



US 20240213013A1

(19) **United States**

(12) **Patent Application Publication**
BOWDLER

(10) **Pub. No.: US 2024/0213013 A1**

(43) **Pub. Date: Jun. 27, 2024**

(54) **TIME OF FLIGHT MASS SPECTROMETER**

Publication Classification

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(51) **Int. Cl.**
H01J 49/40 (2006.01)

H01J 49/16 (2006.01)

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(52) **U.S. Cl.**
CPC **H01J 49/40** (2013.01); **H01J 49/164**
(2013.01)

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(57) **ABSTRACT**

A time of flight ("TOF") mass spectrometer having a control unit that is configured to control the TOF mass spectrometer to perform at least one acquisition cycle that includes operating a variable voltage unit to apply a dynamic potential difference between at least two electrodes of an ion gate. The dynamic potential difference is configured so that, within the/each acquisition cycle; a first potential difference is applied between the at least two electrodes in a first state at a first time; and a second potential difference is applied between the at least two electrodes at a second time. At least one of the first and second states of the ion gate is an intermediate state in which the ion gate deflects the ions passing through the ion gate such that some but not all of the ions passing through the ion gate are prevented from reaching a detector.

(21) Appl. No.: **18/288,489**

(22) PCT Filed: **Apr. 28, 2022**

(86) PCT No.: **PCT/EP2022/061389**

§ 371 (c)(1),

(2) Date: **Oct. 26, 2023**

(30) **Foreign Application Priority Data**

May 4, 2021 (GB) 2106342.5

