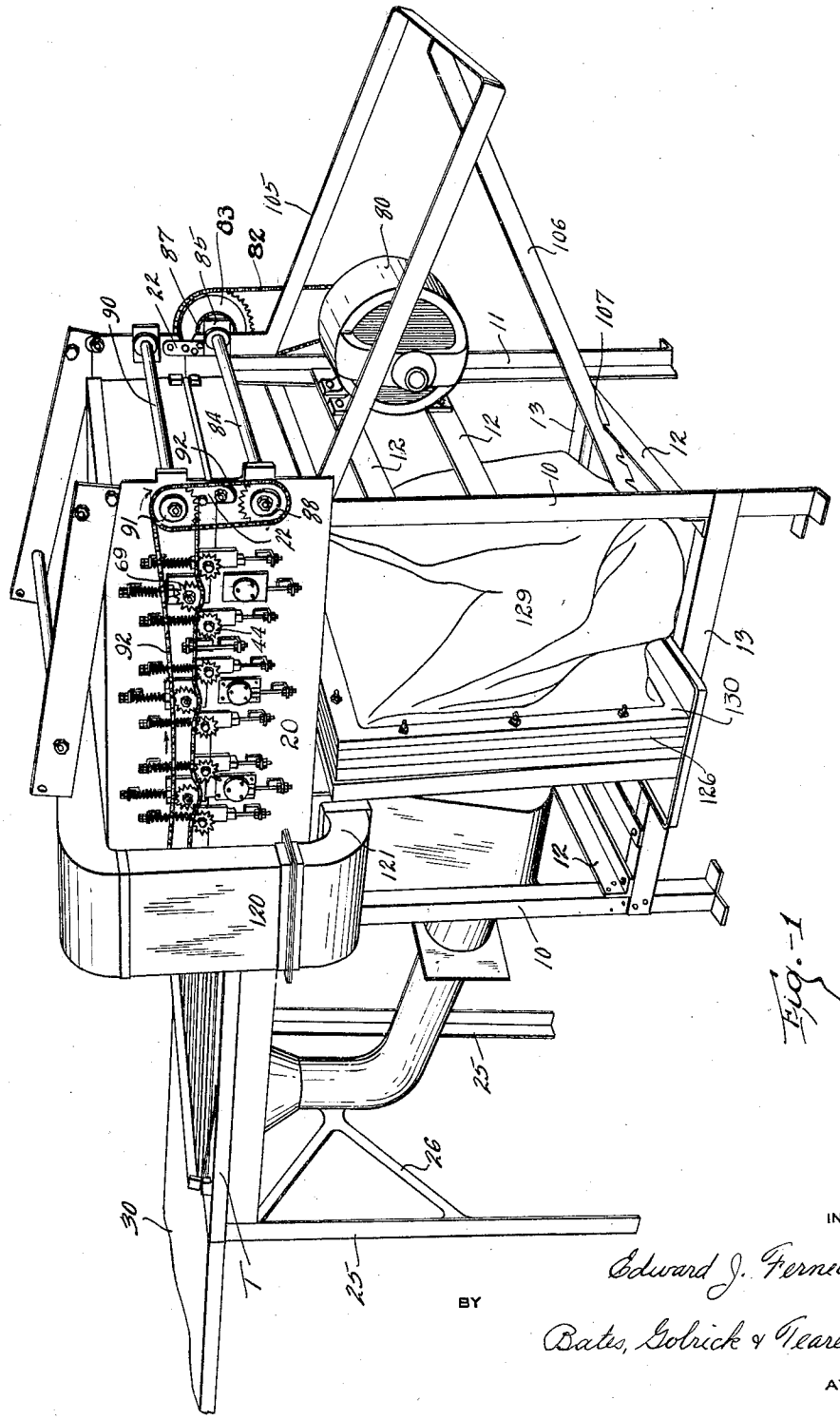


Fig. -1

INVENTOR

Edward J. Ferneding

BY

Bates, Golrick & Teare

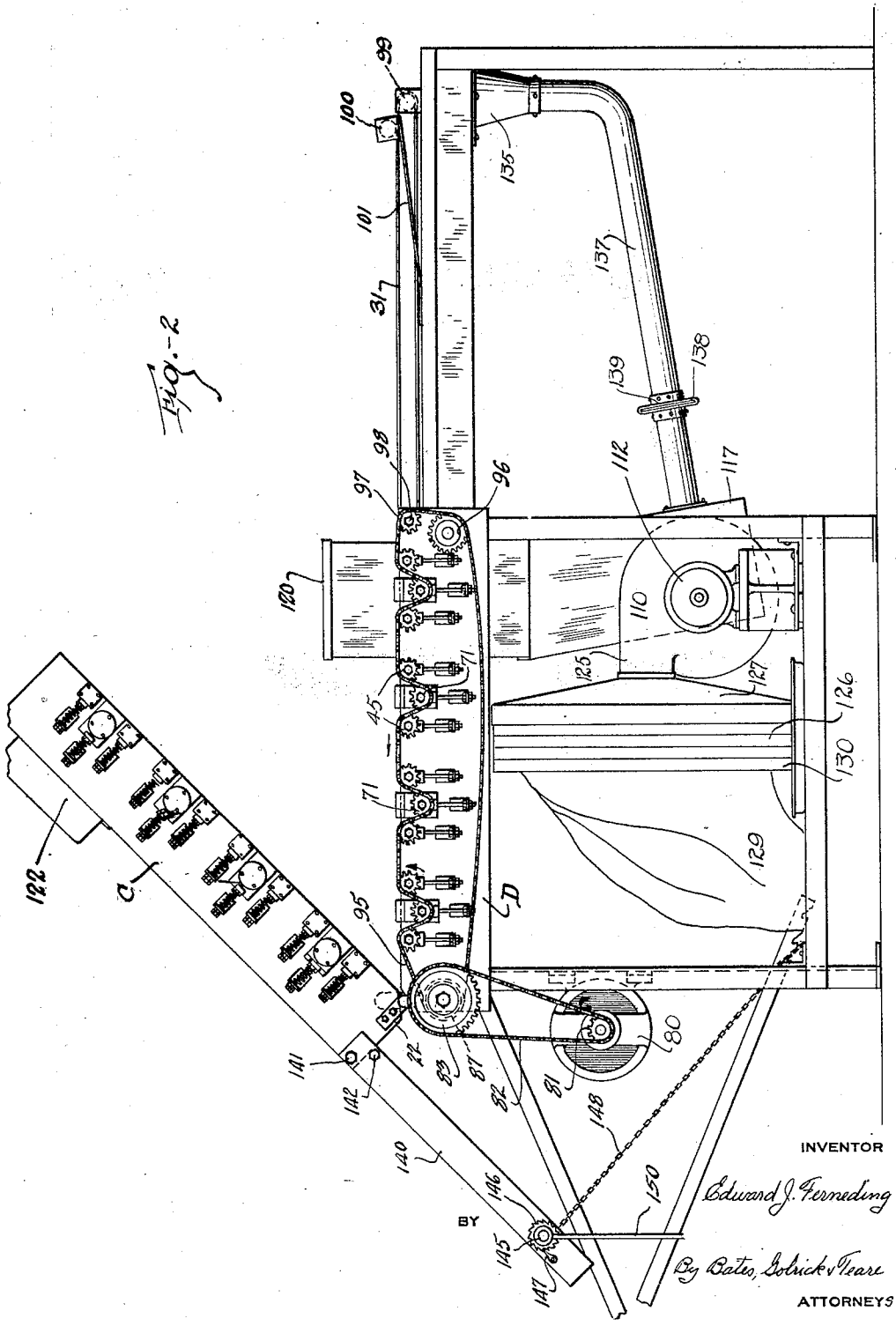
ATTORNEYS

Feb. 23, 1932. E. J. FERNEDING 1,846,547

METHOD AND APPARATUS FOR RECOVERING GOLD DUST

Filed Feb. 23, 1929 4 Sheets-Sheet 2

Fig. 2



INVENTOR

Edward J. Ferneding

BY

By Bates, Golrick & Trare

ATTORNEYS

Feb. 23, 1932. E. J. FERNEDING 1,846,547

METHOD AND APPARATUS FOR RECOVERING GOLD DUST

Filed Feb. 23, 1929 4 Sheets-Sheet 3

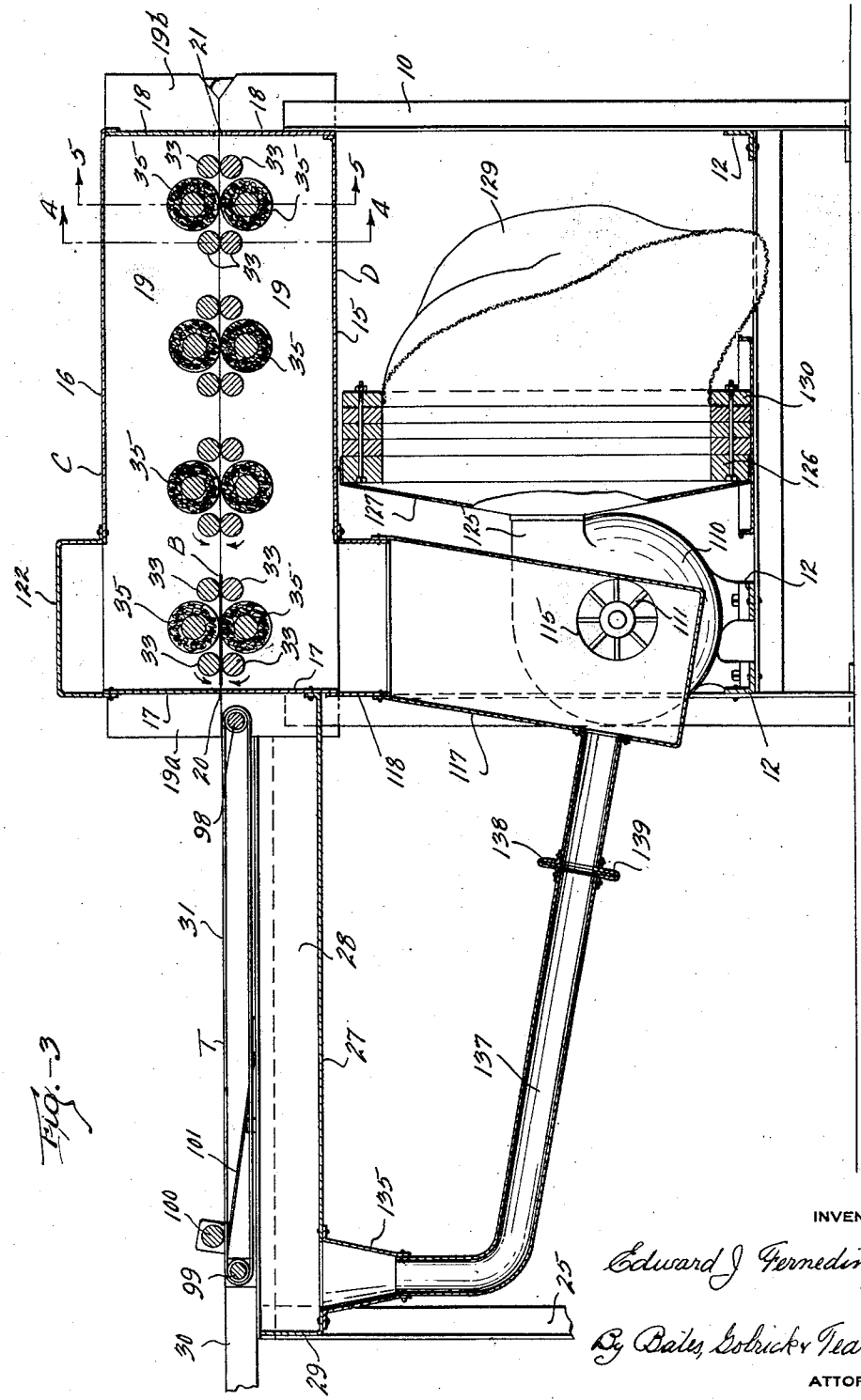


Fig. 3

INVENTOR

Edward J. Ferneding

By Bailey, Eobrick & Teare

ATTORNEYS

Feb. 23, 1932. E. J. FERNEDING 1,846,547

METHOD AND APPARATUS FOR RECOVERING GOLD DUST

Filed Feb. 23, 1929 4 Sheets-Sheet 4

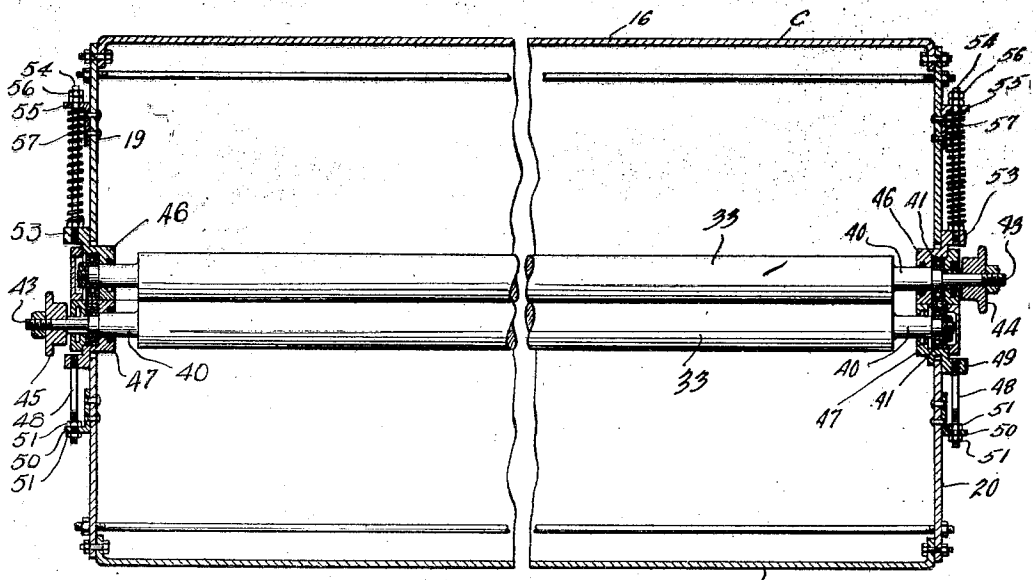


Fig. -4

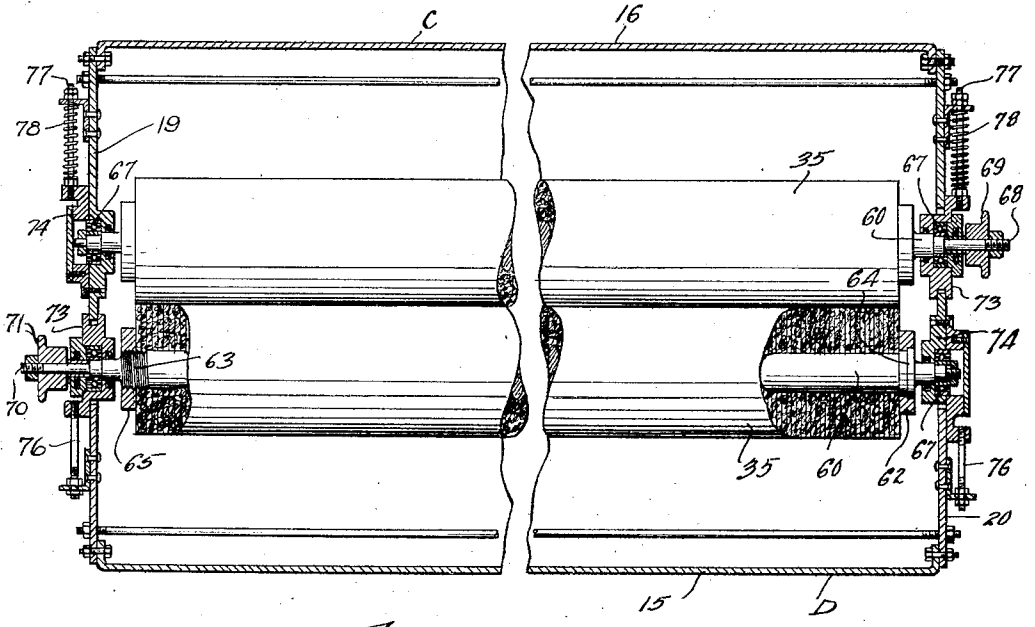


Fig. -5

INVENTOR

Edward J. Ferneding

BY

Bates, Golrick & Teare

ATTORNEYS

Patented Feb. 23, 1932 1,846,547

UNITED STATES PATENT OFFICE

EDWARD J. FERNEDING, OF CINCINNATI, OHIO, ASSIGNOR TO THE GIBSON ART COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO

METHOD AND APPARATUS FOR RECOVERING GOLD DUST

Application filed February 23, 1929. Serial No. 342,243.

The general object of this invention is to provide an efficient and simple method and apparatus for removing foreign or undesirable dust-like material from cards or the like. A specific object is to provide a method and apparatus for removing metallic dust from printed or engraved cards, such as greeting cards, playing cards and the like, which have characters, designs and the like in a color to represent gold, silver, etc.

One method of printing cards with gold colored portions, for example, is to print those portions which are to ultimately appear as gold with adhesive ink or like fluid, after which a suitable metal in the form of dust or powder is applied to the adhesive. The result of such printing is that considerable excess dust is left on the printed body. It is obviously desirable to remove this excess dust.

My invention comprises in general an apparatus wherein there are means for progressing cards, or the like, substantially positively in a given direction, and means acting on the cards or the like while they are being progressed, and in the opposite direction from such progression, to remove the excess dust from the cards.

The invention further comprises means, for acting in conjunction with the dust removing means and progressing means, to salvage the excess dust without allowing the same to spread about the room in which the apparatus is contained. It may be here mentioned that metallic dust, such as is used for the purposes mentioned, is in effect, poisonous when inhaled by people occupying the same room. Free dust of this character in the air has other deleterious effects which it is believed are obvious.

Further objects and features of my invention will become apparent from the following description relating to the accompanying drawings, wherein I show my preferred form. The essential characteristics are summarized in the claims.

In the drawings, Fig. 1 is a perspective view of a machine embodying my invention, and by which the process above discussed may be carried out; Fig. 2 is a side elevation of the machine showing the side opposite that shown in Fig. 1; Fig. 3 is a longitudinal cross sectional view through the machine, and Figs. 4 and 5 are transverse cross sectional views through the top portion of the machine, as indicated by the lines 4—4 and 5—5 on Fig. 3.

Referring in detail to the drawings, I show a suitable frame for the machine, comprising upright members 10 and 11 formed to support the more essential parts of the mechanism, to be described. These members 10 and 11 are positioned by transverse cross connecting members 12 and longitudinal connecting members 13. Surmounting and supported by the frame is a hollow box-like structure, a suitable form of which is illustrated in detail in Figs. 3 to 5, and which comprises a bottom wall 15, top wall 16, front and rear end walls 17 and 18 and side walls 19 and 20. Certain of these walls may be connected to the upright members 10 and 11, as where the members 10 are seen to overlie projecting ends of the side wall 19, the projecting ends being designated 19a and 19b. The side walls and end walls are made in upper and lower sections separate from each other, but which abut along a common horizontal plane to form a substantially airtight joint, except for apertures in the end walls, such as 20 and 21, which form inlet and outlet openings for the cards.

For convenience, the top portion of the box-like structure or casing will be designated C, and the lower portion D. The top portion of the casing C is movable relative to the lower portion D, the latter being stationary at all times. Such movement of the part C may be allowed, by reason of a hinged connection between the two parts, as by hinge members of any nature, including straps 22 (Figs. 1 and 2).

Positioned at the front end of the machine, i. e. to the left, as shown in Figs. 1 and 3, is a supplemental frame, comprising uprights 25 and cross members 26, which support a feed table T, on which the cards are placed prior to entering the box-like structure. This table comprises, as shown, an upwardly open channel-like construction, including a bottom wall 27, side walls 28 and an end wall 29. The

walls 27 and 28 are joined to the fixed portion of the casing section D by any suitable means.

Adjacent and forwardly of the feed table T is a supplemental feed table comprising, in effect, an extension 30. This, of course, has a suitable support, not illustrated. The top of the feed table T has a plurality of conveyor belts 31, suitably driven, as will be hereinafter described, by means of which cards from the table 30 are conveyed toward the opening 20 in the casing C—D, from which conveyer the cards pass into the bite of the first pair of a series of rollers 33 (see Figs. 3 and 4). All these rollers are driven in timed relation to each other and in a direction indicated by the arrows shown in Fig. 3. Obviously, assuming the cards are of a length such as shown at B (Fig. 3), the cards will always be in contact with a second pair of rollers 33, before leaving a former pair. The rollers 33 comprise a sub-series: four rollers forming such sub-series; two rollers being positioned on each side of a pair of cleaning rollers 35. There are four such pairs of cleaning rollers shown, but obviously any number of these cleaning rollers and corresponding sets of driving rollers may be used.

The construction of the driving rollers is shown best in Fig. 4, wherein these driving rollers have reduced spindle portions 40 engaging suitable bearings 41. As shown, these bearings are a common type of ball-bearing. Hence, these will not be described in detail. The construction of the spindles is such that the spindle on one end of each roller projects materially beyond the casing walls, as at 43, in order to carry suitable driving sprockets 44 and 45. The projecting portions of the spindle for the top roller 33 is at the right in Fig. 4 and carries its gear 44 above the plane of the card passing between the rollers; while the roller below this plane has its spindle projecting to carry the gear 45 at the opposite side of the casing. The sprockets 44 and 45 are driven by suitable sprocket chains, which will be hereinafter described in detail.

The supports for the bearings 41 comprise individual blocks slidably mounted in the respective side walls of the casing sections. As shown, there are upper blocks 46 for the uppermost bearings, and lower blocks 47 suitably guided and supported by the lower side walls 19 and 20, substantially in vertical alignment with the blocks 46. It is to be understood that any suitable guiding arrangement between the wall members 19 and 20 and the blocks 46 and 47 may be provided to allow vertical adjustment of both blocks with reference to their respective casing sections.

The lower blocks 47 are normally in fixed position with relation to the casing section D, but vertical adjustment is provided by reason of threaded studs 48 entering outstanding ears 49 on the blocks 47 and passing loosely through angle members 50 supported on the respective casing walls 19 and 20, suitable adjustment nuts being provided above and below the horizontal flanges of the members 50 as at 51. The upper bearing blocks 46 also have outstanding ears, designated 53, to which are threaded vertical studs or rods 54 which pass loosely through horizontal flanges on angle members 55 rigid with the respective uppermost walls 19 and 20. The rods are maintained in set position against downward movement by suitable nuts 56 above the horizontal flanges 55, but are constantly urged downwardly in a direction to carry the upper rods 33 toward the lower rolls, by reason of springs 57 surrounding the rods 54 and bearing at their opposite ends on the ears 53 and flanges 55.

The construction of the duster or cleaning rolls 35 is best shown in Fig. 5. In this figure, one of the rolls is partly broken away to show a metal shaft or core 60, passing through a series of laminations comprising the cleaning elements of the duster rolls. These laminations are preferably cloth loosely compressed between rings 62 and 65, the ring 62, shown in Fig. 5, being held on the shaft by reason of an enlargement or flange 64, and the ring 65 being adjustably forced against the adjacent cloth disk by a threaded portion 63 of the shaft 60. The ends of the shaft 60 are reduced and enter suitable bearings 67, similar to those described in connection with the bearings shown in Fig. 4. Furthermore, one of the shafts 60 has its spindle projecting materially beyond the casing wall as at 68 for carrying a sprocket 69, and the other shaft projects beyond the casing wall 19, as at 70 for carrying a sprocket 71. All the upper duster roll shafts project to one side of the casing, as at 68, and all the lower duster roll shafts project at the other side of the casing as at 70.

The bearing blocks 73 and 74 are in general built similar to the blocks 46 and 47, these being slidably mounted for vertical movement in the respective wall members 19 and 20, and being provided with adjusting studs or rods, designated 76 and 77. The upper block 73 has a spring 78 similar to the springs 57, previously described.

It will be apparent, without specific description, that the duster rolls may also be maintained in fixed vertical relation to each other, while constantly urged toward each other by the springs 78, thus maintaining the desired brushing pressure on the cards.

The driving arrangement for the card progressing and dusting rolls includes the sprockets, above described, which are all driven from a common source of power, this source being shown in Figs. 1 and 2 as an electric motor 80, suitably supported by the

cross connecting frame members 12. The driving shaft of the motor has a sprocket thereon at 81, which, by reason of a sprocket chain 82, drives a sprocket 83 rigid on a cross shaft 84 mounted in suitable bearings (not shown) in brackets 85, rigid with the frame. The shaft 84, in addition to the sprocket 83, has two driving sprockets 87 and 88. Suitably mounted on the movable section C of the casing is a shaft 90, carrying at one end a sprocket 91. This is connected by means of a suitable chain 92 to the sprocket 88. Inwardly from the sprocket 91 and drivingly rigid therewith is a driving sprocket (not shown) which drives a chain 92. The upper stretch of the chain is idle and moves toward the right, as shown in Fig. 1. The lower stretch of the chain passes first over one of the sprockets 44 of the card progressing roll, then under one of the sprockets 69 of the duster rolls, then over another progressing roll sprocket, and so on, so that it will be seen that the progressing rolls of the top section of the casing are positively driven in a direction to progress a card from the end of the casing adjacent the feed table to the other end of the casing, while at the same time the upper duster rolls are rotated in a direction tending to oppose such progression of the cards.

The lower progressing rolls are driven in a direction corresponding to the upper progressing rolls, namely, in the opposite direction, as will be presently shown; likewise, the lower duster rolls are driven in a direction corresponding to the upper duster rolls.

It will be noted that when the casing C is lifted as to the position shown in Fig. 2 for inspection of the various rolls, the driving connections are not disturbed, because the distance between the axes of the sprockets 88 and 91 is not materially changed.

The small sprocket 87 on the cross shaft 84 is the same size as the sprockets 88 and 91 which drive the chain 92; consequently, a chain driven by the chain 97 will travel at the same speed as the chain 92. Such a chain is indicated at 95. The upper or active stretch of this chain passes from right to left, as shown in Fig. 2 over the sprockets 45 of the progressing rolls and under the sprocket 71 of the duster rolls.

A suitable guiding idler for the chain 95 is shown at 96, and it will be assumed that there is a similar idler on the opposite side of the machine for the chain 92. This is not illustrated. It will be seen that each of the progressing rollers supported by the casing section D are rotated counter-clockwise, as shown in Fig. 2, to progress the cards in the proper direction while the duster rolls are oppositely rotated.

In addition to driving the various rollers described, the chains propel the card feeding belts 31 by reason of sprockets, one of which is shown at 97 in Fig. 2 as attached to and rigid with a shaft 98 (see Fig. 3) suitably adapted to drive the conveyor belts 31. The loops of the belts 31 opposite the driving shaft 98 are supported by an idler shaft 99 in suitable bearings on the feed table frame.

Assuming a stack of cards is positioned on the supplemental feed table 30, these may be fed by hand onto upper stretches of the belts 31, the initial feeding being aided by a free roller 100 mounted as on suitable leaf spring supports 101, which are in turn, attached to the feed table frame. The cards carried along the top of the belts enter the openings 20 through which they pass into the bite of the rollers 33. The rollers 33 progress the cards between and past the duster rollers and the cards are finally discharged through the discharge opening 21 in the casing onto a suitable receiving support (not shown). Such support may be carried on a pivoted frame member 105 (see Fig. 1) which is held in the desired position by means of a supporting bar 106 having adjustment teeth 107 coacting with one of the cross members 12 of the main frame.

It will be found that with a machine constructed in accordance with the above description and drawings, that cards containing a large amount of excess dust, having previously been printed with gold or other metal dust, will be very evenly and quickly cleaned of all such excess dust without smearing the printed card. As previously mentioned, I provide means for salvaging all the metallic dust brushed off the cards. The mechanism shown for accomplishing this is as follows:

Suitably mounted as on two of the cross members 12 of the main frame is a suction fan assembly, including a fan housing 110 and suitably supported fan 111. Mounted adjacent the housing and also carried on the supports 12 is an electric motor 112 suitably connected to the fan for driving the same. The fan housing intake is through an opening 115 in a hollow box-like structure 117, which at its upper end communicates as through a second hollow structure 118 with the interior of the casing section D. The structure 118 extends along the bottom wall 15 of the casing section D. One end of the structure 118 is attached to, and communicates with, a conduit 120 by means of a suitable elbow 121. The conduit 120 runs over the top of the casing section C as at 122, and is open therein on its underside. Since air is drawn through the box-like structure 117 and into the fan housing, it will thus be seen that the casing sections C and D are both evacuated.

The discharge connection 125 of the fan housing 110 communicates with the interior of a rectangular frame-like box 126 which

is closed on all four sides and on its front side as by an adapter 127, telescoping the fitting 125. A suitable dust bag is shown at 129 removably secured by a rectangular frame member 130. The dust bag 129 is of any suitable construction, such as fabric, which will allow the passage of air, but will collect and retain the loose dust.

From time to time it is desirable to remove any accumulation of dust from the bottom of the receptacle 27—29 below the feed table. For this purpose, I provide a conduit including an adapter 135 secured to the bottom wall 27 of the receptacle, to which is attached a tube 137, leading into the box-like structure 117. Any suitable damper arrangement, such as a slide plate 138, in a fitting 139 included in the tube 137 may serve to shut off air communication through the tube 137, which would otherwise considerably impair the effectiveness of the reclaiming system for the roller casing.

It is sometimes desirable to hold the casing sections C and D apart, as in Fig. 2, for inspection and replacement of the various rollers, particularly the duster rolls when worn, and for this reason, I may provide means to raise the upper casing and hold the same in position, as shown in Fig. 2. This comprises a frame 140 pivoted as on pins 141 to the top casing section and arranged to be swung down into the position shown in Fig. 2, in which position it is stopped by suitable projections 142. A suitable windlass arrangement is shown as comprising part of the frame 140, there being shown a rotatable shaft 145 provided with a ratchet-wheel 146, the latter coacting with a detent pawl 147. Attached to the shaft 145 is a suitable chain 148 anchored at one end to the lower part of the main frame. The shaft is also provided with a handle 150, by which the chain may be wound up on the shaft, to thus raise and hold the top casing section.

I claim:

1. In mechanism of the kind described, two pairs of cooperating blank feeding rolls, a pair of blank cleaning rolls, each positioned to act on a respective side of a blank while progressed by the feeding rolls, means to rotate said cleaning rolls and feeding rolls in opposite directions, and a suction casing formed of separate sections housing both the cleaning rolls and feeding rolls, said sections being movable relative to each other, and the rolls being supported in respective sections whereby movement of the sections separates the cooperating roll elements.

2. In mechanism of the kind described, means to progress cards or the like in a given direction along a given plane, said means comprising a pair of cooperating roll elements positioned on opposite sides of such plane, a pair of cooperating cleaning roll elements also positioned on respective sides of such plane, means forming a suction chamber about all of said rolls and comprising relatively movable sections, each supporting all the rolls which are on a respective side of such plane, means for driving the rolls carried by said sections, said means comprising a driving gearing for the rolls on one side of such plane, and separate driving gearing for the rolls on the opposite side of such plane, whereby the sections may be separated without disturbing the relation of the driving gearing to the respective rolls.

3. In mechanism of the kind described, a casing forming a suction chamber, said casing comprising separable sections, a plurality of blank feeding rolls and a plurality of blank cleaning rolls mounted within the casing, and means for driving the feeding and cleaning rolls in opposite directions, each of said sections having bearings for a cleaning roll and a feeding roll, and means connecting the sections arranged to permit said sections to be separated to expose the rolls.

4. Mechanism according to claim 3, wherein one of said rolls is supported in yielding bearings in one of the said sections, and the cooperating roll is supported in fixed bearings in the other section.

5. In mechanism of the kind described, a casing, upper and lower feeding rolls and upper and lower cleaning rolls in the casing for progressing and cleaning blanks while in the casing, a driving gearing on the casing drivingly connected with all of the rolls below the plane of the blank, and a driving gearing drivingly connected with all of the rolls above such plane for driving the upper rolls, there being means to guidingly support said upper rolls for bodily movement relative to the lower rolls, sufficient to expose both the upper and lower rolls for inspection, and power means drivingly associated with both said gearing.

6. In mechanism of the kind described, a suction chamber formed of separate casing sections, a plurality of blank feeding rolls and bearing supports therefor in one of said sections, a plurality of cooperating feeding rolls and bearing supports therefor in the other section, a pair of oppositely positioned cleaning rolls and bearing supports for each of said cleaning rolls in respective sections, gearing means on each section for driving all the rolls supported on such section, a common power mechanism drivingly connected to both driving gearing means, and means whereby the sections may be moved apart while maintaining said driving connections between the power mechanism and the two gearing means aforesaid.

7. In mechanism of the kind described, a suction casing formed of separable sections, blank progressing means and blank cleaning means, all enclosed within said casing, a frame for supporting said casing, suction

mechanism supported by the frame, and tubular means including a U-shaped tube, the arms of the tube being secured to respective casing sections and communicating therewith and forming a suction connection between both sections and the suction mechanism, said tube being formed in sections movable with respective casing sections, whereby the tube is substantially closed and continuous when the sections are together, and whereby the sections may be moved apart to permit inspection of the feeding and cleaning means.

8. In mechanism of the kind described, a suction chamber, blank feeding and blank cleaning means disposed within the chamber, a conveyor disposed exteriorly of the chamber, a dust collecting tray below said conveyor, the chamber having an opening adjacent the conveyor to receive blanks therefrom, suction producing means, including a conduit leading therefrom and communicating with the chamber, a second conduit leading from the suction producing means and communicating with the dust collecting tray, and means to periodically render the second conduit effective to remove dust from the tray.

9. In mechanism of the kind described, a casing comprising an upper section and a lower section, pairs of blank feeding rolls mounted in the upper section, cooperating pairs of blank feeding rolls mounted in the lower section, cleaning rolls mounted in each section, said cleaning rolls being substantially parallel to the feeding rolls and located between the same, separate driving gearings for the rolls in the upper and lower sections, respectively, each driving gearing comprising a chain and sprockets, there being a sprocket on each roll and each chain passing on one side of a feeding roll sprocket and on the other side of a cleaning roll sprocket, whereby the feeding and cleaning rolls are driven in opposite directions and the sections may be separated without disturbing the driving relation of the gearings and rolls driven thereby.

10. In mechanism of the kind described, a casing forming a suction chamber, said casing comprising separable sections, a plurality of blank feeding rolls and a plurality of blank cleaning rolls mounted within each section, bearings in each section for mounting said rolls, some of the bearings being yieldably mounted, means for driving the feeding and cleaning rolls in opposite directions, and additional means connecting the sections arranged to permit said sections to be separated to expose the rolls.

11. In mechanism of the kind described, a suction chamber having a plurality of openings therein, blank feeding and blank cleaning members disposed within the chamber, a conveyor disposed exteriorly of the chamber, said conveyor being so placed that it will feed blanks through an opening in such chamber, and between said blank feeding and blank cleaning members, respectively, a dust collecting tray below said conveyor, suction producing means, including a conduit leading therefrom and communicating with the chamber, a second conduit leading from the suction chamber and communicating with the dust collecting tray.

In testimony whereof, I hereunto affix my signature.

EDWARD J. FERNEDING.