

(No Model.)

2 Sheets—Sheet 1.

J. HUMPHREY & B. F. UPHAM.  
OVERLAY.

No. 597,677.

Patented Jan. 18, 1898.

Fig. 1.

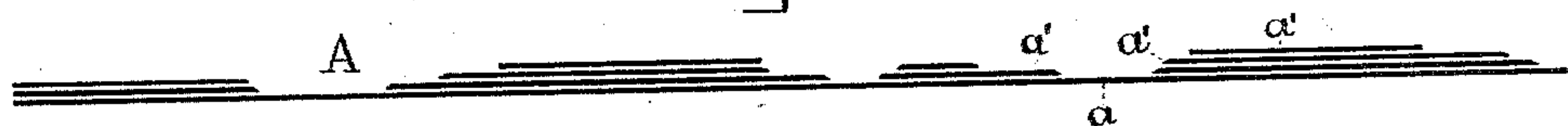
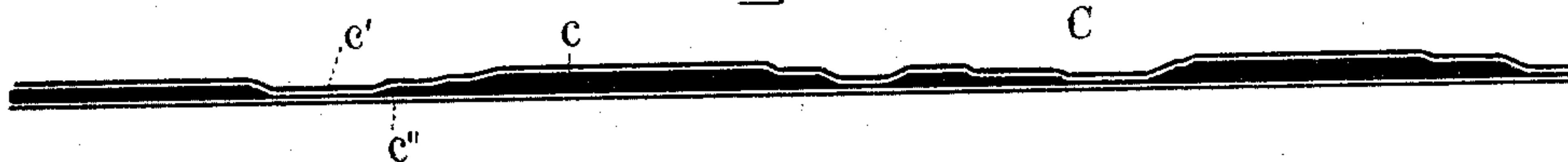


Fig. 2.



Fig. 3.



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(No Model.)

2 Sheets—Sheet 2.

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*Fig. 4.*



*Fig. 5.*



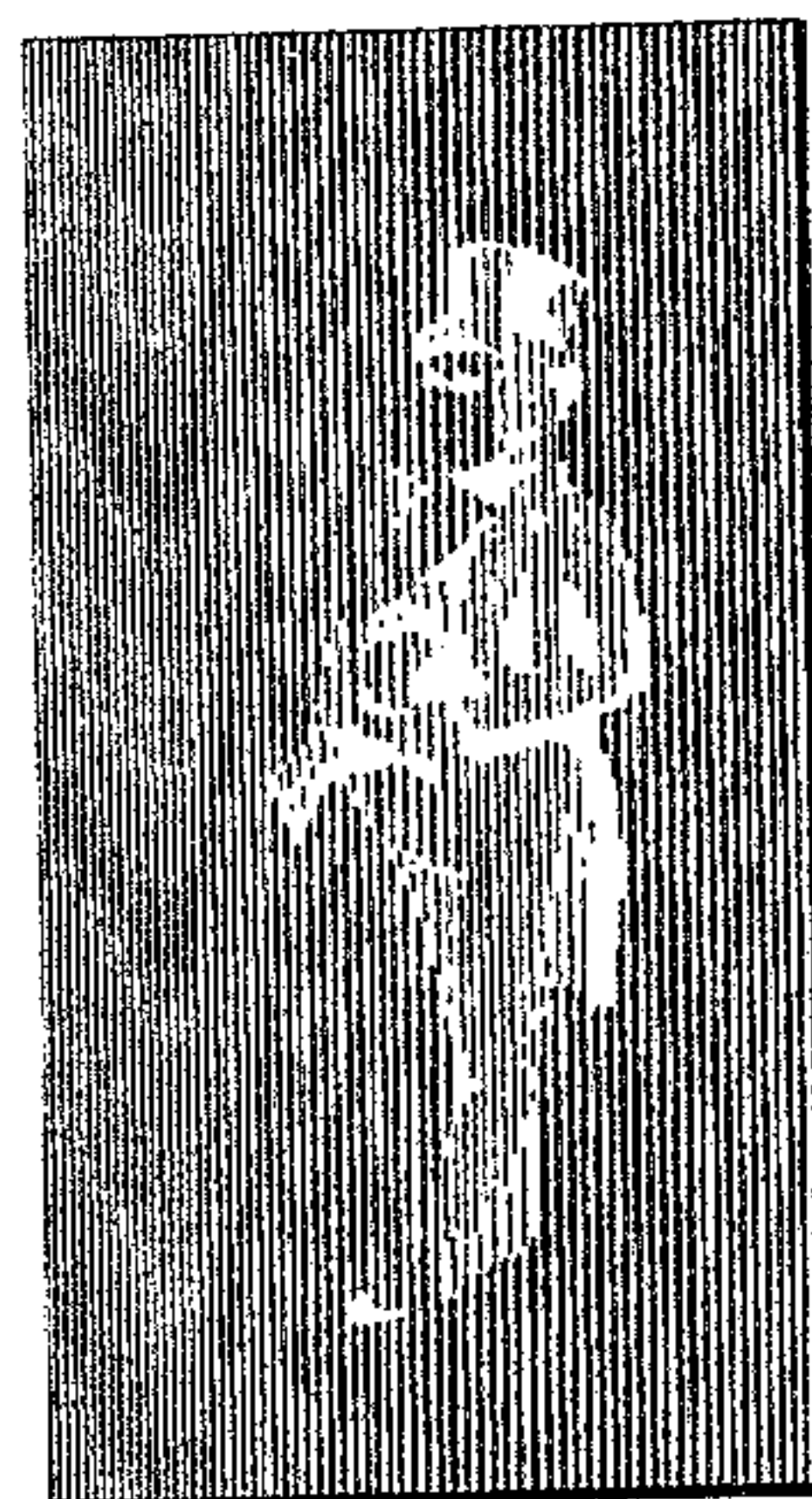
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



*Fig. 9.*

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*Attorney.*



# UNITED STATES PATENT OFFICE.

JAMES HUMPHREY AND BURT F. UPHAM, OF BOSTON, MASSACHUSETTS,  
ASSIGNORS TO PERRY MASON & CO., OF SAME PLACE.

## OVERLAY.

SPECIFICATION forming part of Letters Patent No. 597,677, dated January 18, 1898.

Application filed August 18, 1896. Serial No. 603,163. (No specimens.)

*To all whom it may concern:*

Be it known that we, JAMES HUMPHREY and BURT F. UPHAM, citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Overlays, of which the following is a full, clear, and exact description.

In all first-class printing it is customary to vary the pressure of various parts of the letter-press or cuts upon the imprinted paper by inserting beneath the latter one or more suitably-shaped pieces of paper termed the "overlay." In doing this a proof is taken of the letter-press or engraving and upon this is pasted the bits of paper, one layer at some places, two at others, and more where a greater thickness still is wished.

In the case of cuts and large full-face letters the thickness of the overlay may be made considerable, enough at any rate to materially increase the pressure of the press at such places as it is wished to have print a heavier black. With letter-press the requirement is simply to make the pressure perfectly uniform throughout the entire plate.

It is readily seen that the work of cutting overlays is a slow, tedious, and expensive one, especially in the case of cuts abounding in numerous intricate dead-black and shaded sections which must be heavily overlaid with accurately-cut and exactly-pasted bits of paper. This expense and delay are proportionately multiplied when several duplicate overlays have to be made, as is the case when several duplicate electrotypes are on the press. The reduction of this delay and work is the object of this invention, which we accomplish in the following manner.

Referring to the drawings, Figure 1 is a diagrammatic cross-section of an overlay, Fig. 2 of a mold, and Fig. 3 of our reproduced overlay. Fig. 4 is a proof of a cut for which we will suppose an overlay is to be prepared. Figs. 5, 6, and 7 indicate duplicate proofs from which suitable portions have been removed to form a mold for the overlay. Fig. 8 indicates a mold formed by the superposition of said proofs, and Fig. 9 represents our overlay formed by means of said mold.

In Fig. 1 of the drawings, A indicates the

completed overlay, and *a a'* the foundation-sheet and the superadded sheets of paper, such as are customarily made.

In Fig. 2 the foundation strip or sheet *b* has the thickening sections of paper *b'* pasted to the under side of it, and in addition it will be noticed they are located precisely where there are none in Fig. 1. In other words, it is a mold for the form shown in Fig. 1. This is one important feature of our invention. Instead of making an overlay and then making a mold from that we construct a mold to begin with. This we do in the following manner:

In forming our mold we pull three proofs of the cut for which an overlay is to be prepared, taking, as an example, the illustration shown in Fig. 4, which will indicate one such proof. From one of these proofs we proceed to cut away all the black or most heavily-shaded portions. Fig. 5 is a diagram of such mutilated proof, the oblique lines running downward from left to right indicating said excised portions. From the second proof we cut away all the black and medium dark portions (indicated in Fig. 6 by the oblique lines running downward from right to left,) and from the third proof we remove all but the very lightest parts of the cut, as shown in Fig. 7 by the horizontal shaded lines. These three prepared proofs we then turn face downward and paste one upon the other, that shown in Fig. 5 being placed undermost, that of Fig. 6 next, and that of Fig. 7 uppermost. These are of course accurately registered by any suitable means, as the usual registering identations or cuts *r*. The proofs thus united form the mold from which the overlays are to be made, as hereinafter described. Such an overlay is illustrated in Fig. 9, wherein the most elevated or thickest parts are indicated by the lightest-shade lines. Such thickest parts are, of course, those which are to give the heaviest overlay, and correspond to the deepest portions of the mold and the darkest sections of the picture. The advantage of this feature of our invention is, first, a diminution of labor from what it would be if the usual overlay were first made, and then in some way a mold formed from it; second, the great danger of the distortion of



the mold and consequent ruin of the resulting overlay is wholly eliminated, since the mold itself is made direct from the proof. The second step is casting the overlays from the mold thus produced. We do this by first laying a sheet of paper over the mold, then a thin sheet of unvulcanized rubber upon that, and, lastly, a second sheet of paper over the whole. By means of a powerful hydraulic press these layers of mold, paper, and rubber are strongly compressed until the rubber and its envelop are forced into the shape of the overlay desired. Suitable heat is then applied and the rubber vulcanized. The overlay and any number of duplicates of it are then ready for use in the usual manner.

In our first experiments with rubber for this purpose we found it useless on account of its shrinkage under vulcanizing, and of course without vulcanizing, it would not endure the heavy pressure required in printing. After further experiments, however, we discovered that by having the rubber quite thin and placing it between the two sheets of paper, as described, such shrinkage was entirely overcome. Furthermore, such paper surface better adapts our overlay for its work than would be the case were naked rubber alone employed.

One reason for the better work done by the employment of a paper surface on the rubber overlay is this: The bare rubber alone takes a sharp impression at its edges or minute steps where the various sheets are pasted one upon the other in forming the mold; but when the paper is pressed upon the rubber the paper does not bend with absolute sharpness over said minute steps, but forms an almost imperceptible gradation from step to step. Since any sharp edge in an overlay tends to print a dark line, this removal of sharp edges, even though minute, is an important consideration. The most important function, however, of the paper facings of the rubber is that previously referred to. Rubber alone will shrink in being vulcanized, and when, as in the case of an overlay, the rubber is spread out very thin and over considerable surface the shrinkage would be such as to render the same absolutely worthless for the purpose. The more remote parts of the overlay would not register; but when the rubber is compressed between the two sheets of paper and by such pressure thoroughly incorporated therewith and in many parts reduced to a microscopic thickness the natural shrinkage of

the rubber in vulcanizing is controlled and overcome by means of the superior resisting strength of the paper. The function of the rubber is more that of a filling for the thicker portions of the overlay, the same being in effect an overlay composed of two layers of paper filled at the required places with the proper amount of non-plastic material—the vulcanized rubber.

In the case of comparatively small overlays we sometimes omit the under sheet of paper and apply one upon the working face of the rubber alone.

By means of our invention as thus described we are enabled to equip six presses with overlays in one-quarter of the time and at a greatly-reduced cost over the method previously employed.

Referring again to the drawings, Fig. 2 represents the mold described, being built up by pasting the bits of paper *b'* upon the foundation-sheet *b*. In Fig. 3 is the overlay formed from this mold and consisting of the rubber sheet *c* and the enveloping paper *c' c''*. As will be noticed, the sheet *c''* is perfectly flat, corresponding to the under surface of the rubber, while the upper sheet *c'* partakes, with the upper surface of the rubber, of the contour of the mold B.

What we claim as our invention, and desire to secure by Letters Patent, is as follows, to wit:

1. The within-described mold from which to form overlays, such mold comprising a plurality of proof-sheets pasted face down one upon the other, the lowermost of which has its blackest parts alone cut out, and the upper ones have more thereof cut away, substantially as and for the purpose set forth.

2. The within-described overlay consisting of vulcanized rubber having facings of paper, substantially as and for the purposes set forth.

3. The within-described overlay consisting of vulcanized rubber having a sheet of paper compressed upon, and incorporated with, its working face, substantially as and for the purpose set forth.

In testimony that we claim the foregoing invention we have hereunto set our hands and seals this 3d day of August, 1896.

JAMES HUMPHREY. [L. S.]  
BURT F. UPHAM. [L. S.]

Witnesses:

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A. B. UPHAM.