(No Model.) 2 Sheets—Sheet 1.

E. LIPPMANN & O. KELLER.

MECHANICAL ZITHER.

No. 540,449. Patented June 4, 1895.

Fig. 1

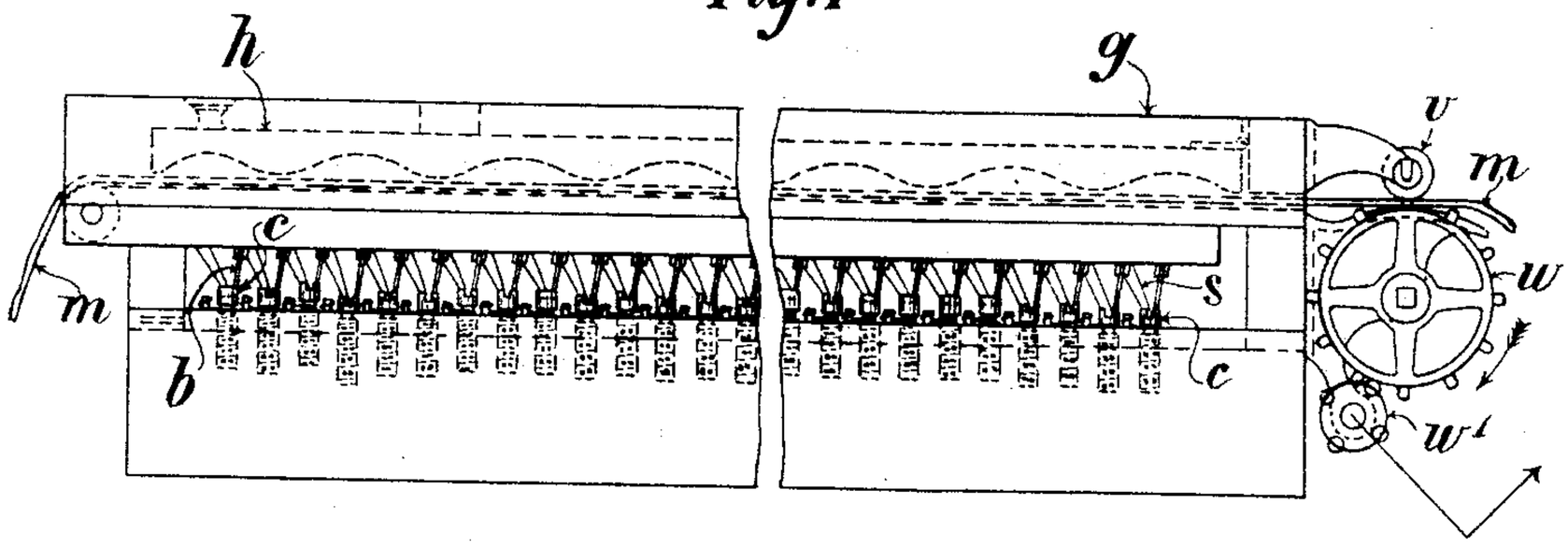
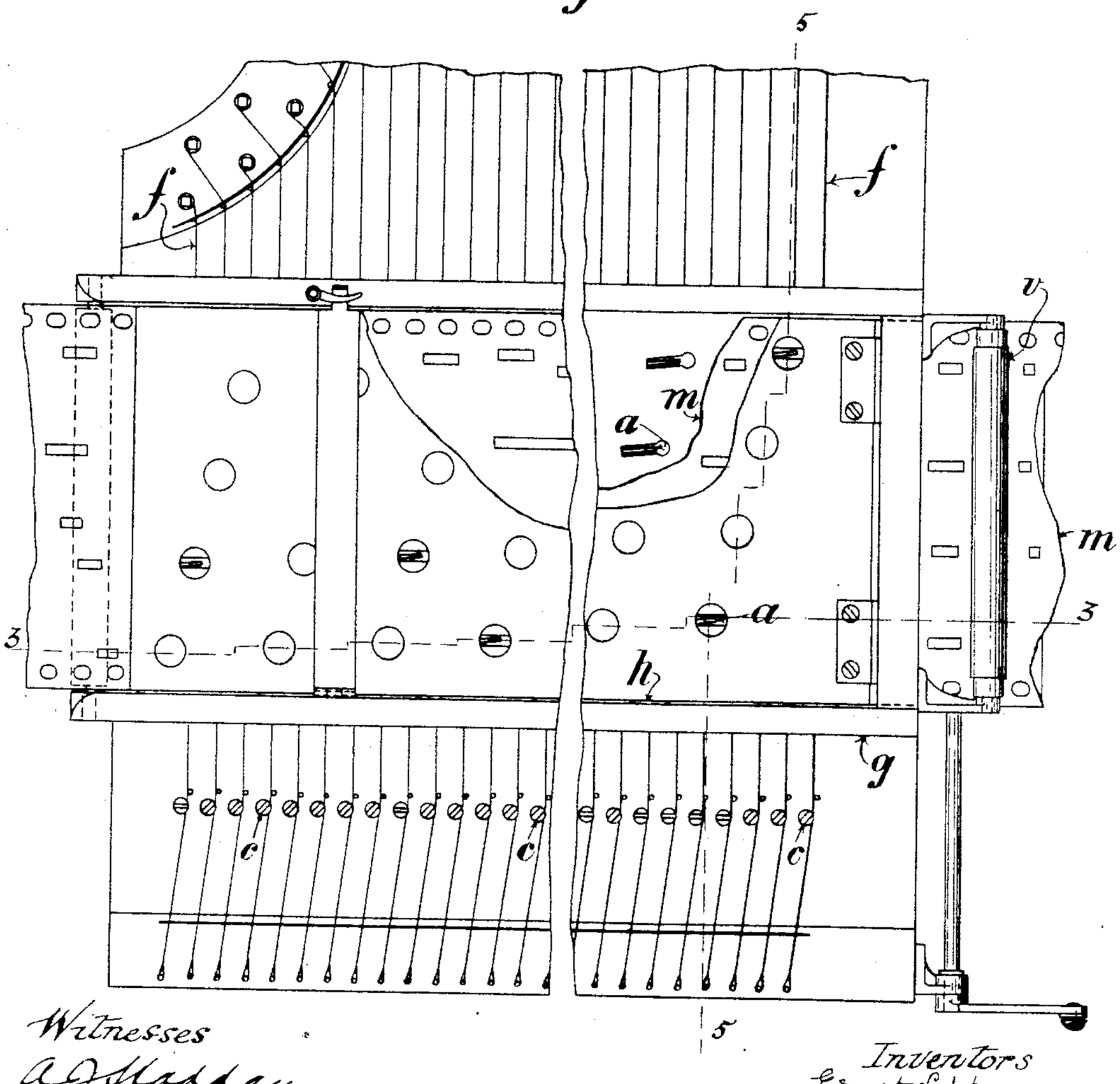


Fig. 2



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3

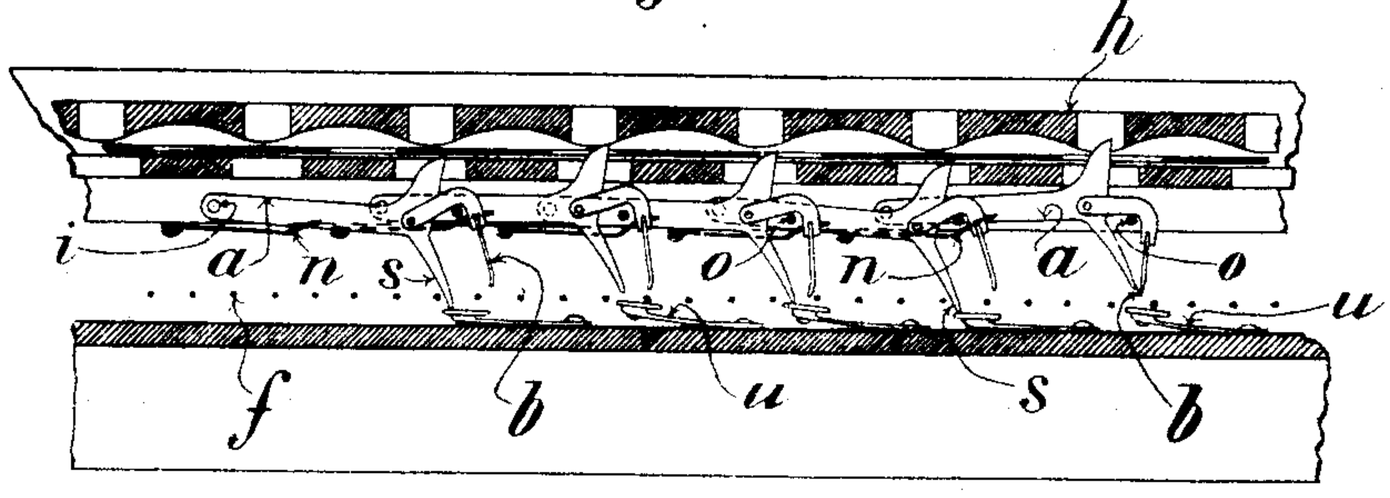


Fig. 4

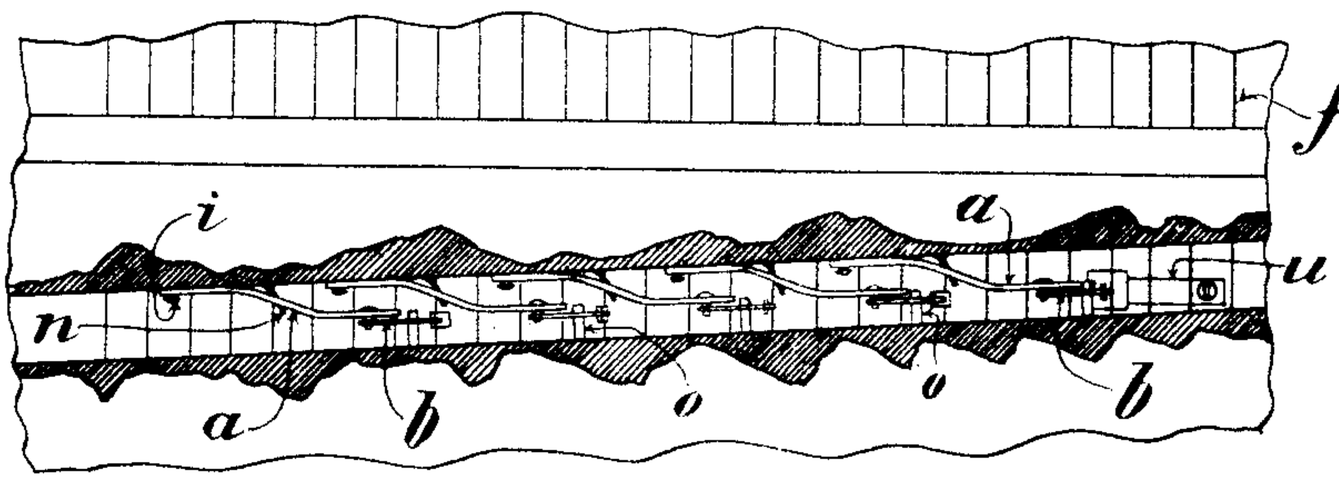
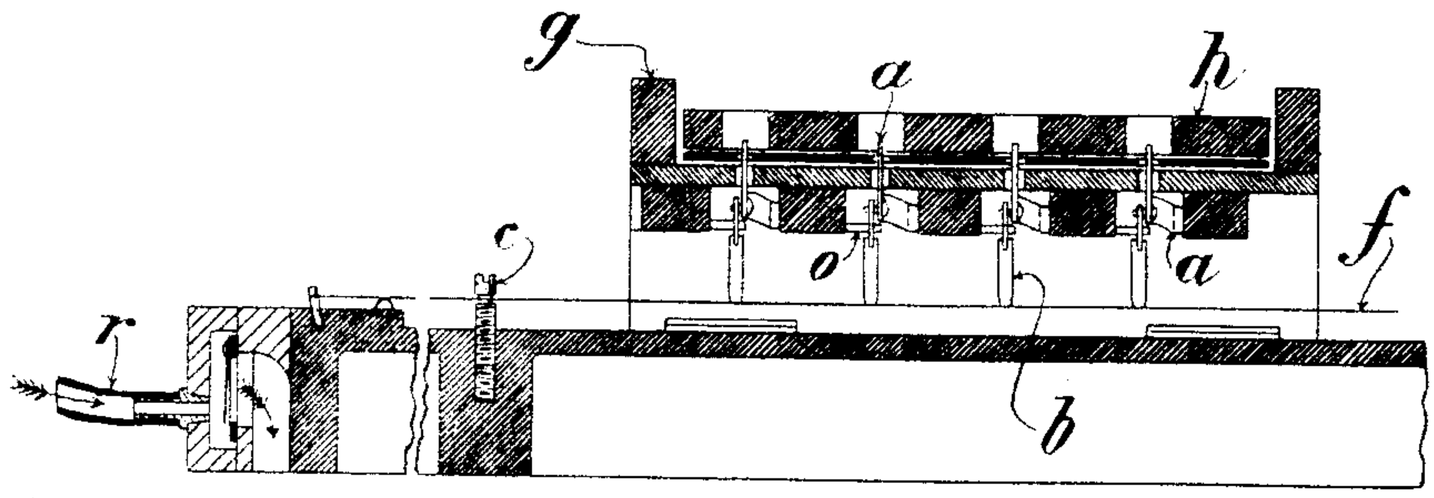


Fig. 5



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UNITED STATES PATENT OFFICE.

ERNST LIPPMANN AND OTTO KELLER, OF ZEITZ, GERMANY.

MECHANICAL ZITHER.

SPECIFICATION forming part of Letters Patent No. 540,449, dated June 4, 1895.

Application filed March 12, 1895. Serial No. 541,504. (No model.)

To all whom it may concern:

Be it known that we, ERNST LIPPMANN and OTTO KELLER, subjects of the Emperor of Germany, residing at Zeitz, Kingdom of Prussia, Germany, have invented a new and useful Improvement in Mechanical Zithers, of which the following is a clear and exact specification.

This invention relates to an improved zither constructed for playing mechanically any piece of music by using music sheets.

In the annexed drawings, Figure 1 represents a front elevation, and Fig. 2 shows a portion of the zither in plan view. Fig. 3 is a section along the pickers—for instance, on line 3 3 of Fig. 2; Fig. 4, a portion of the plan view broken away to show the key-levers and pickers or picking members from above; and Fig. 5 represents a cross-section along the strings and across the pickers—for instance, on line 5 5, Fig. 2.

The instrument is in the usual manner provided with its stretched strings and the mechanically actuated pickers are arranged at the top and across said strings.

This arrangement substantially consists of the key levers *a* arranged in the top of the instrument, distributed in rows over the strings and provided with corresponding dampers each of the said key levers being pivotally connected to a picker *b* actuated by a stop pin *o*. The arrangement may further comprise the screws *c*, provided upon the instrument, said screws having each an annular groove made around its upper end in each of which grooves one string *f* is passed for the purpose of regulating the positions of the strings with regard to the pickers.

The key levers *a* at one extremity are pivotally mounted on pins *i* in a series of recesses below the bottom part of the frame *g* and while projecting with their engaging points through holes in the bottom of the said frame, these levers are held in upward position by means of springs *n*. With the other extremity of each key lever *a* an angular picking member *b* resting upon a stop pin *o* is so connected that on pressing down the key lever *a* the angular lever is turned about the pin *o* so that the downturned end of the picker *b* passes transversely over the respective string *f*, deflecting it in its passage and thus producing a vibration of the string. On the rising of the key lever *a* under the pressure of the spring *n*, the angular picker is slightly raised and thus the picking arm of said angular picker is partially lifted before it turns back under its own weight around the pin *o* and thus resumes its initial position without touching the string on its return passage. Furthermore on each key lever *a* a downwardly projecting finger *s* is arranged and upon the instrument there is provided for each string *f* a spring *u* carrying a damper. The springs *u* serve to keep the dampers up against each of the strings *f* and the fingers *s* serve to press the dampers off the strings *f* before the latter are touched by the picking members and thus to keep the strings free for vibration.

The music sheet *m* is, as illustrated in Fig. 1, moved along over the bottom of the frame *g* over the key levers *a* and is held pressed against the latter by means of a covering plate *h* which can be folded onto it, so that the engaging points of the key levers are forced back by the music sheet into the bottom of the frame. On the arriving of a note, that is to say, of a hole in the music sheet (representing the note) above the engaging point of a key lever, this engaging point rises under the action of the spring *n* into the respective hole in the music sheet and the picking member *b* is during this process carried over the respective string and brought to the other side of the same without touching it. As the music sheet is moved forward, the engaging point is again forced out of its music sheet hole and the picker *b* passing over the string, strikes or picks the same, (Fig. 3.)

In order to bring the picking members *b* and the strings to be struck into a suitable position with regard to one another, each of the strings *f* is passed into the groove near the top of a screw *c*, so that by turning the screw in the one or other direction, each string can be adjusted to a higher or lower position to come correctly within reach of the respective picker. Instead of the grooved screws *c* pins or pegs may be used which may be displaced in direction of their height by

means of an eccentric, wedge or the like and which are provided with holes or recesses through which the strings are passed.

The music sheet may be passed along in sliding motion over the engaging points of the key levers *a* either as shown in Fig. 1 by the gearing of the teeth of the wheels *w* into certain holes of the music sheet *m*, in which case the music sheet is by means of the roller U kept in gear with the teeth of the wheels *w* or by winding said music sheet over a roller or in any other suitable form and manner.

In order that the strings may be easily tuned, a tuning tongue is or may be provided, as shown in Fig. 5, for each string which indicates the normal tone to be given to the respective string. These tuning tongues which are made to sound when blown into, are each separately inserted in a cell and each of the cells is provided with an orifice to receive a blow pipe *r* so that on inserting this pipe successively in any of the respective orifices of the cells, each of the tuning tongues can be made to sound. Instead of such tuning tongues for actuation by wind other tuning forks or plates to be actuated by touch or striking may be arranged on the instrument.

We claim as our invention—

1. The combination with a zither of a frame *g* traversing the strings of said zither, key levers *a* pivoted on said frame, pins *o* in said frame, angular pickers *b* resting on said pins *o* and connected to key levers *a* and springs *n* for raising said levers *a* the whole substantially as and for the purpose set forth.

2. In a zither the combination with the strings *f* of means for mechanically striking said strings and adjustable pins adapted to engage said strings and hold same at the correct elevation for operation of said striking mechanism.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ERNST LIPPMANN.
OTTO KELLER.

Witnesses:
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RUDOLPH FRICKE.