C. L. NAGEL.

Machine for Embossing and Perforating Paper.

No. 196,305. Patented Oct. 23, 1877.

Fig: 1

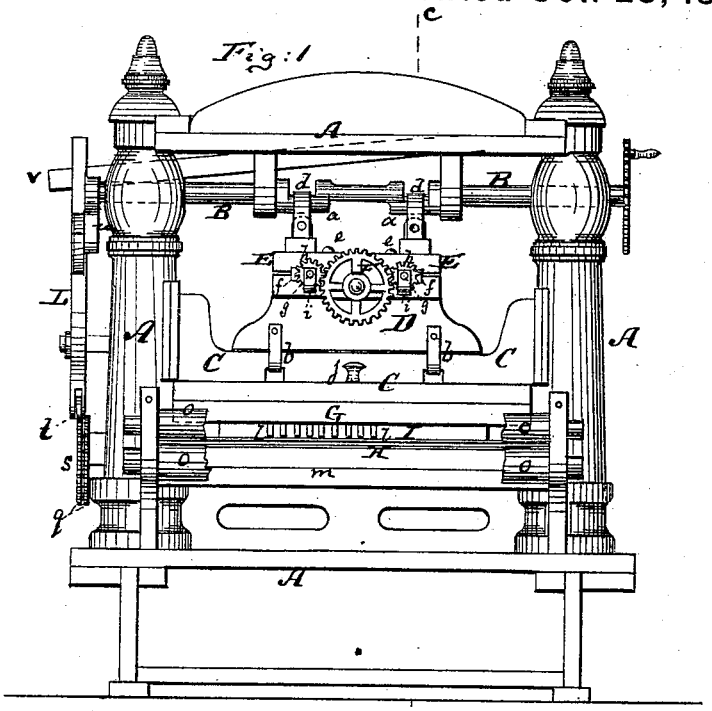

Fig: 2

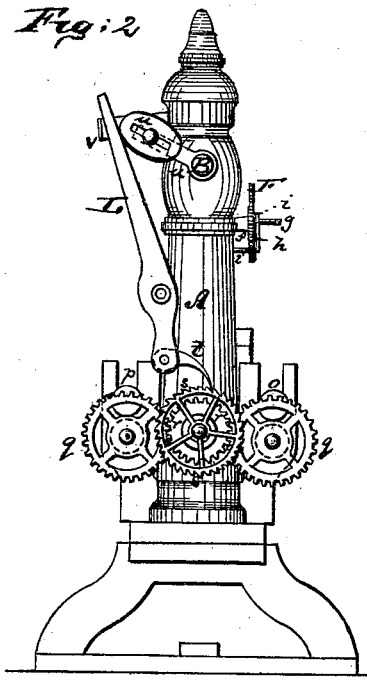

Fig: 3

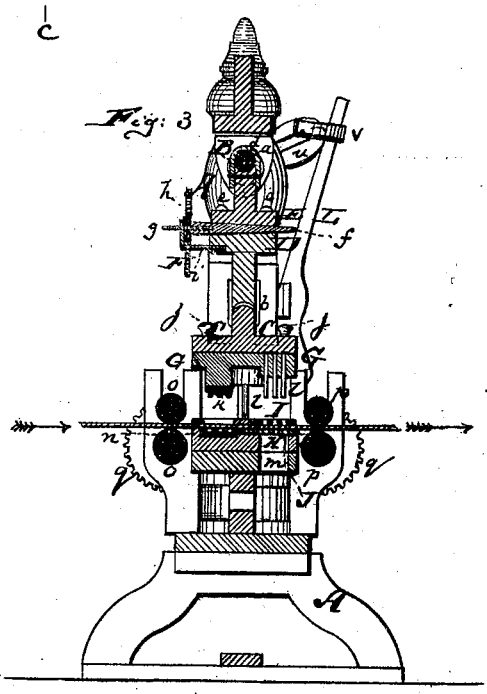

Fig: 4

Witnesses:

John C. Tunbridge

A. V. Briesen

Inventor:

C. Louis Nagel

by his attorney

A. V. Briesen

UNITED STATES PATENT OFFICE.

C. LOUIS NAGEL, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN MACHINES FOR EMBOSSING AND PERFORATING PAPER.

Specification forming part of Letters Patent No. **196,305**, dated October 23, 1877; application filed July 13, 1877.

To all whom it may concern:

Be it known that I, C. LOUIS NAGEL, of Brooklyn, Kings county, New York, have invented an Improved Machine for Embossing and Perforating Paper or other Fabric, of which the following is a specification:

Figure 1 is a front elevation of my improved embossing and perforating machine; Fig. 2, an end view of the same; Fig. 3, a vertical cross-section thereof on the line *c c*, Fig. 1. Fig. 4 is a detailed plan view of a strip of paper embossed and partly perforated on the machine.

Similar letters of reference indicate corresponding parts in all the figures.

The object of this invention is to produce a machine on which paper, leather, or other fabric can be embossed in strips and sheets with ornamental designs, and also perforated to increase the effect of the embossing process, all at one operation; and the invention consists, particularly, in combining in one machine, and securing to one reciprocating cross-head, an embossing-die and perforating-plungers, so that the two operations of embossing and perforating may be simultaneously carried on to properly affect the strip of paper.

The invention also consists in various details of construction of the parts which make up the machine, all as hereinafter more fully described.

In the accompanying drawings, the letter A represents the frame of the machine, the same being made of metal or other suitable material, of proper size and strength to enable it to accommodate the parts of the mechanism, and to properly support the same during operation. In the upper part of this frame is hung the driving-shaft B, to which rotary motion is imparted by suitable mechanism. From the cranks *a a*, which are formed on this driving-shaft, is suspended a cross-head, C, to which, by means of these cranks, reciprocating motion in a vertical direction is imparted. The ends of the cross-head are guided in grooves that are formed on the uprights or posts of the frame A.

The connection between the reciprocating cross-head C and the crank-shaft B is as follows: A plate, D, is, by links *b b*, that embrace cylindrical portions of the cross-head, united to the latter, as by a joint, so that the plate D may vibrate on the hinges thus formed in traveling up and down with the cross-head. A similar plate, E, is, by similar links *d*, suspended from the crank-shaft, and capable, therefore, of vibrating thereon; and the two plates D and E, where they come together, are united, and rigidly connected by screws *e*, of which the heads are indicated in Fig. 1. Thus a flexible connection is formed, which, however, by having the same in two parts, D and E, permits of adjustment. This adjustment is effected by wedges *f*, which are introduced between the two plates D and E, and which, at their larger ends that project from and beyond said plates, carry screw projections *g*, upon which pinions *h* are mounted, all as indicated in Figs. 1 and 3. The two pinions *h h* of the two wedges gear into a toothed wheel, F, and the screws *g* fit proper nuts that are formed in the pinions, the outer ends of the screws being supported and guided in brackets *i*, which connect with the plate D or E, as may be desired. Now, when it is desired to cause the cross-head to descend to a greater depth, and to define the embossing design more perfectly and sharply, it is only necessary, after first loosening the screws *e*, to turn the wheel F, and thereby screw the wedges farther in between the plates D and E, thereby separating them to a certain extent, and increasing the distance between the crank-shaft B and the cross-head C.

To the lower face of the cross-head C is attached, by screws *j j*, the die-plate G, which plate, however, is readily removed by unfastening said screws *j j*. The die-plate G carries along one face of the machine a suitable die, *k*, which has the positive design of the embossing engraved on its lower surface. Along the other face of the machine the die-plate G carries a series of punches or perforating-pins, *l*, properly arranged as to shape and distance from one another, so that they will harmonize in their effect with the design which is produced by the embossing-tools.

Instead of making the plate G in one piece, it may be made in a series of pieces.

Below the cross-head and die-plate is supported upon a thick horizontal bar or plate,

m, which constitutes part of the frame A, the bed-plate H, which supports, beneath the die *k*, a counter-die, *n*, and beneath the punches *l* a perforated plate, J. At a distance above the counter-die and perforated plate J there is also secured a stripper-plate, I, which is perforated to admit the punches *l*, substantially in the same manner as the plate J is perforated, and which is also perforated to admit the entire die *k*.

The paper to be embossed and perforated is fed through the machine between the stripper-plate and the bed-plate H, so as to be in contact with the counter-die and with the plate J. It is fed in the direction indicated by the arrow in Fig. 3, so as to first be affected by the embossing, and next by the perforating mechanism. The paper having been properly introduced beneath the stripper-plate, the cross-head is brought down, so as to force the die *k* against the paper, crowding the latter into the cavities of the counter-die, and thereby imparting to it the desired embossed form and ornamentation. The paper thus embossed, being further fed forward, is next perforated at the desired places by the descending punches, and at the same time another portion of the paper is embossed, and so forth, until the entire length of the paper has been properly treated.

The punches, counter-die, stripper-plate, and perforated plate J may, of course, be readily removed, to permit different designs to be formed by the same machine; and for this reason I prefer to make that portion of the stripper-plate which is perforated to admit the punches separate from the other portion of the stripper-plate, which merely admits the die *k*, as it will be more frequently necessary to remove the perforated portion of the stripper-plate for different designs than that portion which is above the counter-die.

For feeding the paper two pairs of rollers, *o o* and *p p*, are employed, as clearly shown in Fig. 3. These rollers receive their motion by gear-wheels *q q*, (shown in Fig. 2,) from a toothed wheel, *r*, upon whose arbor a ratchet-wheel, *s*, is mounted, which receives intermittent rotary motion by a pawl, *t*, from a vibrating lever, L. This lever is moved by a crank, *u*, of the driving-shaft B, and is held against said crank by a spring, *v*. Whenever the crank *u* strikes the lever L, said lever will impart motion to the ratchet-wheel, and also to the feed-rollers.

For varying the degree of feed, the crank *u* is made extensible—that is, it is constructed of two parts, of which one is slotted and connected to the other by a screw, as clearly shown in Fig. 2. This enables me to feed the paper with greater or less speed, according to the nature of the design to be produced upon it.

It will be observed that I first emboss the paper and then punch out portions, to perforate the same, as indicated in Fig. 4. The process, as far as that is concerned, may be reversed, although I prefer to first emboss and then perforate, because I thereby obtain for the perforating-punches a less laborious movement, as the parts to be punched out are first depressed and reduced in thickness by the embossing apparatus, and also because the paper, if first perforated, would be likely to be drawn out of shape by the embossing apparatus. I also keep the embossing-tools clear of the waste produced by the punches by first embossing.

I claim as my invention—

1. In a machine for embossing and perforating paper, the combination of the reciprocating cross-head C with the die *k* and punches *l*, attached thereto, and with the counter-die *n*, and perforated plate J, and stripper-plate I, substantially as and for the purpose herein shown and described.

2. The combination of the cross-head C with the plates D and E and crank-shaft B, and with the wedges *f*, screws *g*, and toothed wheels *h* and F, substantially as specified.

C. LOUIS NAGEL.

Witnesses:
F. V. BRIESEN,
A. V. BRIESEN.