C. W. EARLE.

MACHINE FOR PRINTING AND COATING PHOTOGRAPHIC POSTAL CARDS.

APPLICATION FILED SEPT. 21, 1908.

992,345. Patented May 16, 1911.

4 SHEETS—SHEET 1.

Fig. 1.

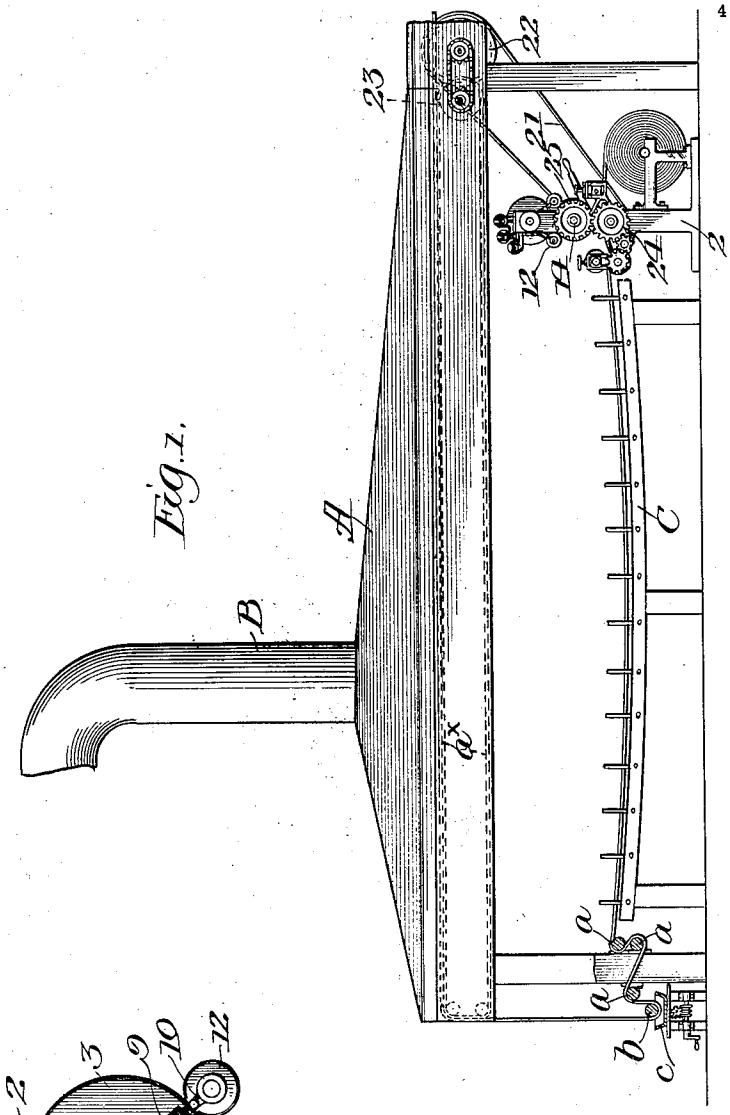


Fig. 7.

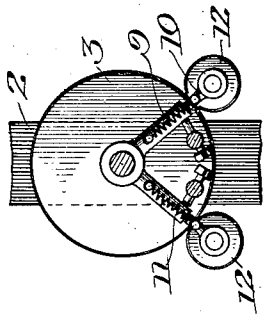
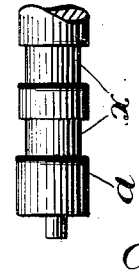


Fig. 8.



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4 SHEETS—SHEET 2.

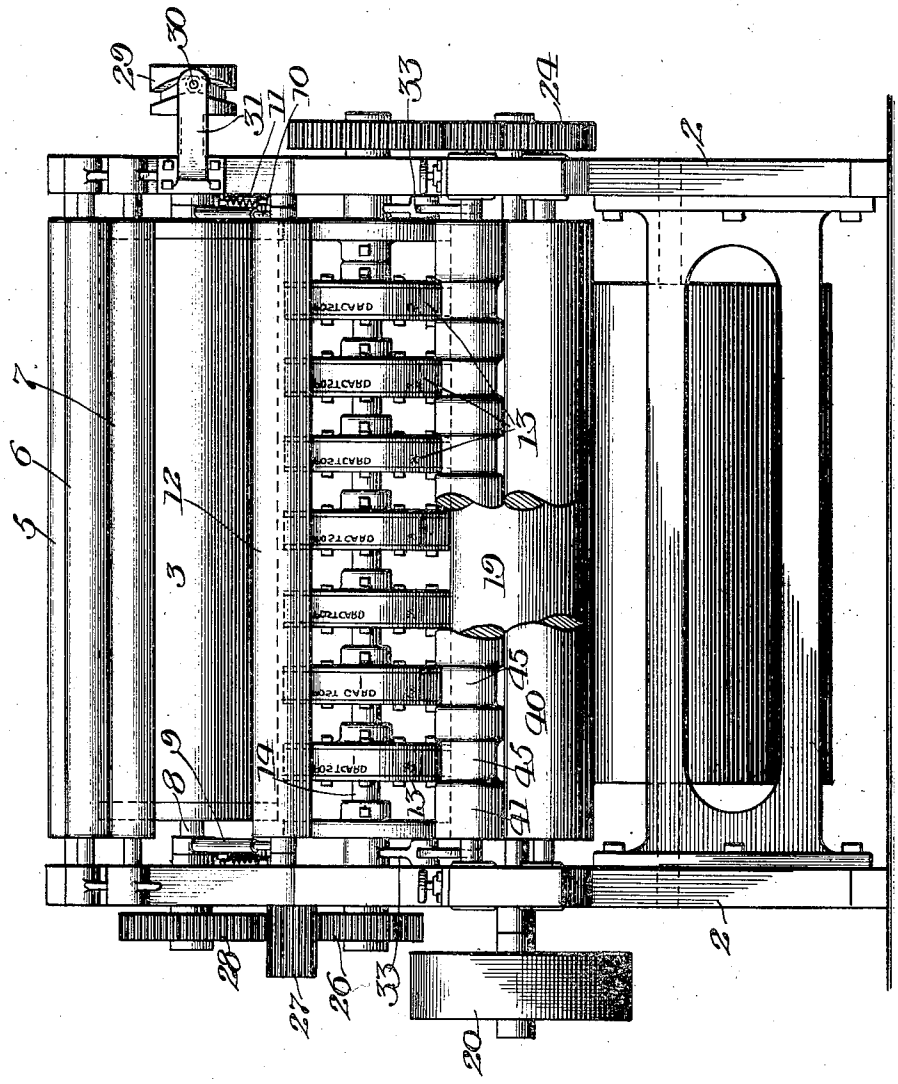

Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 5.

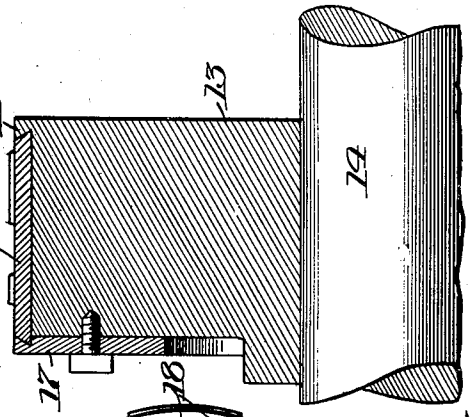

Fig. 6.

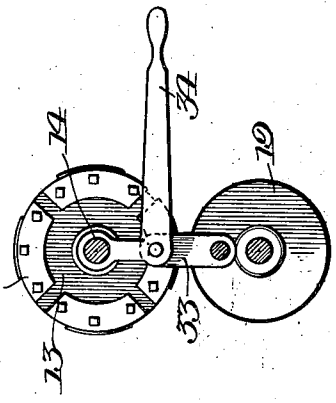

Fig. 4.

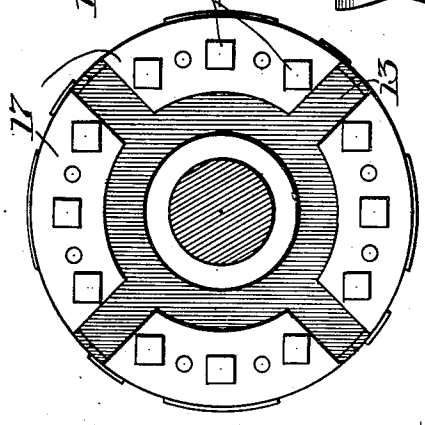

Fig. 3.

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4 SHEETS—SHEET 4.

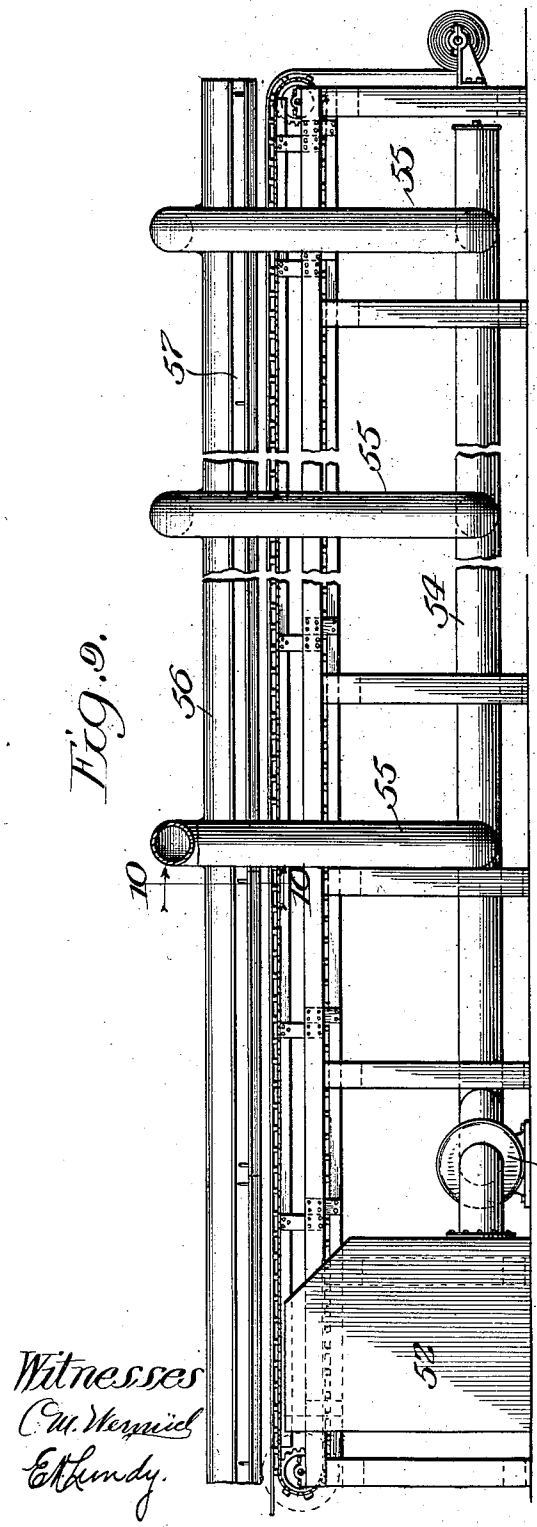

Fig. 9.

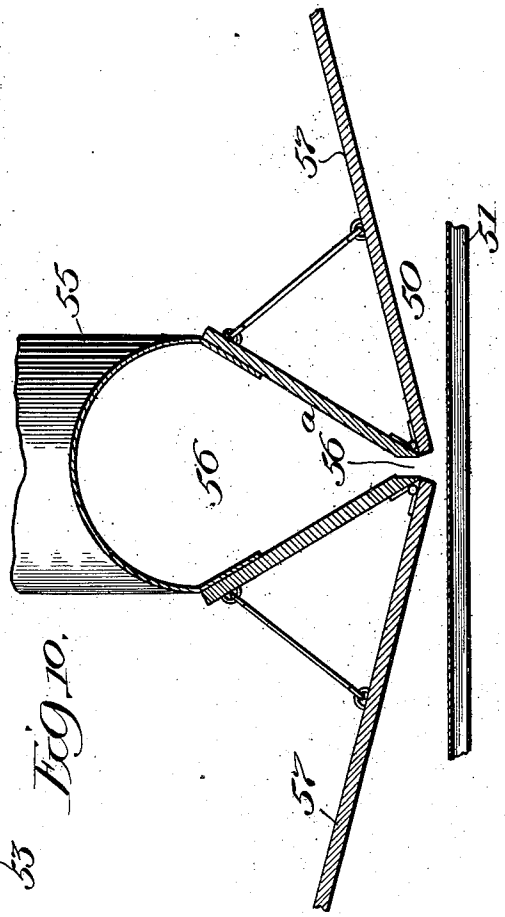

Fig. 10.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR PRINTING AND COATING PHOTOGRAPHIC POSTAL CARDS.

992,345. Specification of Letters Patent. Patented May 16, 1911.

Application filed September 21, 1908. Serial No. 453,969.

To all whom it may concern:

Be it known that I, CHARLES W. EARLE, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Printing and Coating Photographic Postal Cards, of which the following is a clear, full, and exact description.

My invention relates to machines for printing and coating photographic postal cards.

Heretofore it has been customary to first coat the heavy paper used for postal cards with a suitable emulsion; then "set" the emulsion by subjecting the same to a low temperature; then dry the same with a high temperature, and then cut the coated paper into postal card sizes, after which they are printed on job presses. This method not only consumes considerable time, but, by reason of the subsequent necessary handling, increases the liability of the cards becoming soiled, and the liability of the coating being injured by the moisture of the hands, and the lines of the printing showing through the card and cracking or fracturing the coating, and contribute to the general deterioration of the cards.

The object of my invention is to avoid all of these objections, and to enable the coating to be evenly spread over the card, and the printing ink to dry at the same time as the coating, and by reason of these advantages to almost double the output. This I accomplish by the means hereinafter fully described, and as particularly pointed out in the claims.

In the drawings:—Figure 1 is a side elevation of a portion of a photographic emulsion coating machine having my invention embodied therein and applied thereto. Fig. 2 is a front elevation of the printing mechanism of my invention. Fig. 3 is a side elevation of the same. Fig. 4 is a side view, on a slightly larger scale, of one of the type disks of said machine. Fig. 5 is a transverse section through a fragmentary portion of the same, drawn to a larger scale. Fig. 6 is a side view of the type disks and impression roller and shafts therefore removed from the machine. Fig. 7 is a similar view of the end of the ink-roller and distribution rollers therefor. Fig. 8 is a vertical front elevation of an end of one of the recessed rollers used for tightening the strip of paper. Fig. 9 is a vertical side elevation of the drying chamber, the structure being broken away at the end nearest the portion of the mechanism shown in Fig. 1.* Fig. 10 is a transverse vertical section thereof taken on line 10—10 Fig. 9 and drawn to a greatly enlarged scale.

My invention comprises, principally, the combination of a photographic emulsion coating machine, and a printing press, both of which are modified in several particulars to better enable them to accomplish the objects in view.

Heretofore the paper was fed to the coating devices of the coating machine direct from a continuous roll of paper, and from the coating devices the paper pursued a vertical course for a short distance and then horizontally into an inclosed chamber A, in which, as the paper was slowly carried by a suitable apron toward the ends of the machine farthest from the coating devices, it was subjected to a cold atmosphere, discharged into the top of said chamber A through a pipe B, substantially as shown in Fig. 1 of the drawings, and by means of which the coating was "set". The coating devices referred to consisted of a series of idle rollers *a*, *a*, which tighten up the paper, and an immersing roller *b* down around which the paper passes, after it leaves the last roller *a*, and is coated by dipping into a liquid emulsion contained in a suitable pan *c*. After this coating is applied, the paper passes vertically to and around a suitable guide roller into the cold air chamber A and it is "set" on the paper while passing through said chamber, after which the paper passes through a warm air chamber (Figs. 9 and 10) by means of which it is thoroughly dried.

It makes very little, if any, difference so far as the operation of the old coating machine was concerned, whether the paper, after it left the roll, was kept in a well defined path or not, but in my invention, I consider this very essential, particularly as it is desired that the moist printed surfaces of the paper should always run in the circumferential grooves or transverse corruga-

tions or depressions x of the rollers a, a, and b, and thus avoid smearing the ink over the paper, and, it is also an object of my invention to give a long sweep to the paper between the supply roller and roller a so that the vibrations imparted to said paper, while in transit through the printing machine will not affect nor prevent the steady continuous movement of the paper around the roller c, while being coated. I accomplish this guidance of the paper by means of a comparatively low frame consisting of parallel rails C, arranged so that one will be on one side of the path of the slack paper between the printing machine and roller a, and the other on the other side, and supported by suitable legs. These rails are provided with a series of equidistant upwardly projecting arms against which the edges of the paper come in contact as it moves along. These arms have their lower ends bent horizontally outward, and extended sidewise through openings in rails C, in which they can be made adjustable by means of set-screws or otherwise, to enable said arms to give the desired direction to the paper. At the end of frame C farthest from the coating device, a printing press takes the paper direct from the roll, and the length of the stretch of paper between this printing mechanism and said coating device is such that the paper hangs slack and sags so that any vibration imparted to the paper while in transit through the press will be absorbed before it reaches the roll a.

The printing mechanism referred to comprises two side-frames 2, 2, each consisting of a vertical standard or upright portion which are provided, near their upper ends, with bearings for the journals of the shaft 8 of an inking-roller 3. At their upper ends these standards are provided with brackets 4, the screw-plate of which is bolted or otherwise attached to said side-frames, and have two or three arms projecting therefrom whose extremities are provided with open bearings for the journals of the ink-distributing rollers 5, 6 and 7, that bear against the cylindrical surface of the roller 3. Next its bearings, shaft 8 has the bosses of a couple of arms 9 loosely mounted thereon, the outer ends of which are made tubular and have pistons or extensions 10 telescoping into their outer ends, and held in engagement therewith by contraction springs 11, one end of which latter is secured to a pin attached to the extension, and the other end to a pin projecting from the arm. The extremities of the extensions 10 are provided with bearings for the journals of the idle inking-rollers 12, 12, that are adapted to take ink from the roller 3 and transmit it to the series of metallic printing disks 13.

Disks 13 are mounted upon a shaft 14, which is journaled in suitable bearings in the side-frames, and the width of these disks is such that a series of them can be mounted on the shaft between its bearings. These disks are of a suitable diameter, and are each provided with a central boss for the accommodation of a set-screw, by means of which they can be adjustable longitudinally on shaft 14, and also moved to their proper circumferential position, and immovably secured to the shaft. The edge of the cylindrical circumference of each disk farthest from the side from which their bosses are shown to project, is provided with a circumferential flange 15, whose inner side is undercut, and the stereotype or electrotype plate 16 is secured upon the cylindrical circumference of the disk between flange 15 and the outer edge of segmental plate 17, the inner surfaces of which latter are provided with undercut grooves into which the beveled edge of plates 16 enters and clamped by tightening plates 17 in place by set-screws 18, tapped through the same into the side of the disk. These printing disks engage an impression roller 19, the circumference of which is smooth from end to end. This impression-roller is substantially the same as the impression-roller of any web-perfecting press, and at one end its journal extends through its bearing in the side-frame and is provided with a suitable pulley 20, by means of which said shaft is driven through the medium of a belt 21, that takes its motion from a pulley 22 on the end of a transverse shaft having bearings in the ends of the longitudinally elongated cold air chamber A, which latter derives motion by a sprocket and chain connection with the shaft of the adjacent drum 23 around which apron a^x travels.

The journal of the impression-roller 19 opposite pulley 20 extends through its bearings and is provided with a gear 24, which engages and drives a suitable gear 25 upon the adjacent end of shaft 14 of the printing disks, and the latter, at its opposite end has a gear 26 secured to its extended end which engages an idle barrel-gear 27 that imparts motion to shaft 8 through the medium of a gear 28. The end of shaft 8, opposite gear 28, extends through its bearings a suitable distance and has secured thereto a cam 29, that has a transversely disposed zigzag groove or runway therein, which is engaged by a stationary pin 30 projecting transversely from the end of the curved arm of a bracket 31, whose supporting-plate is suitably secured to and mounted upon the adjacent side-frame 2. As roller 3 revolves the engagement of the cam 29 with the pin 30 causes shaft 8 and the ink roller to have a longitudinally reciprocal motion, and idle-gear 27 is made barrel-shaped to accommodate this side motion of gear 28.

The bearings of the journals of shaft 14

are made in bearing-blocks 32 that have a slight vertical movement in suitable openings made in the side-frames. Normally disks 13 will bear down upon the circumference of the impression-roller 19, but when it is desired either to pad the circumference of said roller, 19, or to remove the stereotype or electrotype plates from the circumference of the disks, it is desirable to lift said disks and shaft 14 bodily. This I accomplish by the means of toggle-joints 33, the ends of the lower links of which are pivotally connected to the inner surfaces of the side-frames 2 above the bearings of the journals of the impression-roller, and the upper links have bosses at their upper ends which are loosely mounted on shaft 14, and have handles 34 projecting at right angles from the end thereof articulating with the lower links. When handles 34 of these toggle-joints are depressed, as shown in Fig. 6 of the drawings, shaft 14 and disks 13 are lifted out of engagement with the impression-roller, and when said handles are raised, as shown in Fig. 3, the disks are lifted into engagement with the impression roller. The cogs of gears 24 and 25 are, preferably, made longer than shaft 8 so as to permit of the separation of the disks from the impression-roller without getting out of mesh.

The journals of the roll of paper 35 are mounted in open bearings located near the ends of the horizontal member and near the angles of inverted L-shaped frames 36, whose extremities are secured in suitable manner to the basal flange and the adjacent edge of the side-frame 2. As it unrolls the web of paper passes to and around an idle-roller 37 journaled in vertically disposed bearing-blocks 38, which latter are suitably mounted in openings in the ends of a bracket 39, projecting from the adjacent edge of the side-frames, 2. From this roller the web of paper pursues an upward course to and over the impression-roller, and between the same and the printing-disks, and then extends in slightly downward direction to and between idle-rollers 40 and 41 that are journaled in bearing-blocks located one above the other in a suitable vertical opening in the end of brackets 42, projecting from the edge of the side-frames 2 opposite that from which brackets 39 project. The lower of these two idle-rollers 40, has a pinion 43 secured to the extended end of its journal adjacent to gear 24, and is connected to and driven by the latter through the medium of an idle pinion 44.

When passing between the printing-disks and the impression-roller the upper surface of the paper will be printed upon, so, in order to avoid the possibility of the fresh ink being smeared or blurred by its passage between rollers 40 and 41, I provide the upper roller 41 with a series of circumferential grooves or transverse corrugations 45 in the same transverse plane as disks 13, the width of which corresponds to the width of the stereotype or electrotype plates by which the printing is accomplished. After passing through the cold air chamber for "setting" the emulsion, etc., the paper continues its course to and through the drier or warm air chamber hereinbefore mentioned. This drying apparatus comprises an elongated compartment 50 through which the paper is conveyed on an endless apron 51 that moves at the same speed as apron a^x in the cold air chamber A. The warm air is fanned from a heat generator 52 near one end of the chamber by means of a blower 53 and is sent through a main flue 54 and distributed at various points throughout the length thereof by branch-pipes 55. These branch-pipes arise to the height of the chamber where they are turned laterally and enter the longitudinally disposed feed trough 56 which latter has a narrow opening 56^a in its bottom toward which the side walls of said trough converge. This opening is close to the upper surface of the paper and directs a current of warm air against the central portion of the same, which current is distributed to either side by the adjustable plates or wings 57 hinged to the lower edges of the trough. After passing through this warm air chamber the paper becomes thoroughly dried and is then conveniently wound in a roll at the outer end of the chamber.

The operation of the mechanism involved in my invention has been set forth in the foregoing description, and it is sufficient to say in conclusion that by means of this mechanism the operation of the machine is greatly facilitated; the printing of the card in no way affects the coating of the same for when the freshly coated paper leaves the dipping pan and travels vertically the emulsion spreads evenly over the surface opposite the printed side, and when the emulsion is "set," in transit through the cold air chamber, the coated surface will be even and unaffected by the printing striking through. Both the printing and the coating are dried at the same time, and the output, both as to quality and quantity, is greatly improved.

What I claim as new is:—

1. In a machine of the kind specified, a printing mechanism, a coating mechanism for applying emulsion to the material being treated, a cold air chamber and a drying chamber through which the material being treated is passed, and said emulsion then set and dried.

2. In a machine of the kind specified, a printing mechanism, a coating mechanism removed such a distance that the material being treated will sag between it and said printing mechanism, a cold air-chamber and a drying chamber by which the material is

first printed on one side, then coated with a photographic emulsion on the other, and said emulsion then dried.

3. In a machine of the kind specified, a printing mechanism, a coating mechanism between which and said printing mechanism the material being treated sags, and means for directing the course of the sagging material, a cold air chamber and a drying chamber, by which the material is first printed on one side, then coated with a photographic emulsion on the other, and said emulsion then dried.

4. In a machine of the kind specified, a printing mechanism having transversely corrugated rolls, a coating mechanism having transversely corrugated rolls, a cold air chamber, and a drying chamber, the material being treated being successively printed upon, then coated with emulsion, and said emulsion then dried.

5. In a machine of the kind specified, a printing mechanism having transversely corrugated rolls, a coating mechanism having corrugated rolls between which and said printing mechanism the material being treated sags, means for directing the course of said sagging paper, a cold air chamber, and a drying chamber, the material being successively printed upon, then coated with emulsion, and said emulsion then dried.

6. In a machine of the kind specified, a printing mechanism comprising a series of printing disks, an impression roller, and a transversely corrugated guide-roller, a coating machine having a corrugated roller, a cold air chamber and a drying chamber, the material being treated being successively printed upon, then coated with emulsion, and said emulsion then dried.

7. In a machine of the kind specified, a printing mechanism comprising a series of printing disks, and an impression roller, a coating machine, a cold air chamber and a drying chamber, the material being treated being successively printed upon, then coated with emulsion, and said emulsion then dried.

8. In a machine of the kind specified, a printing mechanism comprising a series of printing disks, an impression roller, and a transversely corrugated guide-roller, and a coating machine having a corrugated guide-roller, between which and said printing mechanism the material being treated sags, means for directing the course of the sagging material, a cold air chamber and a drying chamber, said paper being successively printed upon, then coated with emulsion, and said emulsion then dried.

9. In a machine of the kind specified, a printing mechanism comprising a series of transversely adjustable printing disks, an impression roller, and a transversely corrugated guide-roller, and a coating mechanism having a corrugated guide-roller, between which and said printing mechanism the material being treated sags, means for directing the course of the sagging material, a cold air chamber, and a drying chamber, said paper being successively printed upon, then coated with emulsion, and said emulsion then dried.

10. In a machine of the kind specified, a printing mechanism comprising a series of transversely adjustable printing disks, an impression roller, and a transversely corrugated guide-roller, and a coating mechanism having a corrugated guide-roller, a cold air chamber, and a drying chamber, the material being treated being successively printed upon, then coated with emulsion, and said emulsion then dried.

11. In a machine of the kind specified, a printing mechanism comprising a series of printing disks each consisting of a solid disk one of the outer circumferential edges of which is provided with a circumferential undercut flange, and clamping-plates which bear against and are secured to the side of the disk opposite said flange, the outer edges of which opposed to said flange being undercut, coating mechanism, a cold air chamber, and a drying chamber, the material being treated being successively printed upon, coated, and said coating set, and dried.

12. A process of making photographic postal cards, consisting of first printing on one side of a continuous roll of suitable paper, then coating the opposite side of the same, then setting said coating, and finally completing the drying of said coating and printed matter simultaneously.

13. The process of manufacturing photographic postal cards consisting of first printing on one side of a continuous roll of suitable paper, then coating the other side thereof, then moving said paper vertically from the coating mechanism, then setting said coating and then simultaneously completing the drying of the coating and printed matter.

14. In a machine of the kind specified, a printing mechanism, coating mechanism, a guide-roll placed above said coating mechanism, a horizontally disposed cold air chamber, and a hot air chamber, the material treated being first printed upon, then coated with emulsion, then moved vertically to and over said guide-roller, the emulsion subjected to the cold air to set the coating, and then dried.

15. In a machine of the kind specified, printing mechanism having a transversely corrugated guide-roller, coating mechanism including transversely corrugated guide-rollers, a transversely corrugated guide-roller placed above and adjacent said coating mechanism, a cold air chamber and a drying chamber, the material treated being successively printed on one side there-

of, coated on the other side of the same, then its coating evenly distributed by being moved vertically to and over the superimposed guide roller, then set, and then dried simultaneously with the printed matter.

16. In a machine of the kind specified, a printing mechanism comprising a series of independent printing disks, an impression roller, and a transversely corrugated guide-roller, coating mechanism including transversely corrugated guide-rollers, a transversely corrugated guide roller placed above and adjacent said coating mechanism, a cold air chamber and a drying chamber, the material treated being successively printed on one side thereof, coated on the other side of the same, then its coating evenly distributed by being moved vertically to and over the superimposed guide-roller, then set, and then dried simultaneously with the printed matter.

In testimony whereof I have hereunto set my hand and seal this 16th day of June, A. D., 1908.

CHARLES W. EARLE. [L. S.]

Witnesses:

FRANK D. THOMASON,

E. K. LUNDY.