V. CHARTENER.

SHEET EMBOSSING MILL.

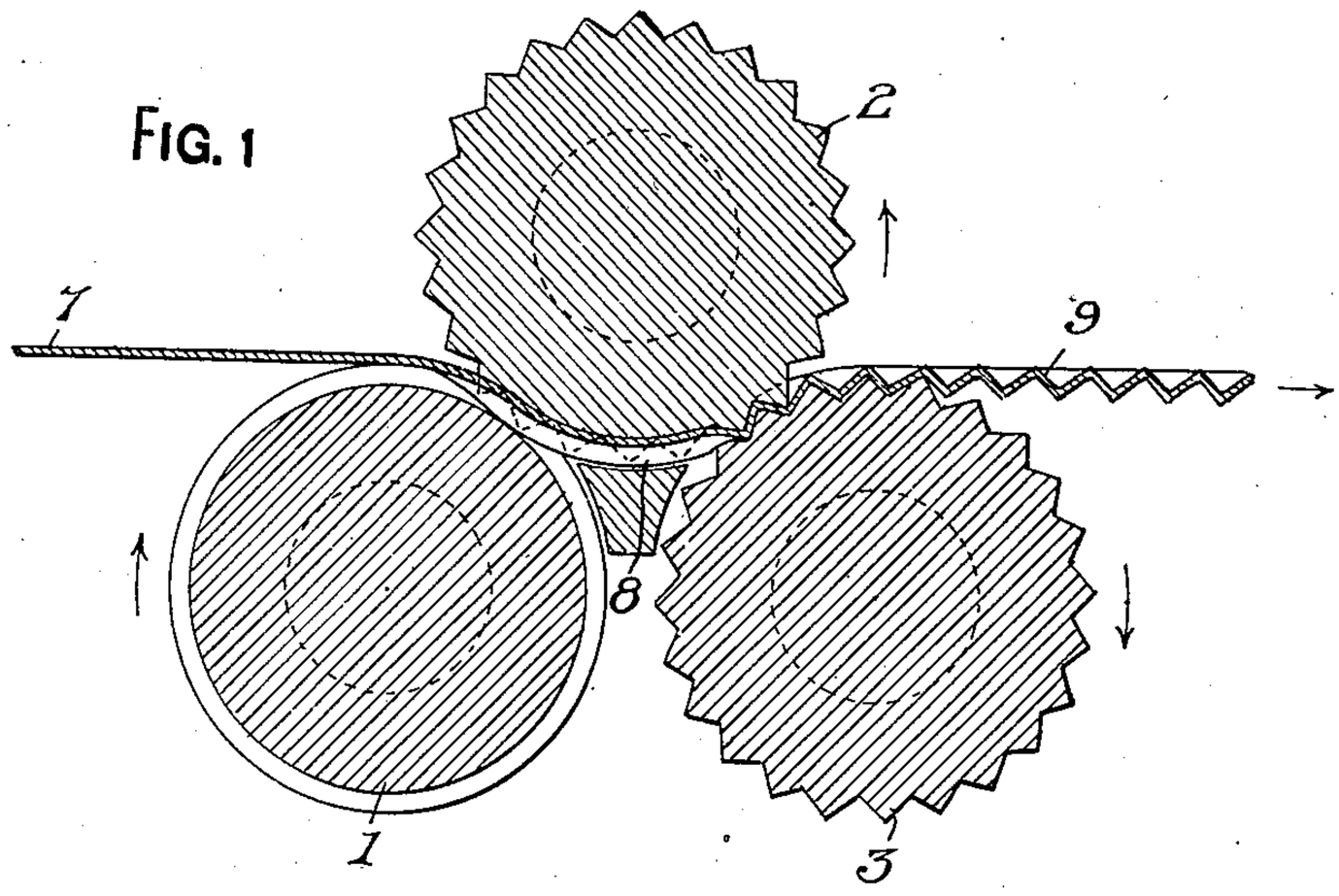
APPLICATION FILED NOV. 1, 1909.

969,460.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.

FIG. 1



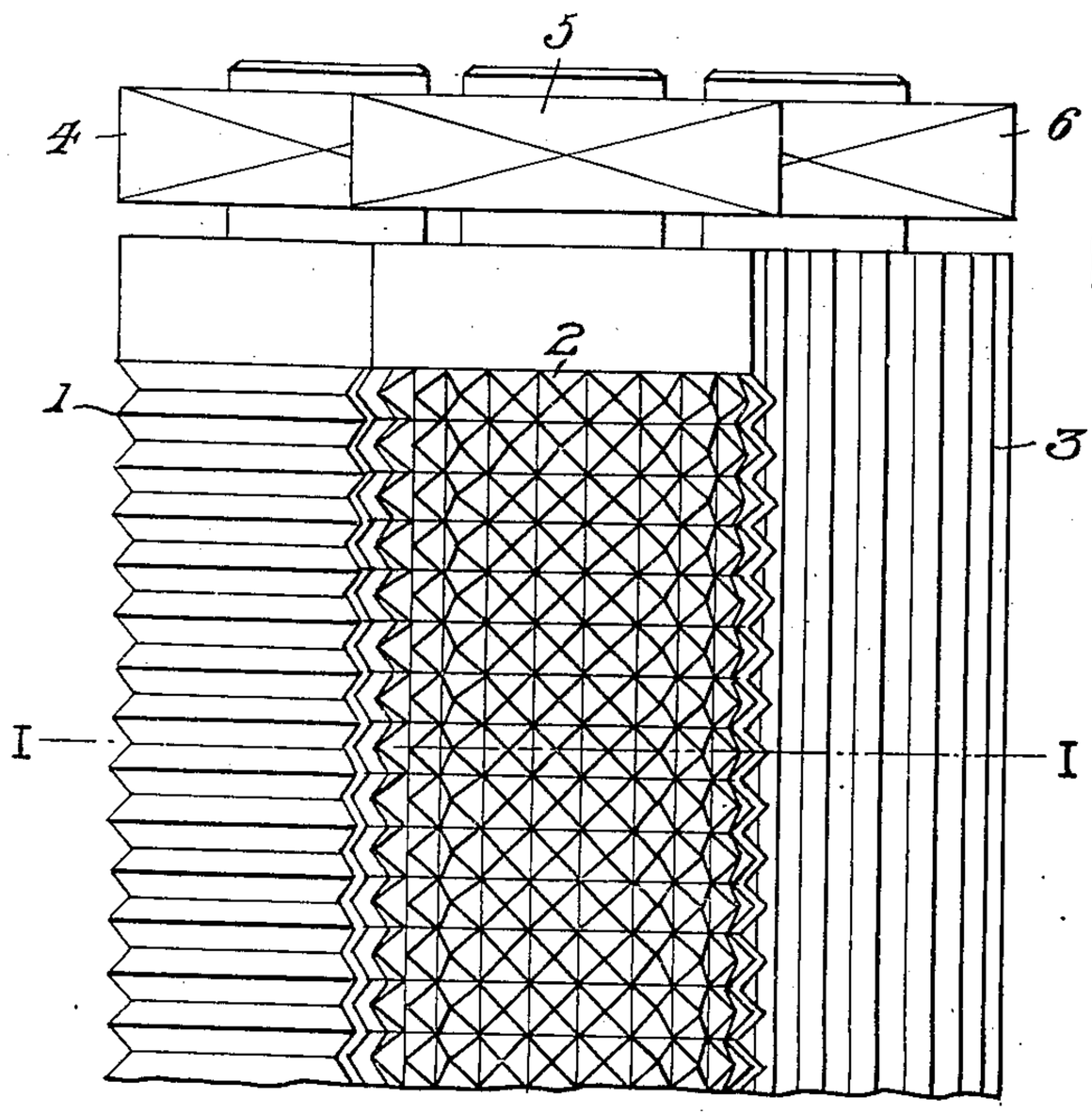
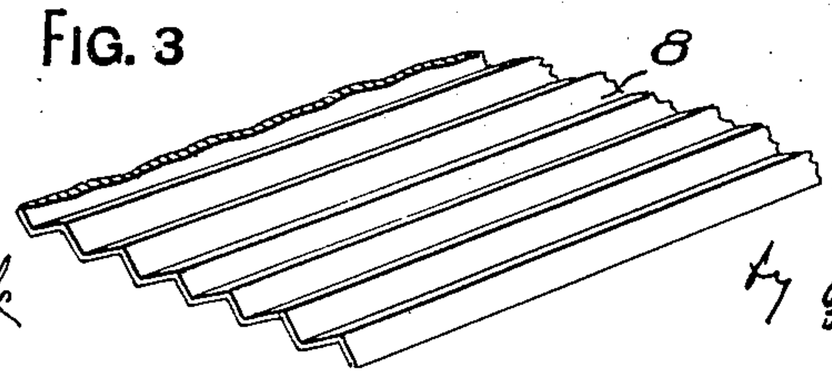


FIG. 2

FIG. 3



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2 SHEETS—SHEET 2.

FIG. 4

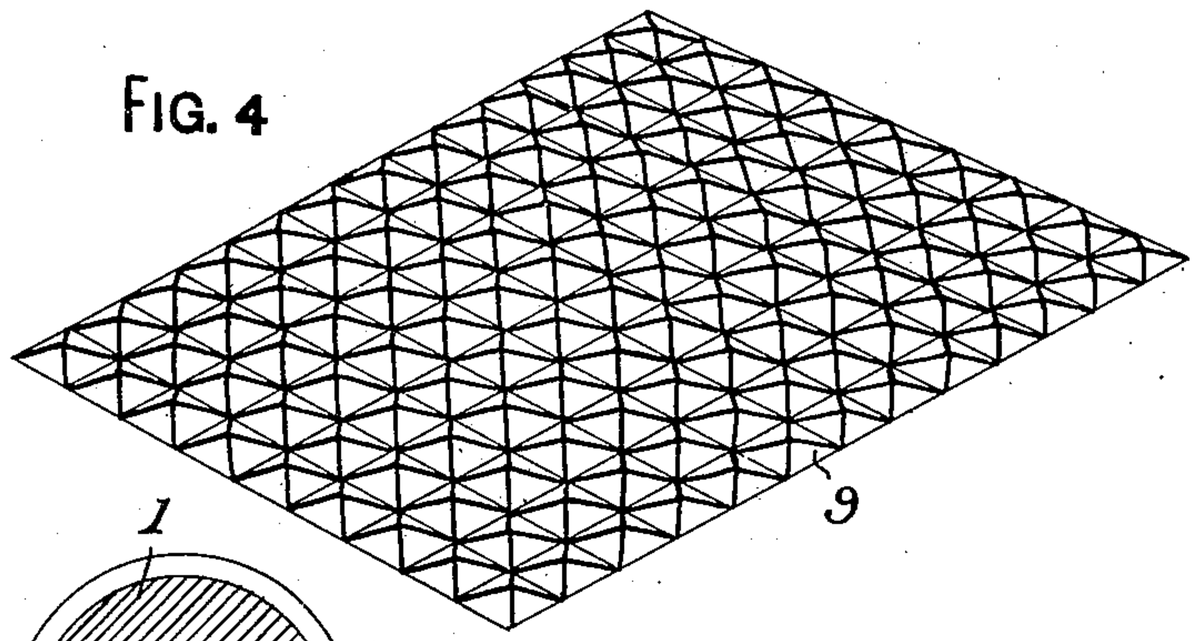


FIG. 5

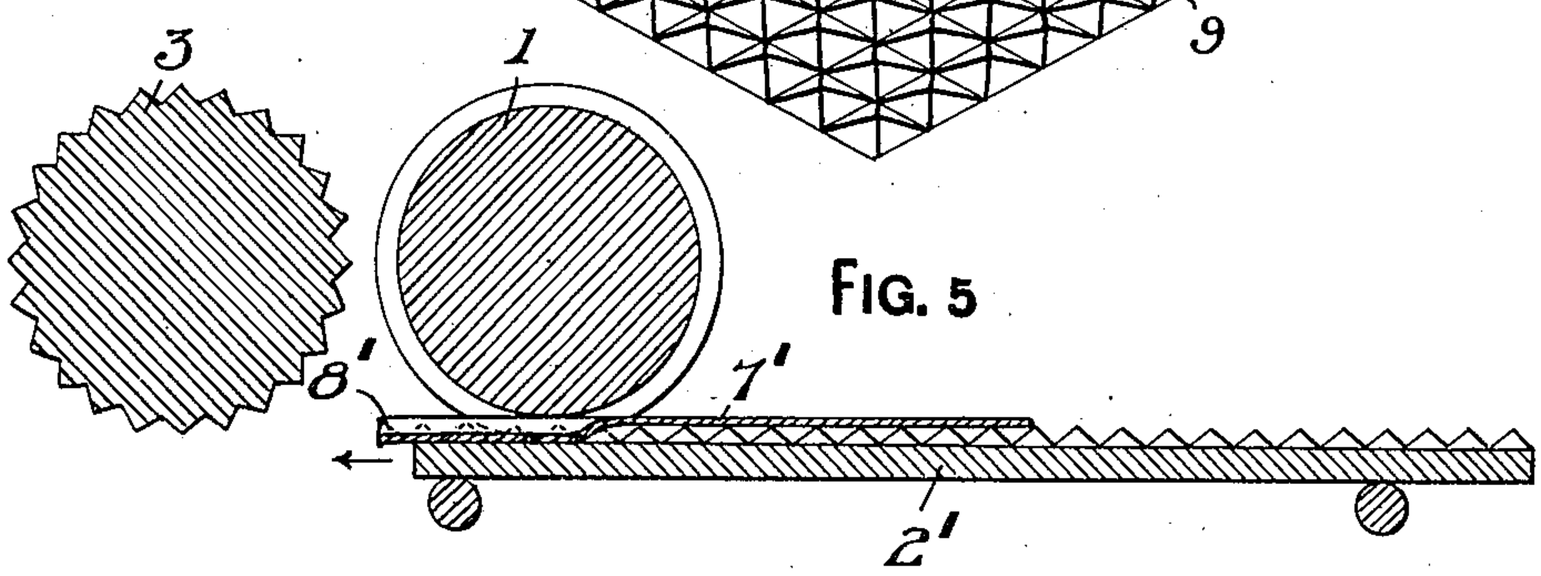


FIG. 6

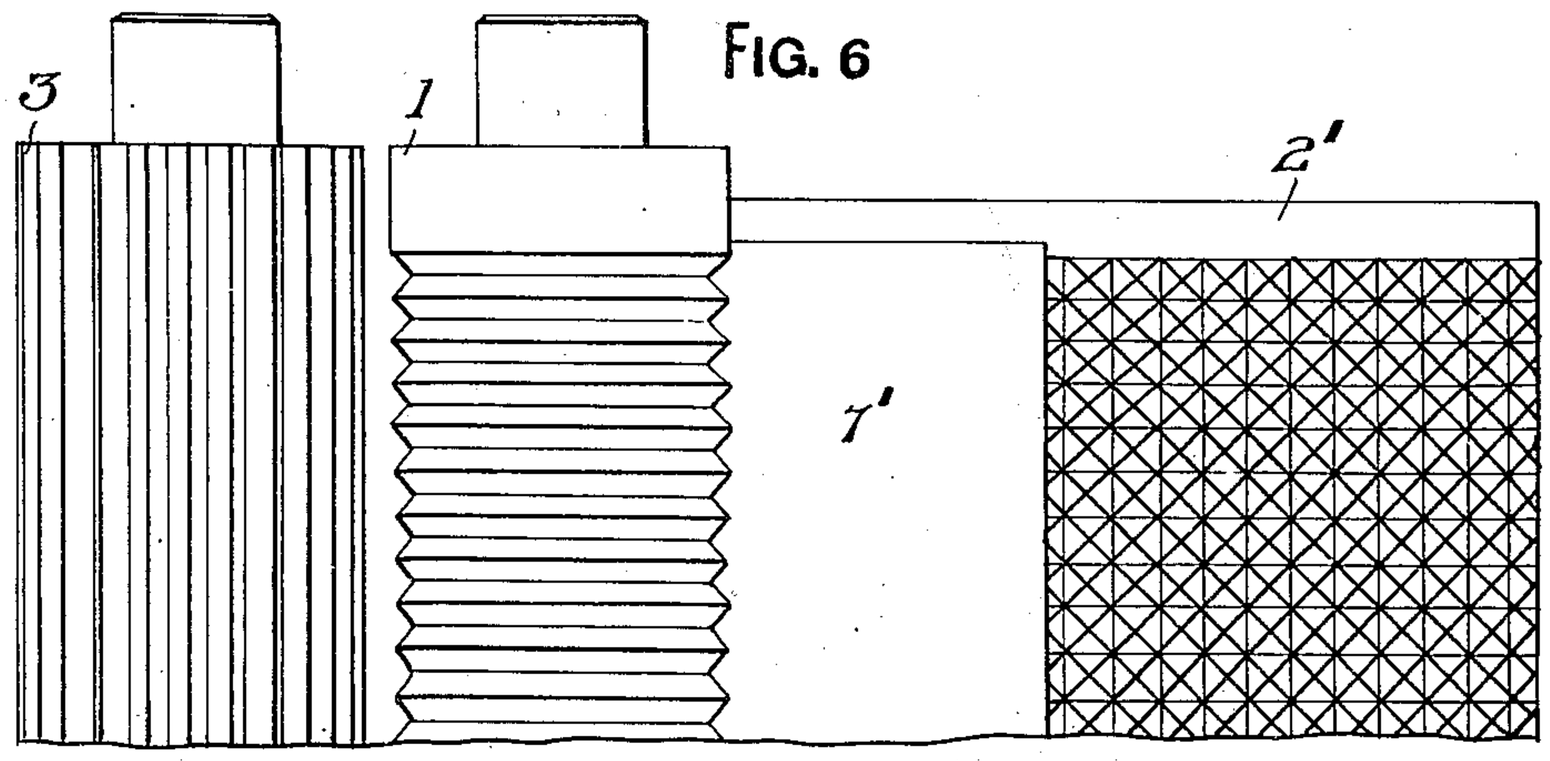
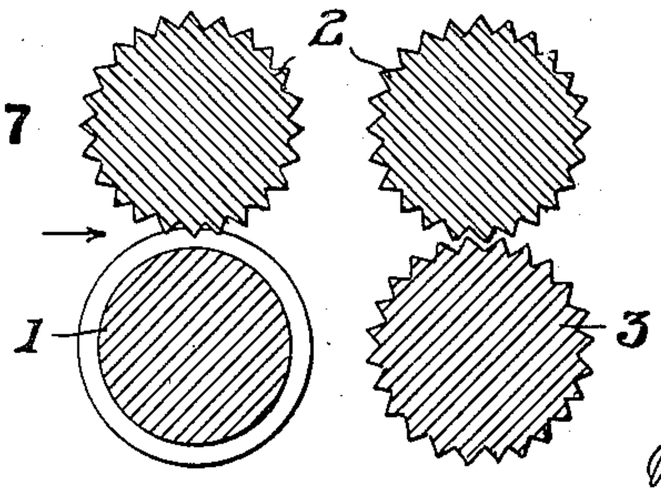


FIG. 7



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SHEET-EMBOSSING MILL.

969,460. Specification of Letters Patent. Patented Sept. 6, 1910.

Application filed November 1, 1909. Serial No. 525,704.

To all whom it may concern:

Be it known that I, VICTOR CHARTENER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Sheet-Embossing Mills, of which the following is a specification.

My invention relates to machines for producing embossed sheets of various designs from metal, rubber, colloid, paper, or other material. Its object is to produce sheets with desired embossed surfaces or to provide sheets with such surfaces.

It has been found very difficult hitherto to emboss sheet metal with a checker-work of pyramidal or analogous projections. By my improvements I am able to make such projections with perfect surfaces and without injury to the sheets.

I do not restrict myself to the treatment of metal sheets, as obviously, I may emboss sheets composed of various substances; in fact, I can take plastic colloid, or analogous substances and form therefrom embossed sheets.

Referring to the accompanying drawings, Figure 1 is a vertical cross-section of three rolls arranged and constructed to form a plain sheet into one having rows of pyramidal bosses, the housings and driving apparatus being omitted; Fig. 2, a plan of Fig. 1, showing the rolls intergeared; Fig. 3, a perspective of a sheet when acted on by the rolls 1 and 2 only; Fig. 4, a perspective of a finished sheet as it appears after passing through the rolls 1 and 2, and 2 and 3; Fig. 5, a vertical section showing Fig. 1 inverted, and a platen substituted for the roll 2; Fig. 6, a plan of Fig. 5; and Fig. 7, a section similar to Fig. 1, but with the roll 2 duplicated, the roll 2 coöperating first with the roll 1 and then, by exchange of rolls, with the roll 3.

Referring first to Figs. 1 to 4, 1 designates a roll provided with annular parallel V-shaped corrugations or with alternate annular V-shaped parallel grooves and ridges at right angles to the axis of the roll.

2 is a roll which may be considered to be corrugated both longitudinally and transversely, the square areas formed by the two series of corrugations having their sides tapered to a point so as to constitute pyramids. The roll 2 may be described as having its surface provided with pyramidal bosses arranged in straight rows parallel with the axis of the roll and also in annular rows at right angles to the said axis.

3 is a roll provided with V-shaped corrugations, or V-shaped grooves and ridges parallel with each other and the axis of the roll.

The rolls 1, 2, and 3 are arranged, as viewed in cross-section (Fig. 1), with their axes at the three corners of a triangle, the roll 2 being at the upper angle, and the two rolls 1 and 3 having their axes in the same horizontal plane and at the other two corners of the triangle. The axis of the roll 2 is parallel with the axes of the rolls 1 and 3.

The rolls 1 and 2 have the annular grooves and ridges of the one coöperating with the annular ridges and grooves, respectively, of the other. The rolls 2 and 3 have the longitudinal grooves and ridges of the one cooperating with the longitudinal ridges and grooves, respectively, of the other.

The direction of rotation of the rolls is shown by the arrows on Fig. 1. On Fig. 2, I have shown the roll 1 provided with the spur-gear 4 which meshes with the spur-gear 5 on the roll 2, the latter spur-gear meshing with the spur-gear 6 on the roll 3.

The sheets are usually made of thin material which may readily be bent by slight hand pressure to take the position shown to the right of the rolls on Fig. 1, but the sheet may issue at any angle from the rolls without departing from the principles of my invention.

7 represents a sheet having the portion 8 formed with longitudinal corrugations, as shown in Fig. 3 and the portion 9 with the pyramidal bosses, as shown in Fig. 4. The portion 8 is formed between the rolls 1 and 2; and the portion 9, between the rolls 2 and 3, as shown in Fig. 1. The process is continuous.

Referring now to Figs. 5 and 6, the parts are the same as in Fig. 1, except that the parts have been inverted or rotated 180 degrees and the rolls 2 have been developed or formed into the platen 2′. The sheet 7′ is laid on the platen with the entering end of the sheet at the right of the roll 1. The platen with the sheet thereon is pushed first

beneath the roll 1 and then beneath the roll 3. It is clear that the result will be as with the three rolls of Fig. 1. Fig. 5 shows the roll 1 forming the part 8′ of the sheet which is like the part 8 of the sheet 7. When the part 8′ passes beneath the roll 3, it will then be like the sheet shown on Fig. 4.

Fig. 7 may be considered from two view points. First, it may be regarded as showing the rolls 1 and 3 each coöperating with a roll 2; or second, it may be regarded as showing in succession the roll 2 coöperating with the roll 1 and with the roll 3, the latter having been substituted for the roll 1.

If a sheet be fed from left to right through the two pairs of rolls shown in Fig. 7, the result would be the same as that secured by the other two forms of my invention. In the other aspect of Fig. 7, the sheets may be fed first between the rolls 1 and 2. Then the roll 3 is substituted for the roll 1 and the sheets longitudinally corrugated by the rolls 1 and 2 are fed through the rolls 2 and 3. The finished article is again the same as that shown in Fig. 4.

I have shown a few ways by which I am enabled to make embossed sheets corrugating the sheets in two directions, but I do not desire to be restricted to the precise mechanism shown and described as there are obviously many ways of arriving at the same or analogous results without departing from the spirit of my invention.

I do not restrict myself to pyramidal bosses as the bosses may have other shapes, as cones, frustums, and the like.

Sheets of metal, paper, or plastic material may be fed through my apparatus, and of desired masses in bulk can be fed through the same, sheets being simultaneously formed and embossed.

I claim—

1. In a sheet forming machine, a die having its surface bearing configurations like the finished article, a second die coöperating with the first die and having its surface bearing the configuration of the finished article in one direction, and a third die cooperating with the first die and having its surface bearing configuration extending across the configurations made by the second die.

2. In a sheet forming machine, a die having intersecting grooves, a second die coöperating therewith and having ribs adapted to the grooves which run in one direction, and a third die coöperating with the first die and having ribs adapted to the grooves which cross the last named grooves.

Signed at Pittsburg, Pa., this 29th day of October, 1909.

VICTOR CHARTENER.

Witnesses:
F. N. Barber,
Anna R. Beatty.