

G. ANDERSON.
 ACCORDION.

APPLICATION FILED JULY 12, 1911.

1,139,010.

Patented May 11, 1915.
 5 SHEETS—SHEET 1.

Fig. 1.

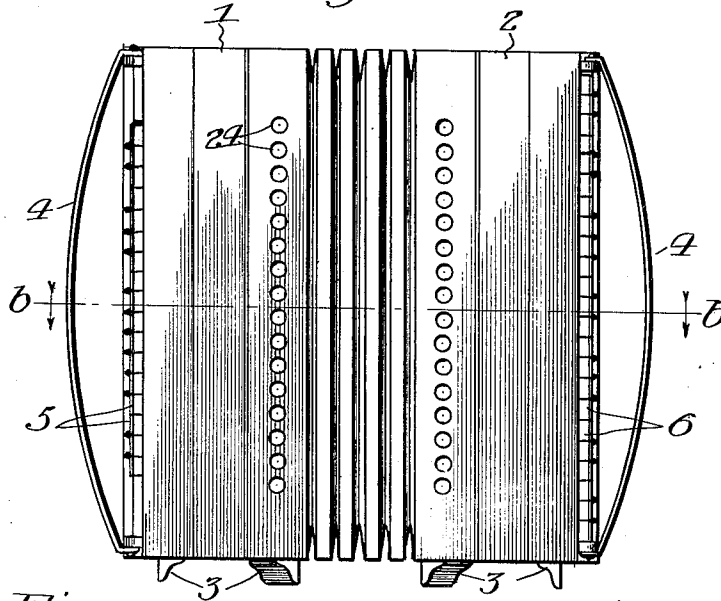


Fig. 2.

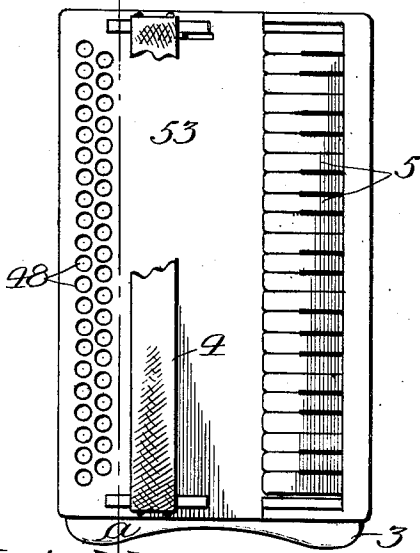
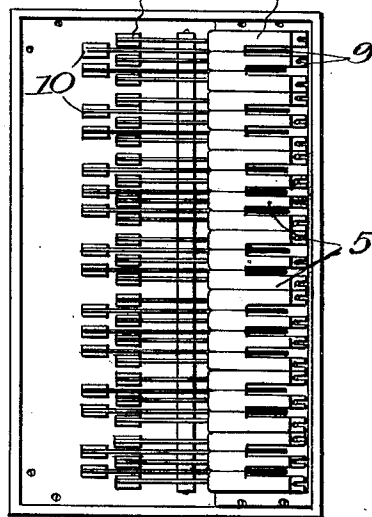


Fig. 3.



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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

Fig. 6.

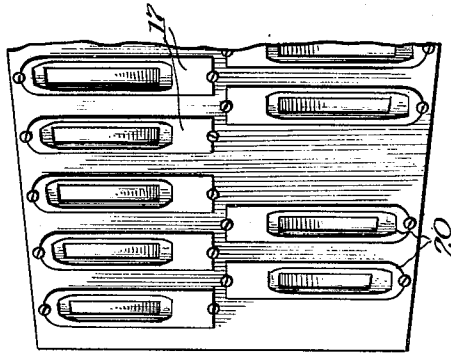
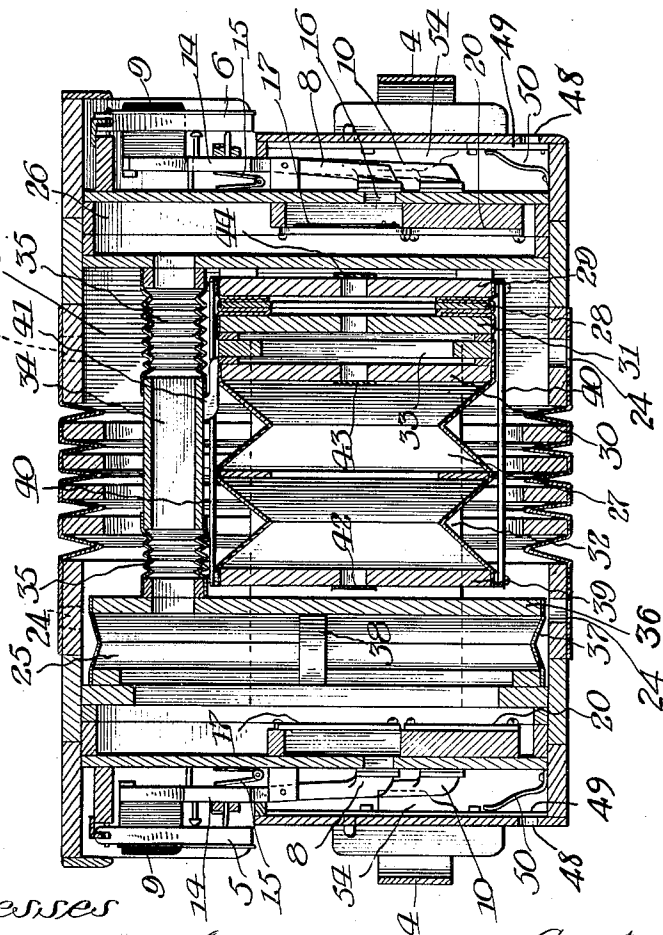


Fig. 5.



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5 SHEETS—SHEET 4.

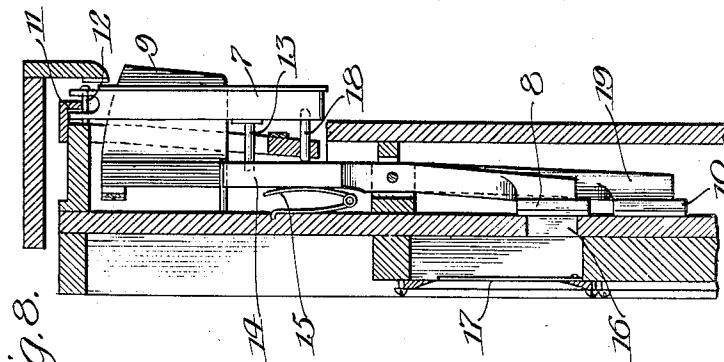
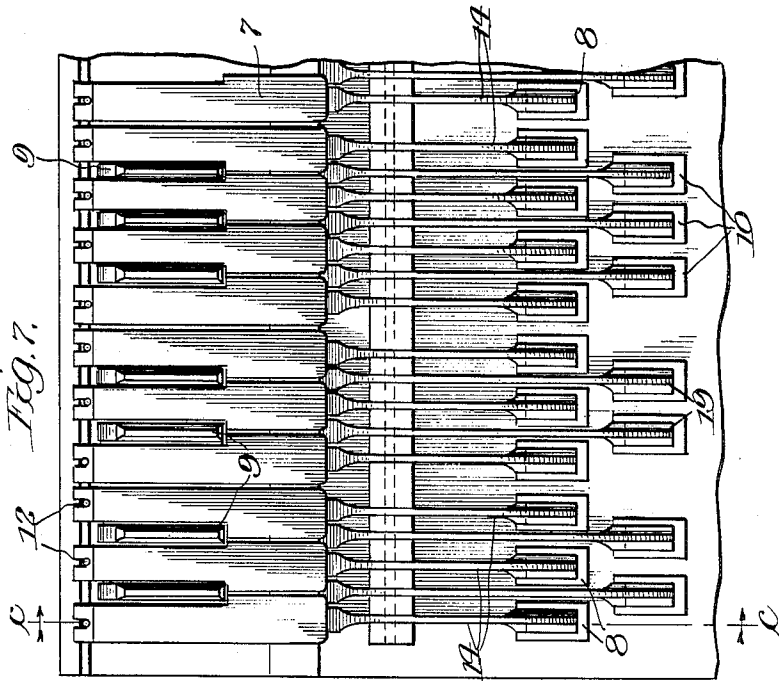


Fig. 8.

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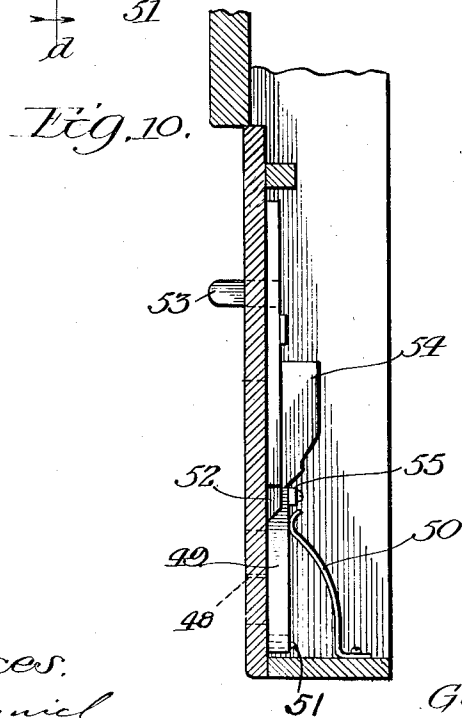
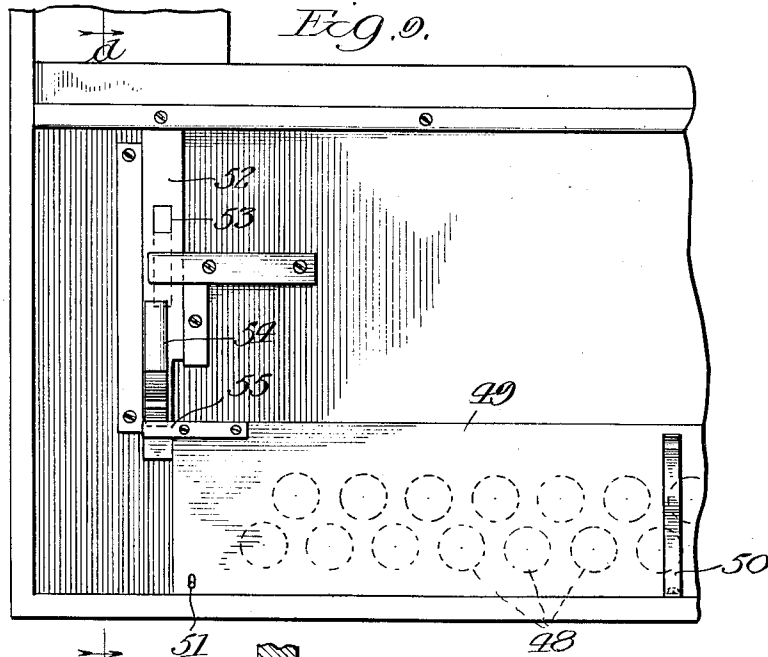
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GUSTAF ANDERSON, OF ISHPEMING, MICHIGAN.

ACCORDION.

1,139,010.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GUSTAF ANDERSON, a citizen of the United States, residing at Ishpeming, in the county of Marquette and State of Michigan, have invented a certain new and useful Improvement in Accordions, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to musical instruments and more particularly to that character of musical instruments pneumatically operated by being extended and retracted by hand, commonly called bellows accordions.

My invention has for its prime object the provision of an instrument in which a note may be sounded and then sustained without stoppage, irrespective of the movement of the bellows device, so that this note may continue to sound whether the instrument is being distended or retracted. Thus no stop occurs when the reversal of movement in the operation of the instrument takes place.

My invention has for its further object the provision of improved constructional features and arrangements whereby this end and others are attained, and also new constructional features applicable to other instruments of this general character.

In the preferred form of my invention, I utilize two key boards. These are preferably so arranged that the notes of one key board overlap the notes of the other key board so that the playing of the bass notes may be confined to one hand and the playing of the treble confined to the other hand. When two separate key boards are utilized I preferably use two separate air chambers which may be of the vacuum or compressed air variety. From these chambers which are in operative relation to the reeds or other sound producing devices, air is withdrawn or supplied as the case may be in the form herein shown by means of a bellows operated when the instrument is being distended or retracted.

It will be seen that as the sound-producing devices are actuated from the so called air chambers that these sound producing devices may operate continually when controlled by a suitable key irrespective of the distention or retraction of the instrument so long as the instrument is kept in motion, as

the bellows, if such is employed, continually maintains the air chambers under such suitable air supply as is continually necessary for the operation of the sound producing devices.

I will explain my invention more in detail by reference to the accompanying drawings illustrating one embodiment thereof, in which:

Figure 1 is a side view of an instrument constructed in accordance with my invention; Fig. 2 is an end view thereof; Fig. 3 is a similar view to Fig. 2 with the cover plate removed; Fig. 4 is a sectional view on lines *a-a* of Fig. 2; Fig. 5 is a sectional view on lines *b-b* of Figs. 1 and 4; Fig. 6 is a detail plan view of the sound producing devices; Fig. 7 is a plan view of one keyboard and associated mechanism; Fig. 8 is a sectional view on lines *c-c* of Fig. 7; Fig. 9 is a detail view of an expression attachment, and, Fig. 10 is a sectional view on lines *d-d* of Fig. 9.

Referring more particularly to Fig. 1, I show a side view of my instrument preferably made in what might be called two sections 1 and 2, each of which is provided with knee rests 3, 3 and straps 4, 4. The two halves are adapted to rest upon the knees and to be moved toward and away from each other, the hands being inserted between the sides of the instrument and the straps, where they are in proximity to the key boards respectively 5 and 6. One key board is preferably used for the bass notes and the other key board for the treble notes, the notes supplied by the two key boards preferably overlapping so that the high bass notes are duplicated in the treble key board and the low treble notes are duplicated in the bass key board, so that one hand may play the bass notes and the other hand the treble notes without confusion. In Fig. 2 which is an end view of the structure shown in Fig. 1, the arrangement of the keys will be more clearly apparent. The keyboard herein shown is like the ordinary piano or reed organ keyboard.

Referring more particularly to Fig. 3, the white keys 7 are so arranged as to actuate valves 8 and the black keys 9 are arranged to actuate valves 10. This arrangement is more clearly brought out in Figs. 7 and 8 where the white keys 7 are shown as movably mounted between an angle plate 11 and pins 12, thereby permitting their up and

down motion. These keys 7 by means of pins 13 actuate levers 14 normally held in a valve closing position by means of springs 15. The levers 14 end in valves 8 which control ports 16 associated with sound producing devices or reeds 17. The pins 18 are for guiding purposes. The black keys 9 are directly mounted on levers 19 which carry the valves 10 at their extremities to control ports associated with corresponding reeds 20 as will be clearly apparent. The ports are normally closed by reason of the springs 15 and whenever any of the keys are depressed, air may flow through the ports and actuate the reeds.

Referring more particularly to Fig. 4, the two sections 1 and 2 are shown united by an extensible and retractable structure comprising the ribs 21 and flexible membrane 22, so that these parts 1 and 2 may be moved toward and away from each other. A chamber 23 is formed by these parts which is always in communication with the atmosphere by means of holes 24 (Fig. 1). Two air chambers respectively 25 and 26 are provided in the sections 1 and 2 respectively, and it is into these air chambers that the passages controlled by the reeds open. If the air in the chambers 25 and 26 is exhausted or maintained under pressure constantly, it will be seen that whenever any valve 8 or 10 is actuated that air flows through the passages controlled by the reeds associated with said passages and that thus the reeds are operated to emit sound. It will also be understood that if these air conditions within the chambers 25 and 26 are constantly maintained that continuous sounds may be emitted by the reeds irrespective of whether the sections 1 and 2 are moved toward and away from each other. To maintain these air conditions, which in this particular application are vacuum conditions, I provide a bellows formed preferably in two parts respectively 27 and 28. The outside plate 29 of the bellows 28 is fastened to the section 2 and the plate 30 of the bellows 27 and the plate 31 of the bellows 28 are preferably fastened to the ends of the ducts 32 which are fastened to the section 1 and lead from the chamber 33 to within the air chamber 25. In the form shown herein these ducts 32 are unextensible. A duct 34 having extensible sections 35, 35 unites the air chamber 25 with the air chamber 26 so that the conditions in both chambers may be alike. The air chamber 25 has a plate 36 which by means of a collapsible membrane 37 and spring 38 is adapted to yield to the varying air conditions within the air chambers 25 and 26 to regulate the pressure therein. The plate 39 of the bellows 27 and the plate 29 of the bellows 28 are suitably fastened together by means of links 40. The casing of the

duct 34 preferably has a connecting link 41 by means of which it may be fastened to the plate 30. The bellows 27 has check valves 42 and 43 and the bellows 28 has check valves 44 and 45. As the sections 1 and 2 are moved to and from one another, the bellows 27 and 28 which are fastened to the casing 2 are actuated through the connection of their middle boards 30 and 31 to the casing by the ducts 32. For instance when the sections 1 and 2 are separated, this movement of the sections 1 and 2 causes a separation of plates 29 and 31 and permits air to be withdrawn from the chamber 33 through the check valve 45, at the same time plate 39 is moved toward plate 30 so that the air within the pumping bellows 27 is projected through the check valve 42 into the space surrounding the bellows and leaves this space through the openings 24. When the parts 1 and 2 are then again moved together, plate 39 is pulled from plate 30 to withdraw air from the chamber 33 through the check valve 43 at the same time the air in the pumping bellows 28 is forced out through the check valve 44 into the space surrounding the bellows as before. In this way it will be seen that air is continually exhausted from the chamber 33 and this exhaustion of air from the chamber 33 by reason of the duct 32 and duct 34 maintains a vacuum or partial vacuum within the reservoir bellows 25 and pneumatic storage chamber 26. Now whenever any key is actuated it opens the valve leading to its associated reed and permits atmospheric air to pass through the reed structure into one or the other of the chambers 25 and 26 to thereby operate the said reed. As the vacuum is continually maintained in the chambers 25 and 26, the reeds will respond continuously when the keys are actuated irrespective of whether the sections 1 and 2 are being opened or closed.

The sound emitted by the reeds travels substantially through the ports through which the air enters into either chambers 46 or 47 as the case may be and must pass through openings 48. In order to control this sound so that it may be loud or soft as desired, I provide a closure plate 49 which is normally held by a spring 50 to close these apertures and which is swung around pins 51. A slide 52 having a projecting handle 53 and an inclined wedge shaped plate 54 is movable to engage an arm 55 fastened to the plate 49 so that this plate may be raised away from these apertures or permitted to close them at will, so as to control the loudness of the sound emitted.

The reeds used are preferably of the standard organ type so that my device provides music of a variety entirely comparable to that furnished by an organ.

The advantages of thus producing a con-

tinuously responding instrument will be readily apparent. The tone qualities of the instrument are also considerably improved and widely different from previous instruments of this general character. The lowest note on the bass side is the same note that would be produced in any open organ pipe eight feet long. All the notes on the bass side are arranged chromatically, there being twenty-nine notes, so that the bass scale ends with E in the third octave. The lowest treble note is G next below middle C, and the thirty-nine notes are also arranged chromatically.

While I have herein described specifically one form in which I may embody my invention, it will be clear that wide variation is possible from the structure herein shown in accordance with the spirit of the invention.

Having, however, thus described one form what I claim as new and desire to secure by Letters Patent is:

1. A bellows accordion having two sections movable toward and away from each other substantially parallel to each other, sound producing devices carried by each section, manually operable keys provided on each section, a pneumatic chamber within each section, whose operative connection with its corresponding devices is controlled by said keys, said pneumatic chambers forming a reservoir chamber, an extensible and retractable tube for uniting said pneumatic chambers, and means operated by said sections when they are moved toward and away from each other to maintain a predetermined pneumatic condition within said reservoir chamber, said means including a pair of pumping bellows arranged side by side.

2. A bellows accordion having two sections movable toward and away from each other substantially parallel to each other, sound producing devices carried by each section, manually operable keys provided on each section, a pneumatic chamber within each section, whose operative connection with its corresponding devices is controlled by said keys, said pneumatic chambers forming a reservoir chamber, an extensible and retractable tube for uniting said pneumatic chambers, and means operated by said sections when they are moved toward and away from each other to maintain a predetermined pneumatic condition within said reservoir chamber, said means including a pair of pumping bellows arranged side by side, the adjoining end plates of said pumping bellows forming a chamber, and ducts leading from said last aforesaid chamber to said reservoir chamber.

3. A bellows accordion having two sections movable toward and away from each other substantially parallel to each other, sound producing devices carried by each

section, manually operable keys provided on each section, a pneumatic chamber within each section, whose operative connection with its corresponding devices is controlled by said keys, said pneumatic chambers forming a reservoir chamber, an extensible and retractable tube for uniting said pneumatic chambers, and means operated by said sections when they are moved toward and away from each other to maintain a predetermined pneumatic condition within said reservoir chamber, said means including a pair of pumping bellows arranged side by side, the adjoining end plates of said pumping bellows forming a chamber, and ducts leading from said last aforesaid chamber to said reservoir chamber, and means whereby said two pumping bellows are actuated alternately.

4. A bellows accordion having two sections movable toward and away from each other substantially parallel to each other, sound producing devices carried by each section, manually operable keys provided on each section, a pneumatic chamber within each section, whose operative connection with its corresponding devices is controlled by said keys, said pneumatic chambers forming a reservoir chamber, an extensible and retractable tube for uniting said pneumatic chambers, and means operated by said sections when they are moved toward and away from each other to maintain a predetermined pneumatic condition within said reservoir chamber, said means including a pair of pumping bellows arranged side by side, the adjoining end plates of said pumping bellows forming a chamber, and ducts leading from said last aforesaid chamber to said reservoir chamber, said reservoir chamber having a yielding wall.

5. An accordion having two sections, a pair of pumping bellows arranged side by side within said sections, means for fastening the adjoining sides of said bellows to one section, and means for fixedly securing the opposite sides of said bellows together and to the other section.

6. An accordion having two sections, a pair of pumping bellows arranged side by side within said sections, a tube for fastening the adjoining sides of said bellows to one section, means for fixedly securing the opposite sides of said bellows together and to the other section, and a reservoir bellows mounted in one section and receiving the air from said pumping bellows through said tube.

7. An accordion having two sections, a pair of pumping bellows arranged side by side within said sections, a tube for fastening the adjoining sides of said bellows to one section, means for fixedly securing the opposite sides of said bellows together and to the other section, a reservoir bellows mounted in

one section and receiving the air from said pumping bellows through said tube, a pneumatic storage chamber for the other section, and an extensible and retractable tube uniting said reservoir bellows with said pneumatic chamber.

8. An accordion having two sections, a pair of pumping bellows arranged side by side within said sections, a tube for fastening the adjoining sides of said bellows to one section, means for fixedly securing the opposite sides of said bellows together and to the other section, a reservoir bellows mounted in one section and receiving the air from said pumping bellows through said tube, a pneumatic storage chamber for the other section, an extensible and retractable tube uniting said reservoir bellows with said pneumatic chamber, and music producing devices mounted in each section and adapted to be operated respectively by said reservoir bellows and said pneumatic chamber.

9. An accordion having two sections, a

pair of pumping bellows arranged side by side within said sections, a tube for fastening the adjoining sides of said bellows to one section, means for fixedly securing the opposite sides of said bellows together and to the other section, a reservoir bellows mounted in one section and receiving the air from said pumping bellows through said tube, a pneumatic storage chamber for the other section, an extensible and retractable tube uniting said reservoir bellows with said pneumatic chamber, music producing devices mounted in each section and adapted to be operated respectively by said reservoir bellows and said pneumatic chamber, and keys provided in each section for controlling said music producing devices.

In witness whereof, I hereunto subscribe my name this 22nd day of June A. D. 1911.

GUSTAF ANDERSON.

Witnesses:

A. LYDA JONES,
O. M. WERMICH.