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WAR DEPARTMENT

OFFICE OF THE CHIEF SIGNAL OFFICER

WASHINGTON

8

April 8, 1935

Invention of Cipher Wheel Control Mechanism for a cipher machine of the type of Converter M-134-T2

1. Have five toothed wheels with varying numbers of teeth, all being prime to one another. For example, 37, 38, 39, 41, and 43 teeth.

2. These wheels are mounted on a common shaft but are not keyed to the shaft, being free to rotate and they are driven stepwise by meshing gears which mesh with the peripheral teeth for driving. The driving gears are mounted upon and keyed to a common drive shaft.

3. Mounted on each wheel is a collar, split into two pieces so as to be demountable easily by removable screws. These collar rings have notchings in irregular sequences. The notchings on the collars of the different wheels are all different and can be varied at will by issue of new collars or new 1/2 collars.

4. These notchings control contacts for opening and closing circuits to cipher wheels of cryptograph.

5. Switching arrangements are provided so that the toothed wheels can be made to control the cipher wheels permutatively. Example: Toothed wheel No. 1 can control cipher wheel No. 3; toothed wheel No. 2 can control cipher wheel No. 5, etc.

6. Paired toothed wheels, ten in all, can be employed as an alternative scheme. By appropriate switching arrangements TW_1 and TW_6, for example, can be made jointly to control one contact; TW_2 and TW_9, another, etc., so that the ten toothed wheels control, jointly in pairs, the five contacts which open and close the circuits for the cipher wheel stepping magnets. This arrangement would provide for a key of enormous length and variability.

7. Markings are provided on the periphery of the toothed wheels, for purposes of aligning them on a bench mark, so as to set the wheels according to a key.

8. The scheme is not limited to having 5 (or ten paired) toothed wheels. One can have as many toothed wheels (or pairs of toothed wheels) as cipher wheels in the cryptograph. Example: A cryptograph with 4 cipher wheels would have 4 toothed wheels (or 4 pairs if scheme in Par. 6 is used); a cryptograph with 6 cipher wheels would have 6 toothed wheels (or 6 pairs), etc.

William F. Friedman.

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April 18, 1935

Invention of Cipher Wheel Control Mechanism for a cipher machine of the type of Converter M-134-T2

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1. Have five toothed wheels with varying numbers of teeth, all being prime to one another. For example, 37, 38, 39, 41, and 43 teeth.

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3. Mounted on each wheel is a collar, split into two pieces so as to be demountable easily by removable screws. These collar rings have notchings in irregular sequences. The notchings on the collars of the different wheels are all different and can be varied at will by issue of new collars or new ½ collars.

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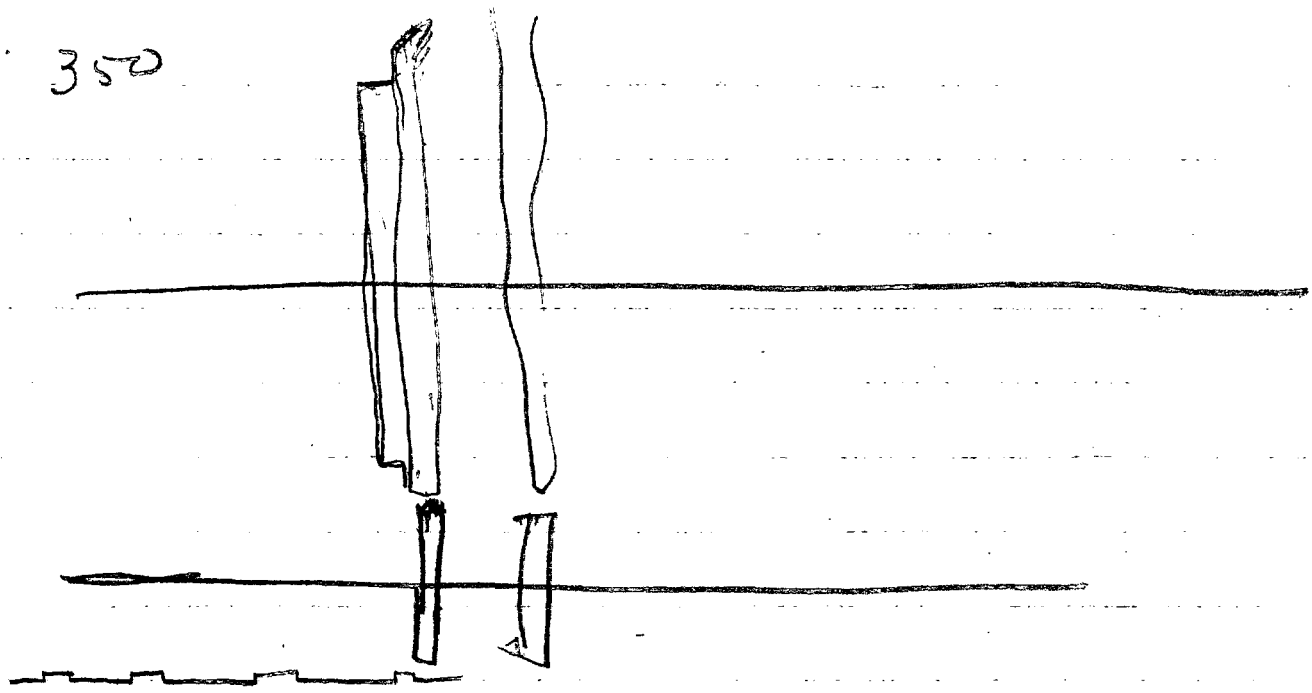
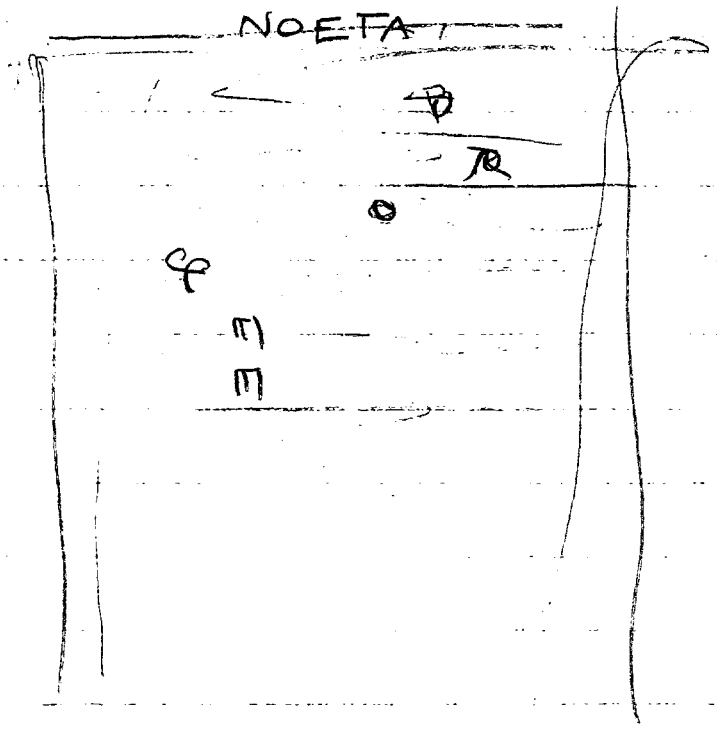
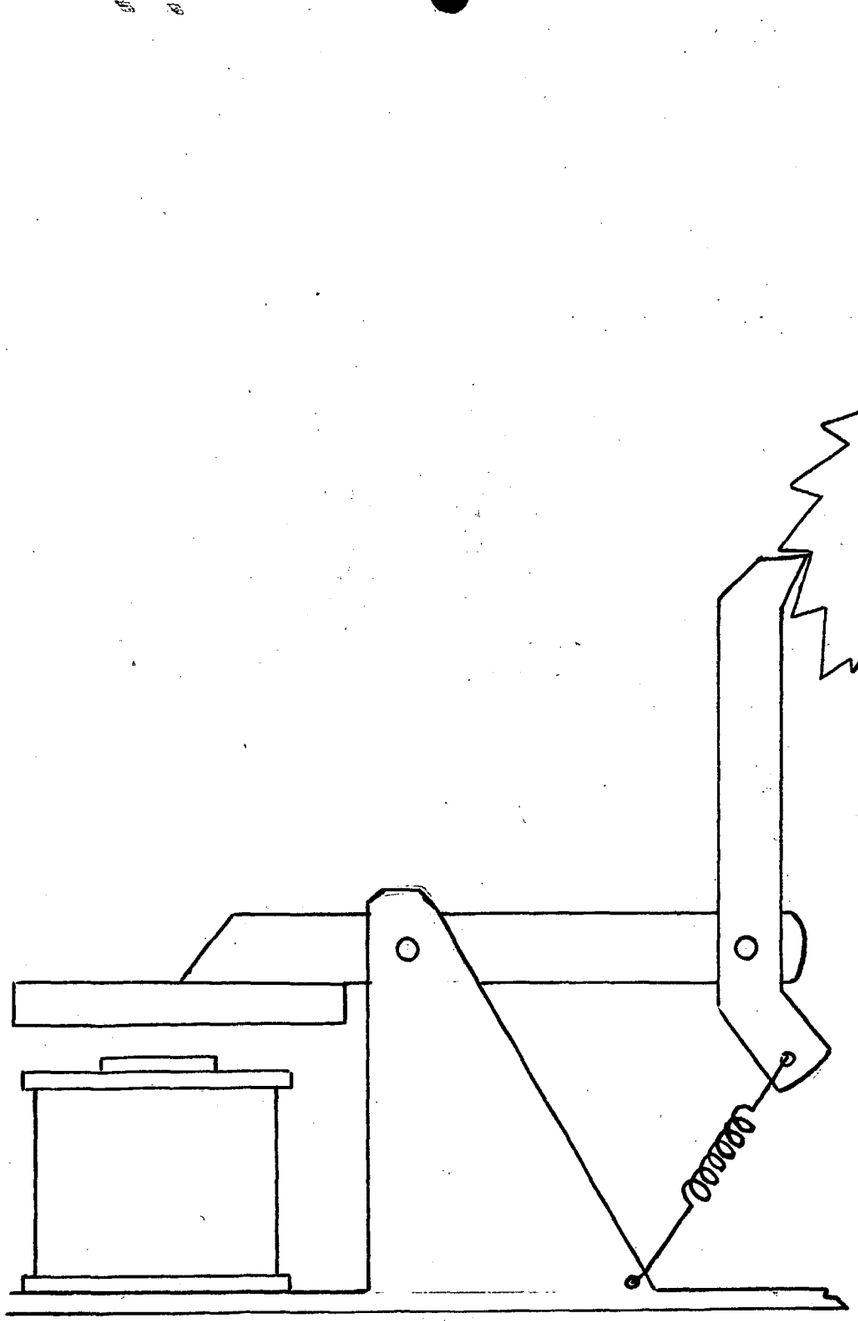
$37 \times 39 \times 41 \times 43 \times 45 \times$

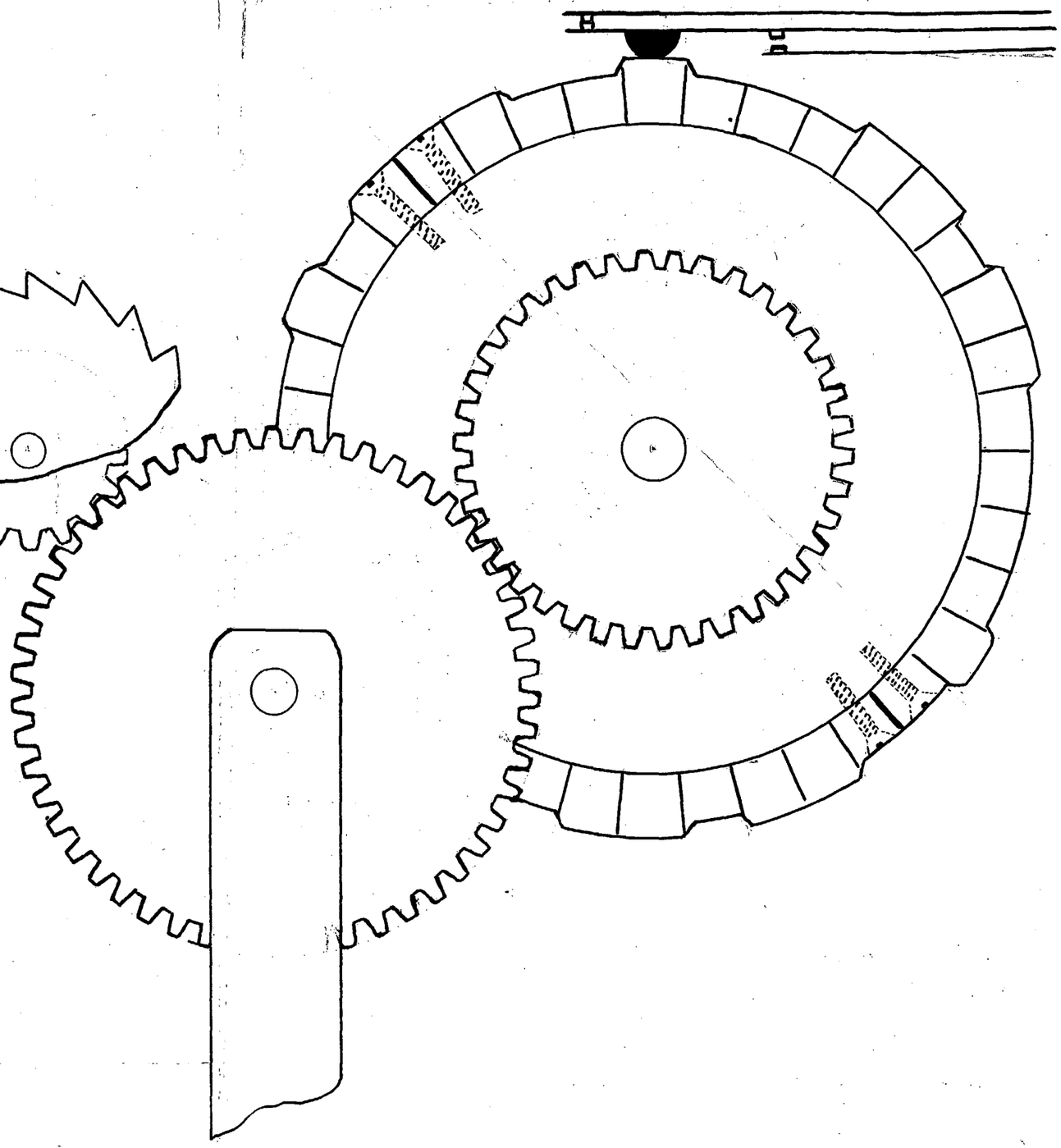
$\sqrt{37 \times 38 \times 39 \times 41 \times 43} \times 47 \times 49 \times 53 \times 55 \times 57$

40









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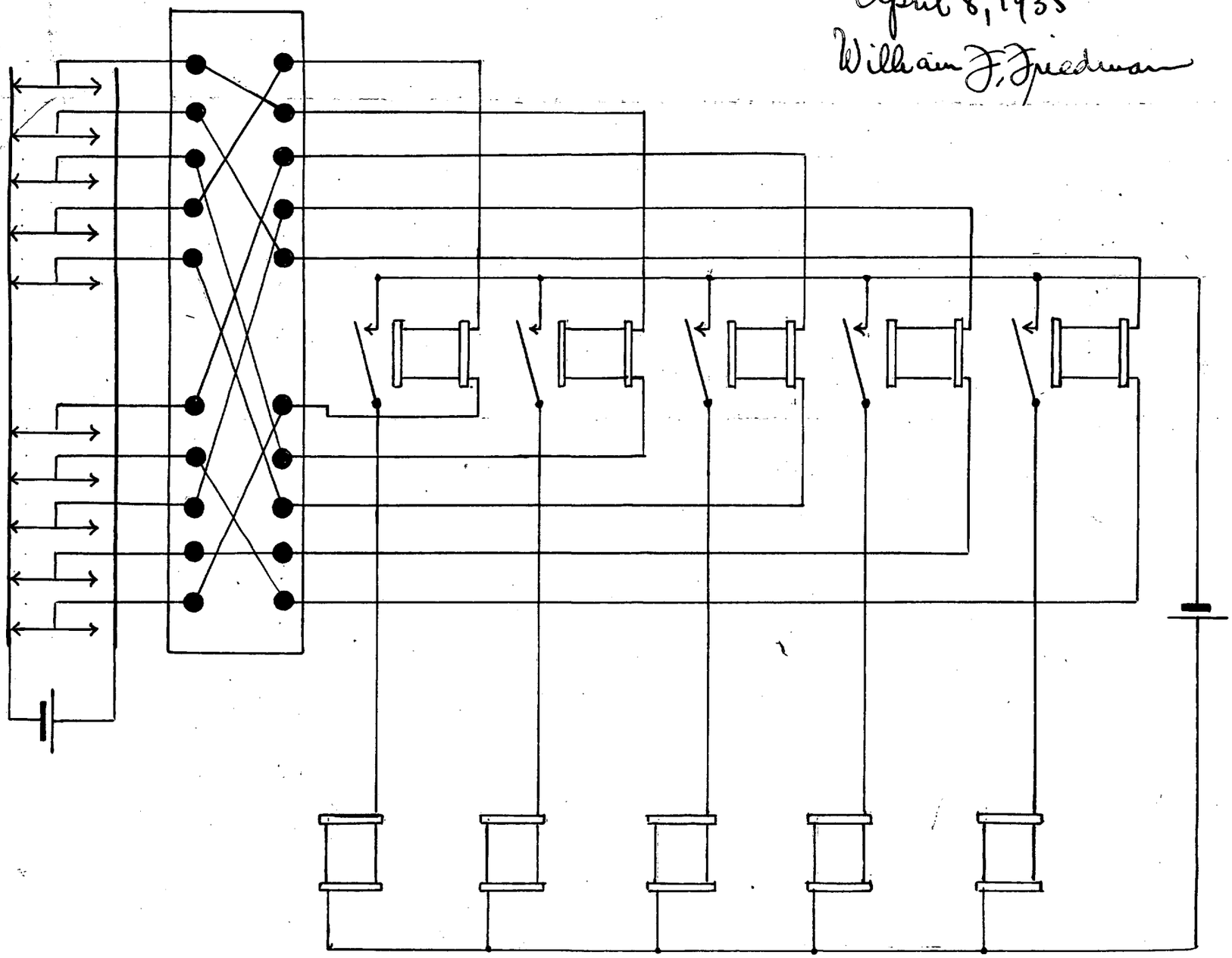

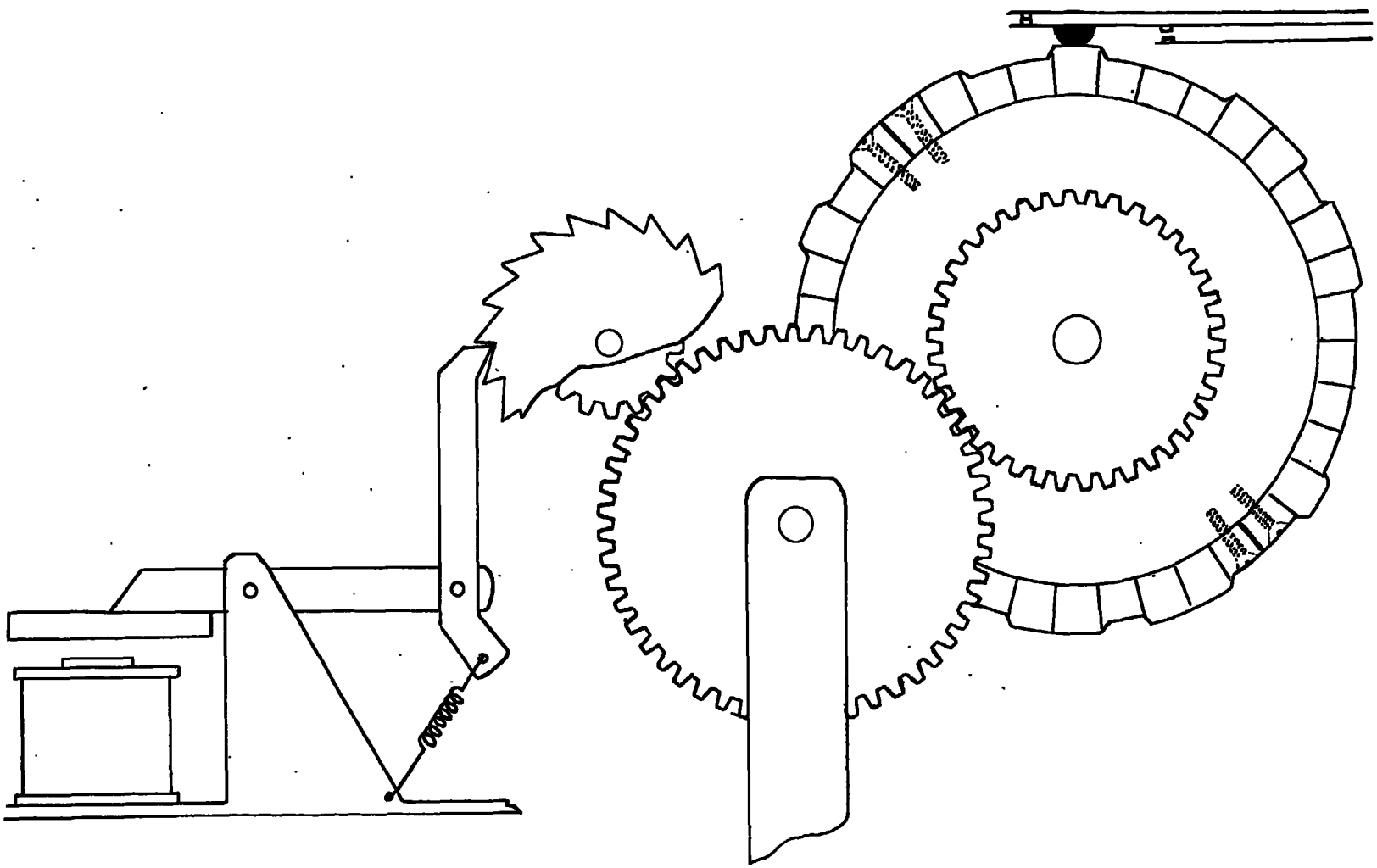

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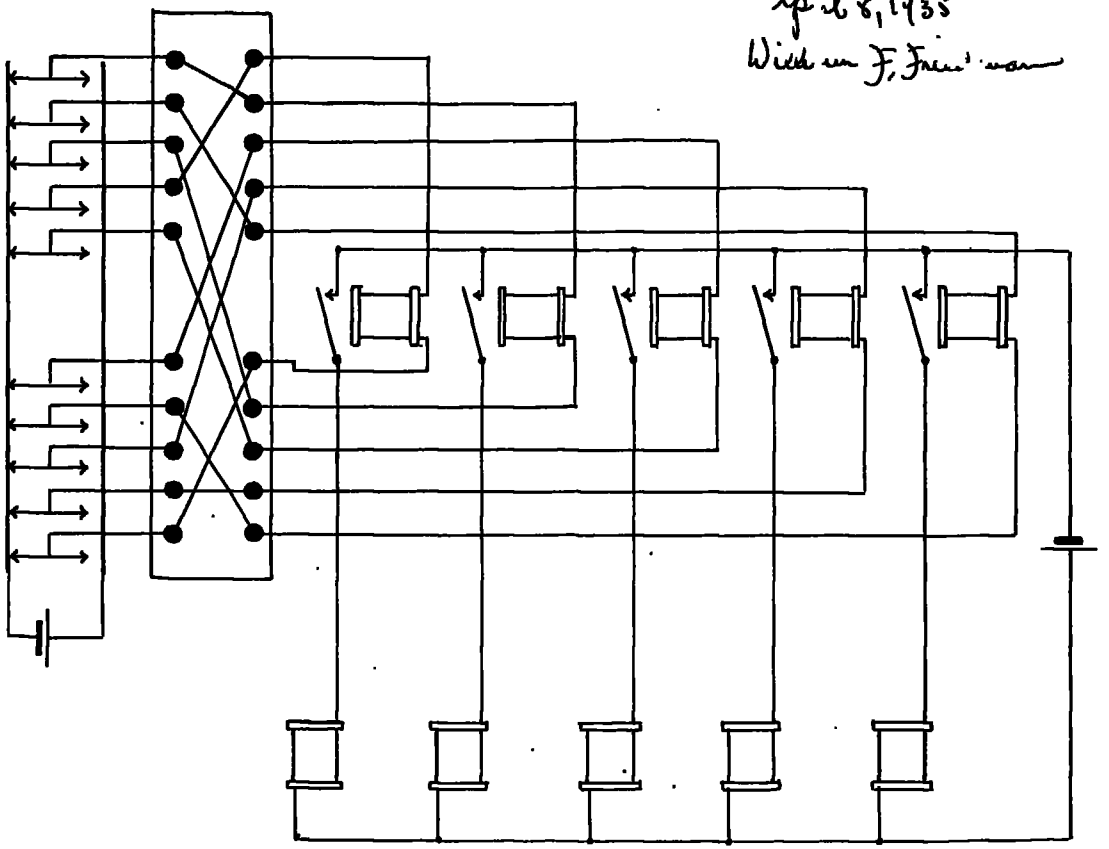
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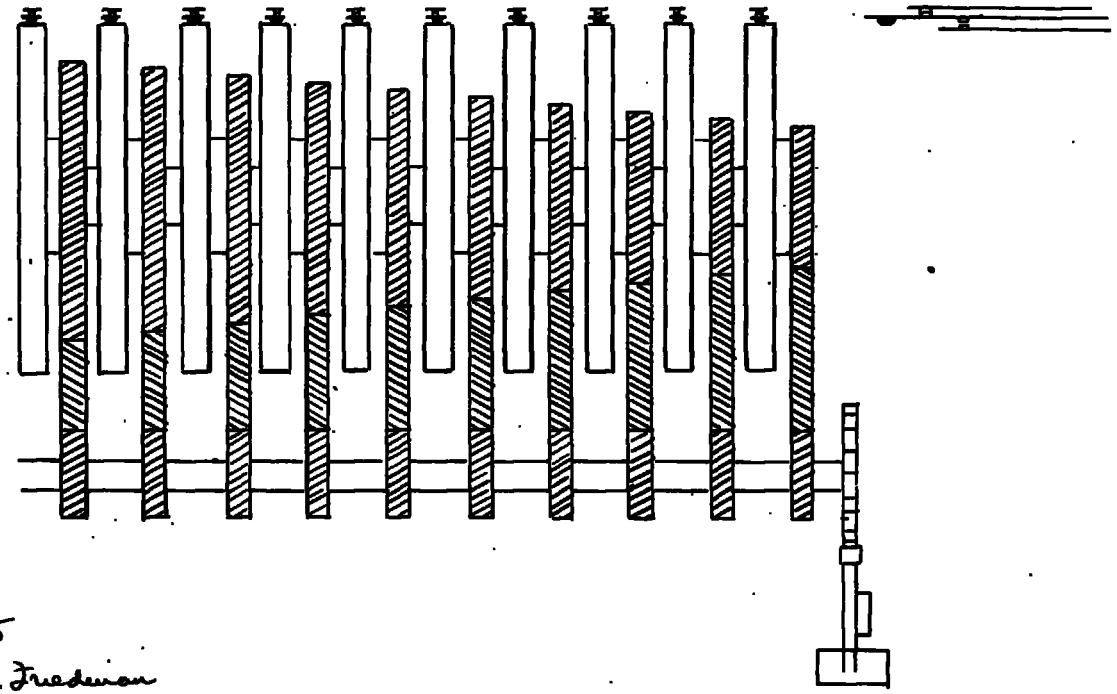

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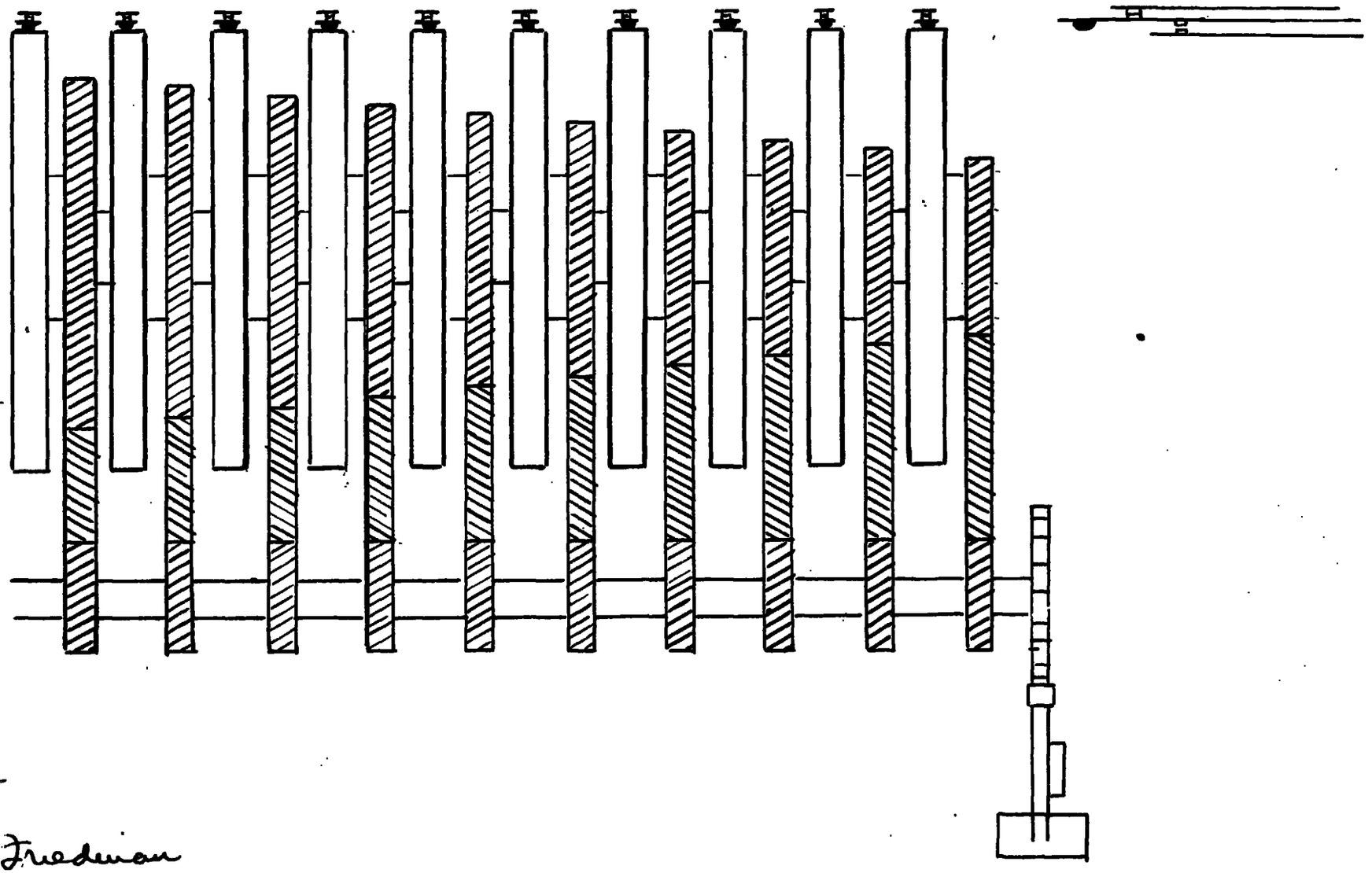

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