Jan. 23, 1940. J. Q. SHERMAN 2,187,760

THERMAL MANIFOLDING APPARATUS

Filed May 4, 1936 2 Sheets-Sheet 1

Fig. 1

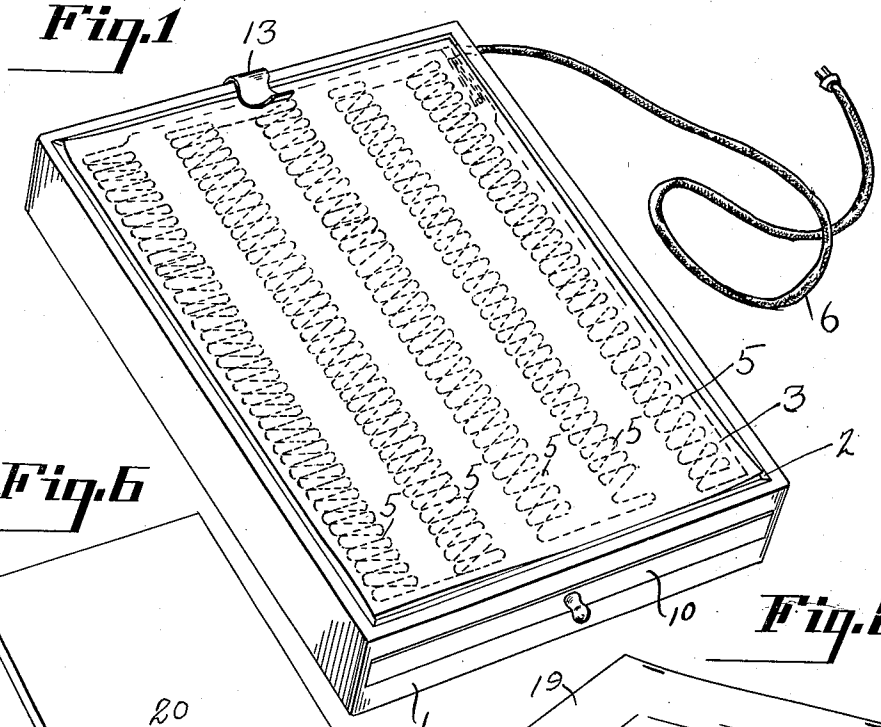


Fig. 6

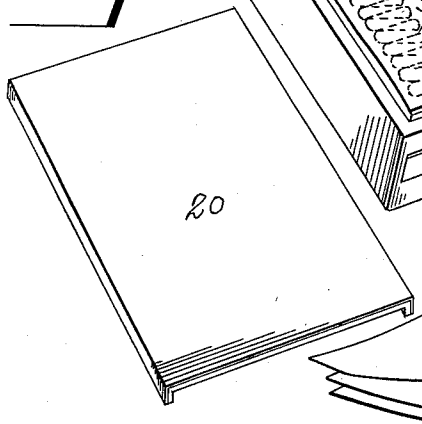


Fig. 5

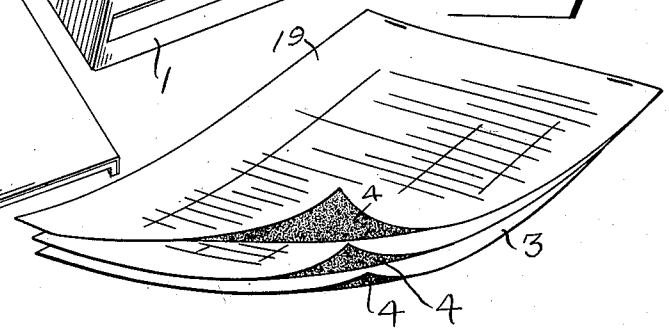


Fig. 3

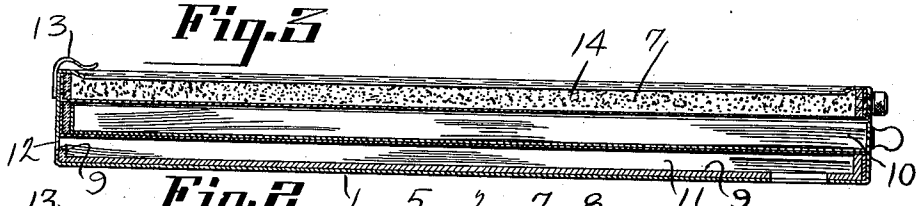
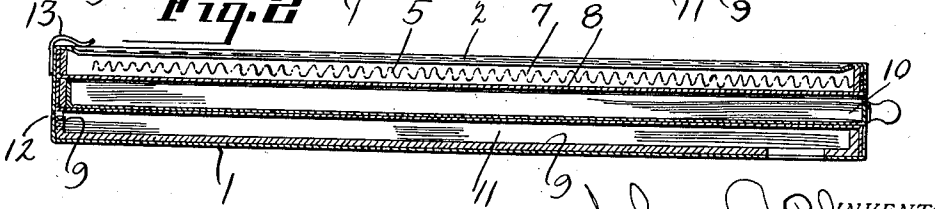


Fig. 2



INVENTOR

John Q. Sherman

BY

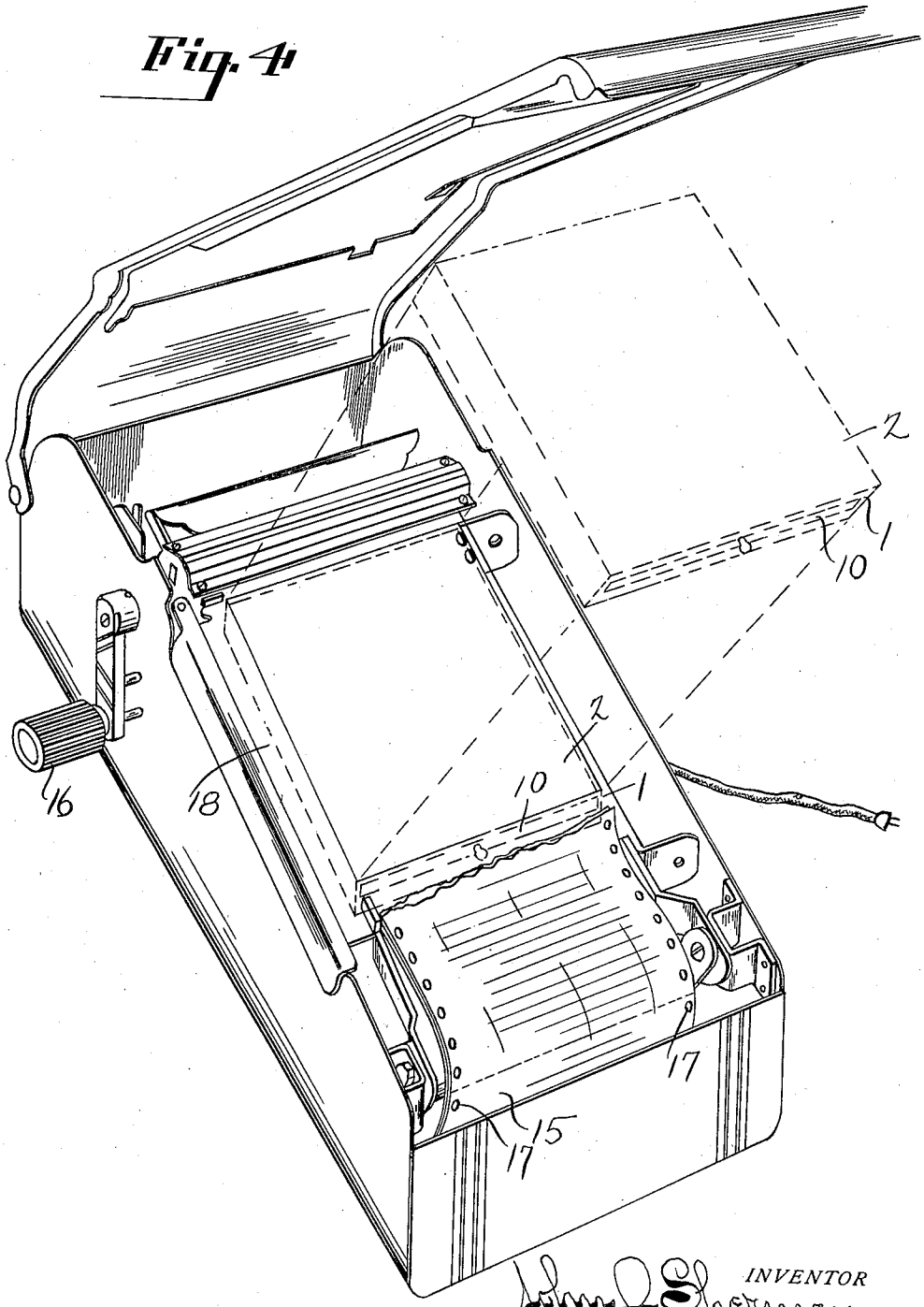
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THERMAL MANIFOLDING APPARATUS

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Fig. 4



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UNITED STATES PATENT OFFICE

2,187,760

THERMAL MANIFOLDING APPARATUS

John Q. Sherman, Dayton, Ohio; Katherine M. Sherman, William C. Sherman, and Wellmore B. Turner, executors of said John Q. Sherman, deceased

Application May 4, 1936, Serial No. 77,722

23 Claims. (Cl. 282—1)

This invention is an autographic manifolding apparatus and more particularly a thermally conditioned writing tablet for activating the normally inert transfer material which forms the subject matter of companion application, Serial Number 74,511, filed April 15, 1936, and a further development of the idea disclosed in my Patent No. 2,057,696 dated October 20, 1936.

Conventional carbon or transfer material being responsive at natural atmospheric temperature rubs off easily leaving smudges and smears on contacted surfaces and soils the fingers of the operator and produces undesired marks and impressions as result of accidental pressure, friction, or impact. "Carbon backed" record sheets and sales slips, the reverse sides of which are directly coated with transfer material, in lieu of interleaved separate transfer sheets, are especially objectionable for the above reasons, and because they are necessarily handled more than interleaved carbon sheets. Such transfer media whether in separate sheets or coated directly on the backs of record sheets and slips must be kept in a soft, more or less "tacky" condition for best results, and quickly deteriorate with age. To overcome these and other objections, there has been developed normally inert transfer material which is noncommunicable under ordinary conditions and at atmospheric temperatures. Preparatory to use such inert transfer media must be preconditioned or activated by appropriate treatment according to the particular composition of the transfer media. The preliminary treatment may comprise exposure to vapors or fumes, subjection to action of a chemical reagent or electrical influence, or by application of heat. The transfer media forming the subject matter of the companion application for patent aforementioned pertains to the latter thermally responsive composition.

The herein described apparatus comprises a heated writing tablet for conditioning such thermal responsive material for autographic manifolding operations. The writing tablet is provided with heater means which may be electrical, chemical, or combustible fuel. Preferably, although not necessarily, associated with the heated tablet is a compartment for a supply of record material and for inscribed sheets.

The heated writing tablet may be embodied in a portable unit such as shown and described in copending application, Serial No. 741,580, filed August 27, 1934, and Serial No. 741,579, filed August 27, 1934, or it may comprise a component part of a conventional counter type of manifolding autographic register.

The object of the invention is to provide a thermal unit for activating normally inert transfer material, of simple construction, which may be economically manufactured, and which will be efficient in operation, having relatively few parts, and unlikely to get out of order.

A further object of the invention is to provide a thermal unit which will afford a uniformly distributed heat over a prescribed area.

A further object of the invention is to provide a convenient unit for preconditioning normally inert transfer material which will be of relatively small, compact form, and which embodies the advantageous structural features and meritorious characteristics herein mentioned.

A further object of the invention is to provide a thermal unit which may be embodied in either a portable manifolding register or in a typical counter type autographic register.

A further object of the invention is to provide a thermal unit which may be heated by either of several energizing means.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter set forth and described in the claims.

In the drawings wherein are illustrated the preferred, but obviously not necessarily the only forms of embodiment of the invention, Fig. 1 is a perspective view of an electrically heated portable manifolding register embodying the present invention.

Fig. 2 is a vertical, longitudinal sectional view thereof.

Fig. 3 is a similar view illustrating the application of chemically reactive heating means.

Fig. 4 is a perspective view of a typical counter type autographic register in which the present heated writing tablet is embodied.

Fig. 5 illustrates a set of carbon back forms such as may be used with the register illustrated in the drawings and forming the subject matter hereof.

Fig. 6 is a perspective view of a removable protective cover which may be applied over the heated writing tablet to conserve heat when the register is not in use.

Like parts are indicated by similar characters of reference throughout the several views.

While the invention may be embodied in vari-

ous forms of portable registers, in which either cut or continuous forms are used, such as are shown in the copending applications for patent before mentioned, for illustrative purposes and with no intent to unduly limit or restrict either the scope or application of the invention, there is herein shown and described a very simple style of portable register employing cut forms.

In the drawings, 1 is a box like housing the top 2 of which forms a writing tablet for superposed record sheets 3. The reverse sides of the sheets 3 are coated with normally inert transfer media 4. In lieu of applying the transfer media directly to the record sheets 3, independent transfer sheets similarly coated may be interposed therebetween.

Located beneath the writing tablet 2 is a series of electrical heating elements 5, to be connected through a flexible cable 6 with a suitable source of electrical energy. The heater elements 5 are preferably enclosed in a compartment 7 formed by a partition 8 in spaced relation with the writing tablet. Beneath this heater compartment is ample storage space for a supply of coated record sheets, or separate transfer sheets and record sheets as may be desired. The outside walls of the box-like housing 1, other than the top are preferably thermally insulated as at 9. The partition 8 may if desired be also insulated, but is preferably uninsulated to permit transmission of heat therethrough to the supply of sheets awaiting use in the storage space. Thus the coated sheets are tempered preparatory to being conditioned or activated on the heated writing tablet 2.

The storage space is preferably divided to maintain separation of the unused and inscribed sheets. In the present instance a drawer 10 immediately beneath the heated partition 8 receives the unused sheets where they are preliminarily warmed or tempered. Beneath the drawer is a storage space 11 into which inscribed sheets may be inserted through a slot 12 in a marginal wall of the box 1.

For use multiple sheets are disposed in superposed registering relation on top of the heated writing tablet 2 where they are temporarily held by a spring clip 13. The electrically energized heater elements 5 transmit through the writing tablet sufficient heat to condition or activate the several sheets thereon.

Thereupon any inscription, design or indicia impressed on the topmost sheet 3 will be reproduced on the underlying sheets by transfer of pigmented transfer media throughout an area corresponding to the pressure area to which the top sheet is subjected. After removal of the inscribed sheets from the heated writing tablet, the coating of transfer media returns to its normal inert condition.

In lieu of heating the writing tablet by electrical energy, suitable chemicals 14 may be introduced into the heater compartment 7 as indicated in Fig. 3, which by their reaction will generate sufficient heat for the purpose. Material having such thermal reaction comprises an intermixture of iron filings and ammonium chloride which when water is added will generate considerable heat, amply sufficient for conditioning the transfer material. Instead of a chemical mixture as mentioned, the body 14 within the heater compartment may be a charcoal brick, which when ignited will burn quite slowly and supply the required heat. In such event the walls of the chamber 7 will be provided with small ventilating openings.

In Fig. 4 there is illustrated a conventional autographic register wherein continuous strips 15 of record material are advanced past writing position by feeding means actuated by the crank 16. Such feeding means is preferably, but not necessarily of pin wheel type engageable in marginally punched holes 17 in the record strips. The writing tablet 18 over which the strips are advanced is heated in one or another of the manners before described. The autographic register of Fig. 4 may be adapted to bodily receive the box-like unit illustrated in Figs. 1 to 3, which may be removably positioned therein.

As illustrated in Fig. 4 the unit of which the writing tablet forms the top, and which embodies heating means as described may be used apart from the register cabinet and strip feeding means. In such case it is used with "cut forms" or sheets of material, an assembly 19 of which is shown in Fig. 5. While Fig. 5 illustrates the material as "carbon backed" wherein the normally inert transfer material is applied directly to the reverse sides of the forms, and subject to conditioning upon the heated writing tablet, it is to be understood that the normally inert transfer material may be applied to separate transfer sheets interleaved between the superposed forms and conditioned for use as before described.

In order to conserve heat and maintain the device ready for use a cover 20 is removably engaged with the unit in overlying relation with the writing tablet.

From the above description it will be apparent that there is thus provided a construction of the character described, possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions and arrangement of parts, without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention is described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A manifolding device for use with superposed plies of record material and an interposed stratum of normally inert thermally responsive transfer media including a box-like container, the top of which forms a writing tablet, a partition within the container dividing the same into a heater compartment contiguous to the writing tablet and a storage compartment, and a heater means within said heater compartment, by which heat is transmitted to the transfer media for conditioning same preparatory to transfer of indicia by pressure thereon.

2. A manifolding device for use with superposed plies of record material and an interposed stratum of normally inert thermally responsive transfer media including a box-like container, the top of which forms a writing tablet, a partition within the container dividing the same into a heater compartment contiguous to the writing tablet and a storage compartment, and heat generating

means in the heater compartment, and a tempering compartment contiguous to the heater compartment for storage of transfer media coated sheets in which the transfer media upon the sheets is warmed preparatory to being conditioned upon the writing tablet.

3. A manifolding device for use with superposed plies of record material and an interposed stratum of normally inert thermally responsive transfer media including a container, the top of which forms a writing tablet, a storage space for transfer media coated sheets within the container, and a heater means common to the storage compartment and the writing tablet supplying heat to each by which the transfer media coated sheets are tempered in the storage compartment preparatory to being conditioned on the writing tablet for transfer of indicia by pressure applied thereto.

4. A manifolding device for use with superposed plies of record material and an interposed stratum of normally inert thermally responsive transfer media including a container, the top of which forms a writing tablet, a storage space for transfer media coated sheets within the container, a heater compartment intermediate the storage compartment and the writing tablet, and heat generating means therein supplying heat to the storage compartment and to the tablet for tempering transfer media coated sheets in the storage compartment preparatory to further conditioning the transfer media thereon upon the writing tablet to enable transfer of indicia by pressure thereon.

5. A manifolding device for producing multiple communication copies with superposed plies of record material and an interposed stratum of thermally responsive normally inert transfer media, characterized by a heated writing tablet on which the record material and transfer media are disposed, from which heat is transmitted to such transfer media for activating the media and rendering it responsive to pressure thereon, and means for heating the tablet.

6. A manifolding device for producing multiple communication copies with superposed plies of record material having therebetween a stratum of thermally responsive normally inert transfer media capable of being activated by temperature increase, characterized by a writing tablet on which the record material and interposed transfer media are disposed, and a heater element associated with the writing tablet, supplying heat therethrough to condition the transfer media whereby it will become temporarily responsive to pressure to effect a reproduction of the pressure area.

7. A manifolding device for use with superposed plies of record material having therebetween a stratum of thermally responsive normally inert transfer media capable of being activated by temperature increase, characterized by a writing tablet on which the record material and interposed transfer media are disposed, and an electrical heater element associated with the writing tablet and supplying heat for conditioning the transfer media preparatory to transfer of indicia by pressure thereon.

8. A manifolding device for use with superposed plies of record material having therebetween a stratum of thermally responsive normally inert transfer media capable of being activated by temperature increase, characterized by a writing tablet on which the record material and interposed transfer media are disposed, and a body of heat generating chemical reactives associated with the writing tablet for supplying heat for conditioning the transfer media preparatory to transfer of indicia by pressure thereon.

9. An autographic register for use with normally inert thermally responsive transfer material including a housing having storage space for a material supply, a writing tablet over which superposed plies of record material may be advanced from a source of supply past a writing position and heater means associated with the writing tablet by which the transfer material associated with the record material at writing position will be conditioned preparatory to transfer of indicia by pressure thereon.

10. An autographic register for use with normally inert thermally responsive transfer material including a container for a supply of record material, a writing tablet over which the record material withdrawn from the supply container may be disposed, and a heater means for conditioning the thermally responsive transfer material preparatory to transfer of indicia by pressure upon the material disposed upon the writing tablet.

11. A manifolding device for producing multiple copies of indicia with superposed plies of record material and an interposed stratum of thermally responsive normally inert transfer media, characterized by a thermally insulated writing tablet on which the record material and transfer media may be disposed, and heating means associated with the writing tablet from which heat is transmitted to such transfer media for activating the media and rendering it responsive to pressure thereon.

12. A manifolding device for producing multiple copies of indicia with superposed plies of record material having therebetween a stratum of thermally responsive normally inert transfer media capable of being activated by temperature increase, characterized by a writing tablet on which the record material and interposed transfer media may be disposed, and a heater element associated with the writing tablet, supplying heat therethrough to condition the transfer media whereby it will become temporarily responsive to pressure to effect a reproduction of the pressure area, said writing tablet being mounted upon a container in which is enclosed the heater element, and said heater element being insulated at all sides except at the writing tablet to prevent the escape of heat except through the writing tablet.

13. An autographic register for use with normally inert thermally responsive transfer material including a writing tablet on which superposed plies of record material may be advanced from a source of supply past a writing position, and heater means associated with the writing tablet by which the transfer material associated with the record material will be conditioned at writing position preparatory to transfer of indicia by pressure thereon, said writing tablet constituting one side of a container incorporating the heater means by which the writing tablet is heated.

14. In a manifolding register for use with superposed plies of record material having therebetween a stratum of normally inert thermally responsive transfer material, a cabinet, record material feeding means mounted therein, a magazine compartment in the cabinet for a supply of record material, a heated writing tablet over which the record material is advanced from the

magazine compartment past a writing position by the record material feeding means, and a heating means associated with the writing tablet for conditioning the record material passing thereover preparatory to transfer of indicia by pressure thereon.

15. In a manifolding register for use with superposed plies of record material having therebetween a stratum of normally inert thermally responsive transfer material, a cabinet, record material feeding means mounted therein, a magazine compartment in the cabinet for a supply of record material, a demountable unit forming a part of the register and normally positioned within the cabinet including a writing tablet over which the record material is advanced from the magazine compartment by the feeding means, and heater means associated with the writing tablet for conditioning the record material disposed thereon, said unit being bodily removable from the cabinet for independent use apart from the cabinet and feeding means.

16. An autographic register for use with normally inert thermally responsive transfer material including a writing tablet over which superposed portions of record material and interposed strata of transfer material may be disposed in writing position, heater means associated with the writing tablet for thermally conditioning the transfer material and a cover adjustable into and out of overlying relation with the writing tablet for conserving the heat when the register is not in use.

17. The combination with a manifolding register cabinet including a supply compartment for record material and strip guiding and feeding means for advancing the record material from the supply compartment into a writing position in association with normally inert thermally responsive transfer material, of heated tablet over which the record material is advanced from the supply compartment into the writing position in association with the transfer material, heater means associated with the tablet, the tablet and heater means comprising a unitary assembly which is bodily removable from the register cabinet for use apart therefrom.

18. The combination with a manifolding register cabinet including a supply compartment for record material and strip guiding and feeding means for advancing the record material from the supply compartment into a writing position in association with normally inert thermally responsive transfer material, and a heated transfer material conditioning surface over which the record material is advanced into writing position, and heater means associated with the conditioning surface.

19. A manifolding register for use with superposed portions of record material and an interposed stratum of normally inert thermally responsive transfer material, including a heated conditioning surface in association with which the record and interposed transfer materials are positioned preparatory to receiving inscriptions thereon, and heater means associated with said surface for supplying transfer material conditioning heat thereto.

20. A manifolding register for use with record material and associated normally inert thermally responsive transfer material, including a writing tablet relative to which the record and transfer material may be positioned to receive an inscription thereon, and a heater means associated with the writing tablet for preconditioning the transfer material positioned on the writing tablet preparatory to transferring the received inscription.

21. A manifolding device wherein a normally inert thermally responsive material is utilized with a heat transfer means for activating the material by temperature change in producing an inscribed record, characterized by a writing tablet upon which the material is disposed for inscribing purposes, and heater means associated with the tablet for activating the material.

22. A manifolding device wherein a sheet of thermally responsive material normally inert and incapable of registering record impressions is utilized with a heat transfer means in producing an inscribed record, characterized by a writing tablet upon which the material is disposed for inscribing purposes, and heater means associated with the writing tablet for preconditioning the material.

23. A manifolding device wherein a sheet of thermally responsive material normally inert and incapable of registering record impressions is utilized with a heat transfer means in producing an inscribed record, characterized by a heated writing tablet upon which the material is disposed for inscribing purposes, and heater means for transmitting heat to the tablet and the material for preconditioning the material preparatory to registering record impressions.

JOHN Q. SHERMAN.