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C. H. MACKENZIE.

PROCESS OF PRODUCING PRINTED SURFACES HAVING RELIEF APPEARANCE

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Fig: 1.

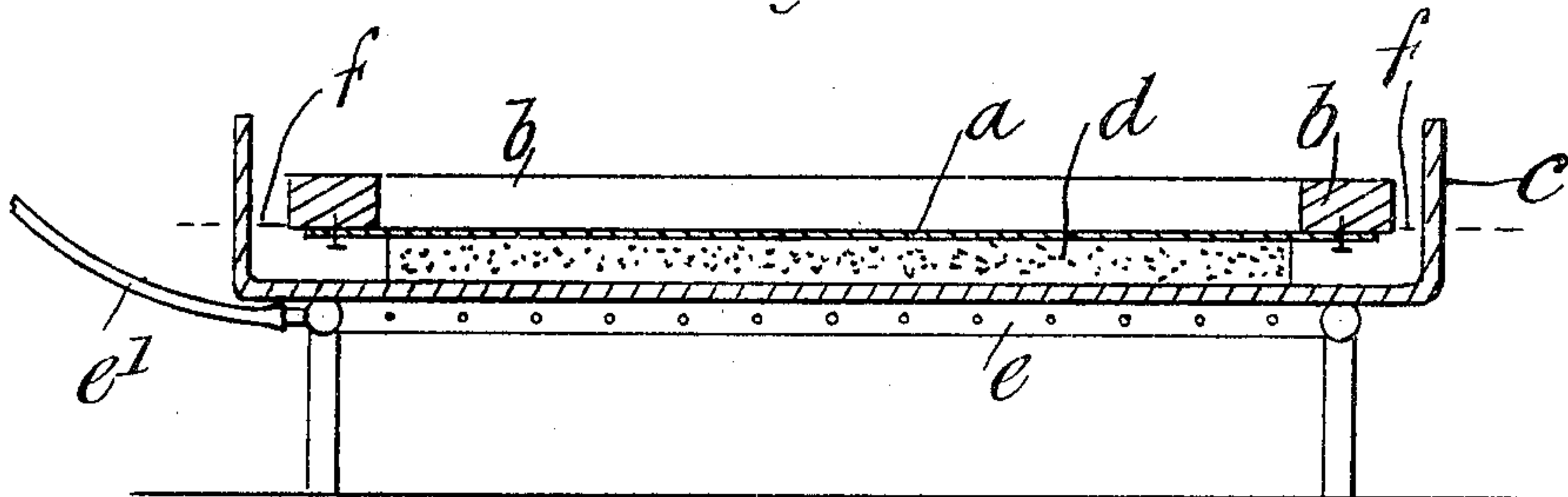


Fig: 2.

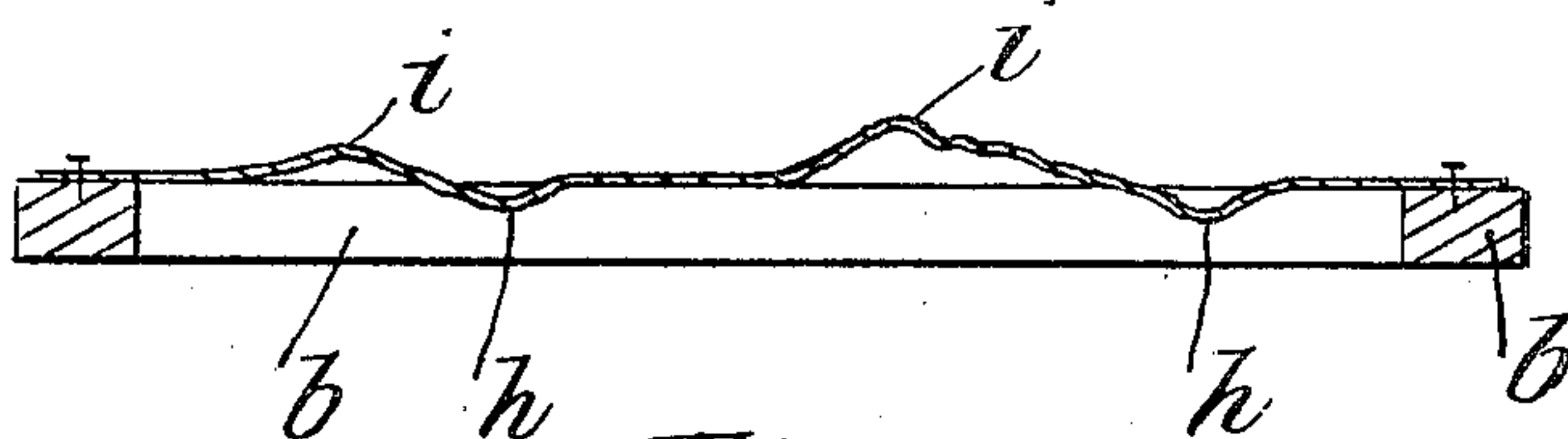
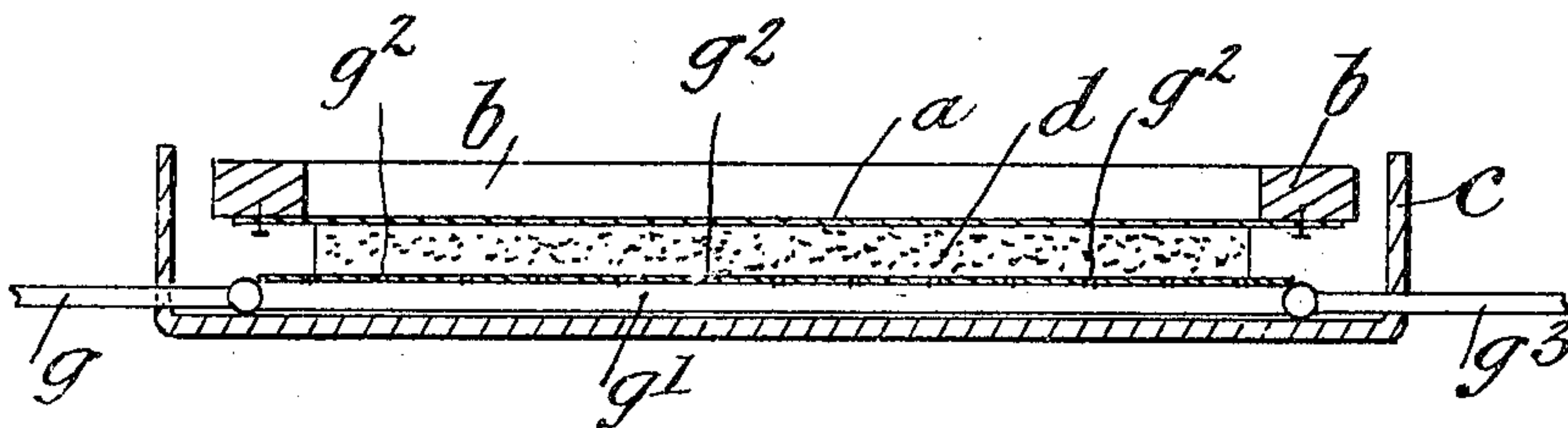


Fig: 3.



Fig: 4.



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UNITED STATES PATENT OFFICE.

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PROCESS OF PRODUCING PRINTED SURFACES HAVING RELIEF APPEARANCE.

NO. 804 195.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CLAUDE HAMILTON MACKENZIE, a subject of the King of Great Britain, residing at London, England, have invented a certain new and useful Process of Producing Printed Surfaces Having a Relief Appearance, of which the following is a full, clear, and exact description.

The object of the present invention is to produce in an accurate and cheap manner a map, chart, or other printed surface having a relief appearance.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of a complete apparatus for use with hot water. Fig. 2 is a sectional view of a frame with a sheet of celluloid or like material pinned thereon, representations of the mountains and valleys having been formed in the sheet of celluloid as hereinafter described. Fig. 3 shows a cast of said sheet of celluloid or like material. Fig. 4 is a sectional view of a modified form of apparatus for use with steam.

In carrying the invention into effect a sheet of transparent celluloid or like material a is placed on a map, chart, or other representation, and a tracing is made thereon in an ink which will adhere to the celluloid even if this latter is softened by means of warm water or steam, or I may place a map, chart, drawing, photograph, or the like upon a sheet of celluloid, with a piece of carbon-paper between them, and trace down a copy of the same onto the sheet of celluloid. It is found that this latter method of producing the outline on the celluloid gives satisfactory results, as the pigment adheres very firmly to the celluloid. In some cases I may sensitize the sheet of celluloid or like material and produce a photograph direct on the same, or I may attach a transparent or other picture to the celluloid with suitable cement.

Other printing-surfaces than those above described may be produced by any of the well-known photographic processes.

The sheet of celluloid a with the map-chart or other representation traced, drawn, or otherwise produced or stuck thereon is, as shown in Fig. 1, pinned on a frame b and is placed in a bath c containing warm water on a soft pad d , made of any suitable material, such as a cloth pocket filled with wool, of about the same size as the interior of the frame b . The bath c may be placed on a gas heating appa-

ratus e , having a supply-pipe e' to keep the water f at the required temperature, or the soft pad d may be kept warm and moist by means of steam, as shown in Fig. 4, in which g is a steam-pipe admitting steam to the chamber g' , having perforations g^2 and an outlet g^3 . This soft pad d is preferably smaller than the sheet of celluloid, so that it only softens the center portion of the sheet, leaving the margins thereof unaffected, and consequently the scale of the map or other representation remains as drawn. The depressions h —such as the rivers, valleys, and lakes in the case of a map, or other depressions in the case of other representations—are produced by pressing down the softened material by a modeling-tool. The sheet of celluloid a is allowed to cool or is cooled by means of cold water and is then removed from the frame b , turned over and repinned thereon, and again placed on the pad d , or the frame and celluloid may be turned upside down. The mountains i in the case of a map, or other raised portions, according to the nature of the representations—such as letters, floral designs, or features—are then produced by pressing the celluloid in a similar manner. The celluloid is again cooled, as above described. A cast may now be taken from the sheet of celluloid in plaster-of-paris or other suitable material, as shown in Fig. 3, and a photograph taken therefrom, or a photograph may be taken direct from the celluloid a . The names of towns and other useful information for a map, or lettering, drawings, or photographs are then written, printed, or otherwise produced or fixed on the photograph, and for small sizes a zinc process-block having a raised surface is produced therefrom by photography in the usual or well-known manner, or for larger sizes copies of the map or chart may be produced by photolithography. Other methods of softening the sheets of celluloid or other suitable material may be employed, such as the use of chemical solutions.

I have shown the manner in which my invention is put into practice when celluloid is used as the material to be impressed; but it is obvious that many materials may be used without departing from my invention, the qualities necessary being that they should be capable of use as a thin sheet and, further, that they should be capable of receiving impressions on both sides, so as to produce a relief and intaglio surface capable of being

photographed direct from the sheet or from a plaster cast taken therefrom. A sheet of blotting-paper, for instance, may be used, though with inferior effect to that when celluloid is employed. In this case the impressions are made by means of a suitable instrument direct on the blotting-paper in a cold dry state. The photograph may then be taken direct from the blotting-paper.

10 I am aware that relief-surfaces have been modeled by hand in clay or other material, that photographs have been taken therefrom, and that maps, charts, and advertisements have been produced from such photographs
15 by means of process-blocks or photolithography; but such relief-surfaces are expensive to produce and are not always accurate. By means of my invention I am able to produce relief-surfaces cheaply and accurately
20 and to reproduce representations of such surfaces by means of process-blocks or on a larger scale by means of photolithography, by which last-mentioned process I can produce cheaply and in a rapid manner large maps,
25 posters, or other representations having a relief appearance.

What I claim is—

1. The process of producing maps, charts and other printed matter showing a relief effect, which process consists in producing an
30 outline thereof on a sheet of suitable material and pressing the sheet as required to represent the relief-surface, obtaining a photograph of such sheet showing the relief effect
35 but actually flat, and then producing a print-

ing-surface from the said photograph and printing therefrom.

2. The process of producing maps, charts and other printed representations, having a relief appearance, which consists in producing the outline thereof on a sheet of celluloid, softening the sheet and pressing the sheet as desired to represent the relief-surface and producing printed representations therefrom, substantially as herein set forth. 40 45

3. The process of producing maps, charts and other printed representations, having a relief appearance, which consists in producing the outline thereof on a sheet of celluloid, attaching same to a frame, softening the sheet, placing same on a pad, pressing the celluloid to represent reliefs, and producing printed representations therefrom, substantially as herein set forth. 50

4. The process of producing maps, charts and other printed representations, having a relief appearance, which consists in tracing the representation on a sheet of celluloid, softening the sheet and pressing the same as desired to produce a relief-surface, photographing the sheet, producing on the photograph additional matter, and making a printing-surface therefrom by means of photography, substantially as set forth. 55 60

In witness whereof I have hereunto set my hand in presence of two witnesses. 65

C. H. MACKENZIE.

Witnesses:

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WM. GIRLING.