

ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ОБРАЗОВАНИЮ
Московский Государственный Технический Университет
«МАМИ»

Кафедра “Теория механизмов и машин”

Одобрено
методической комиссией
общетехнических дисциплин

ПЛАНЕТАРНЫЕ МЕХАНИЗМЫ
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Сборник задач планетарных механизмов по Теории механизмов и машин.
Кол-во стр. 44; Рис. 155;

Цель сборника заданий – закрепление навыков определения передаточного отношения графическим и аналитическим способами многозвенных зубчатых механизмов с неподвижными и с подвижными осями вращения колес.

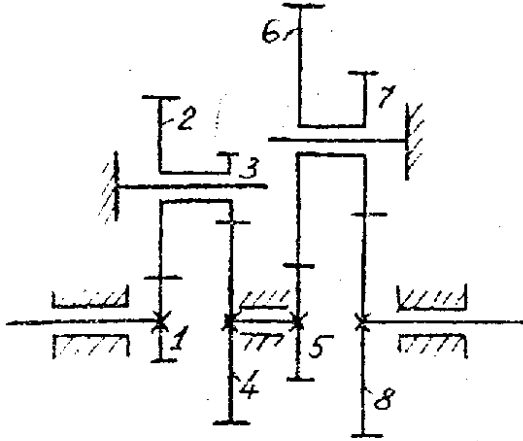
В задачнике даны схемы различных видов планетарных механизмов. Считая радиусы начальных окружностей известными, определить указанные передаточные отношения.

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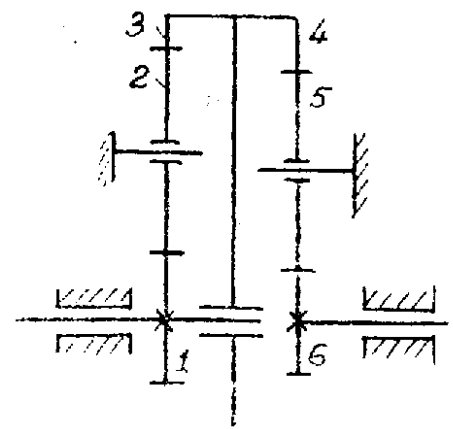
1. Передатки с неподвижными осями

①



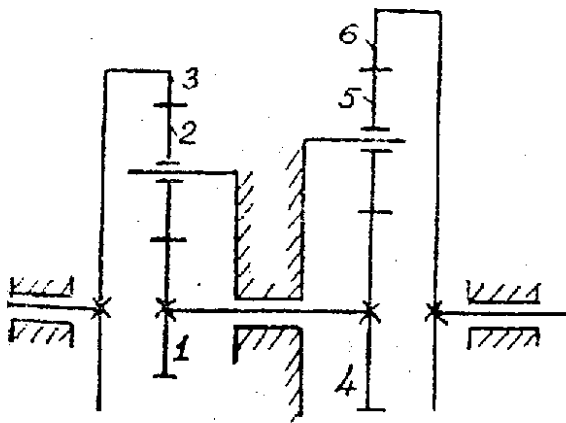
$$U_{18} = \frac{\omega_1}{\omega_8} ?$$

②



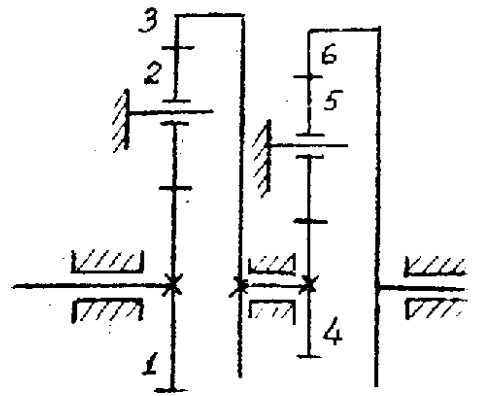
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

③



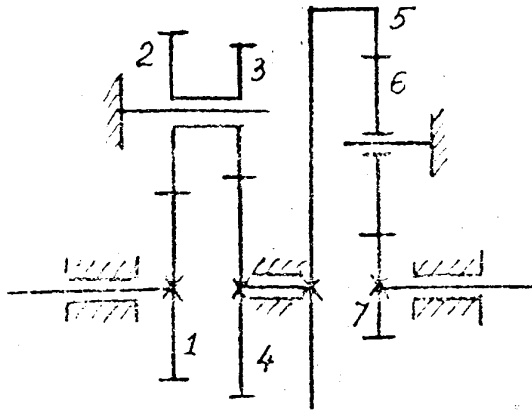
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

④



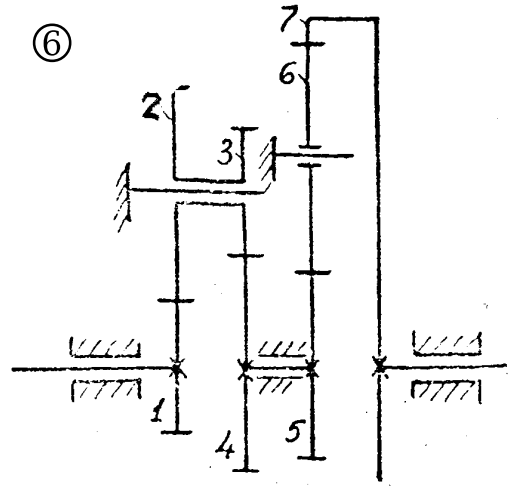
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

⑤



$$U_{17} = \frac{\omega_1}{\omega_7} ?$$

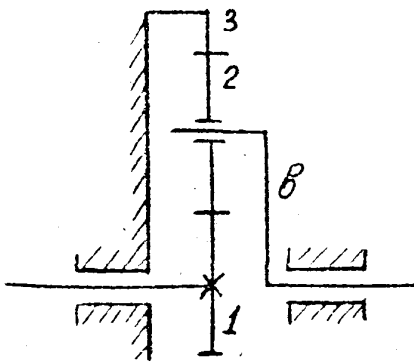
⑥



$$U_{17} = \frac{\omega_1}{\omega_7} ?$$

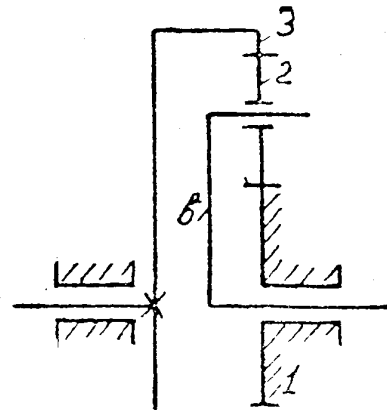
2. Простые планетарные механизмы

⑦



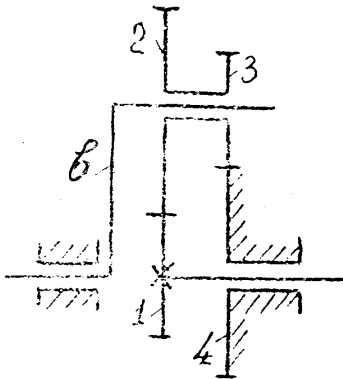
$$U_{1б} = \frac{\omega_1}{\omega_б} ?$$

⑧



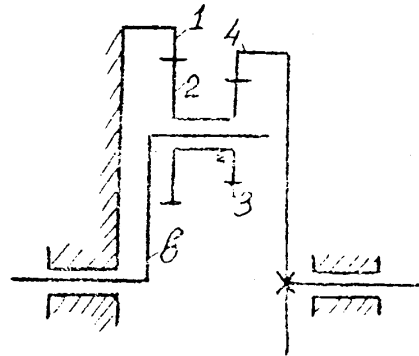
$$U_{3б} = \frac{\omega_3}{\omega_б} ?$$

⑨



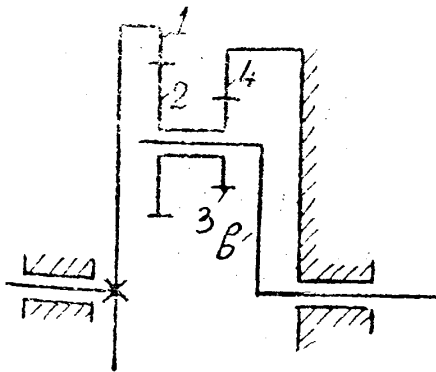
$$U_{e1} = \frac{\omega_2}{\omega_1}?$$

⑩



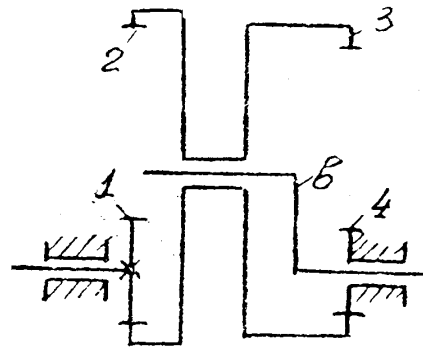
$$U_{e4} = \frac{\omega_2}{\omega_4}?$$

⑪



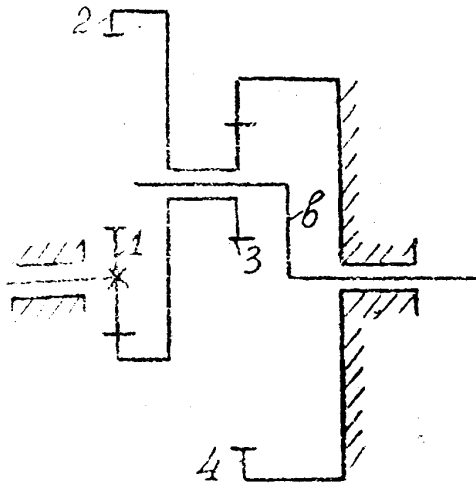
$$U_{e1} = \frac{\omega_2}{\omega_1}?$$

⑫



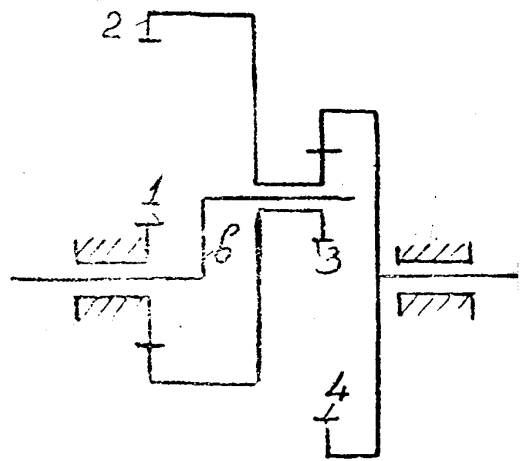
$$U_{e1} = \frac{\omega_2}{\omega_1}?$$

(13)



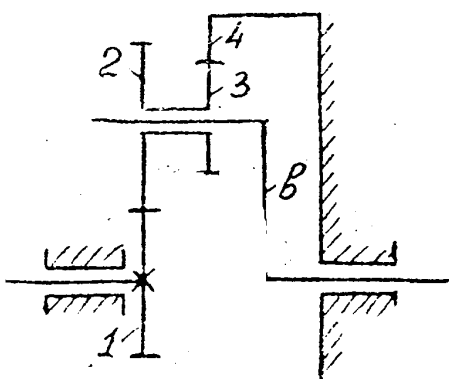
$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

(14)



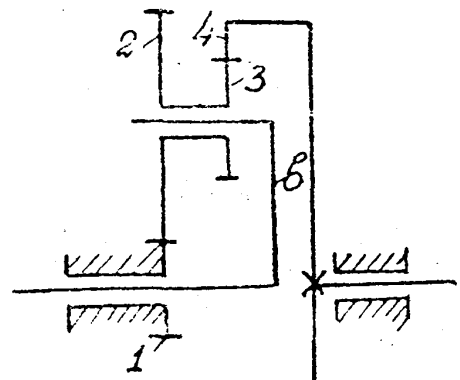
$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

(15)

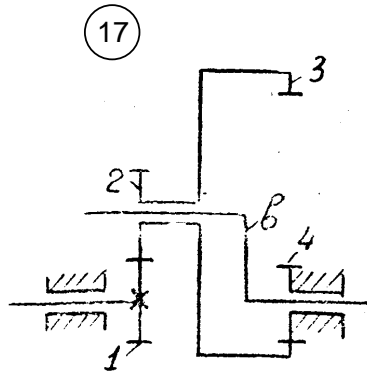


$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

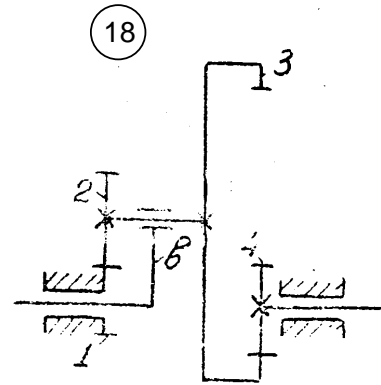
(16)



$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

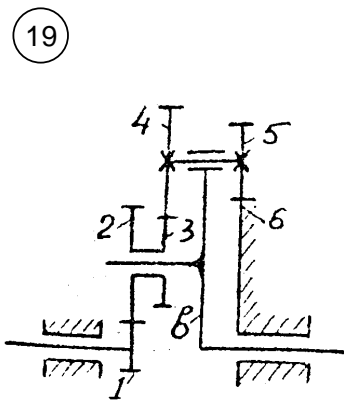


$$U_{e1} = \frac{\omega_6}{\omega_1} ?$$

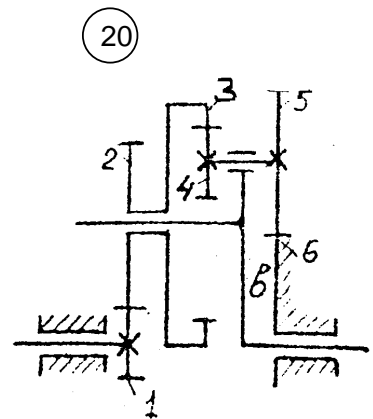


$$U_{e4} = \frac{\omega_6}{\omega_4} ?$$

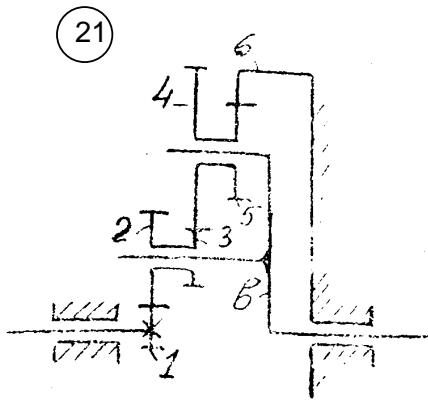
3. Планетарные с тройной передачей



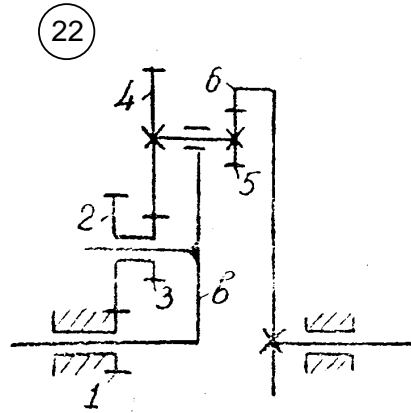
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$



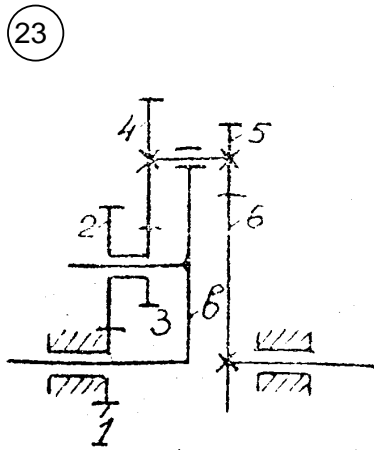
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$



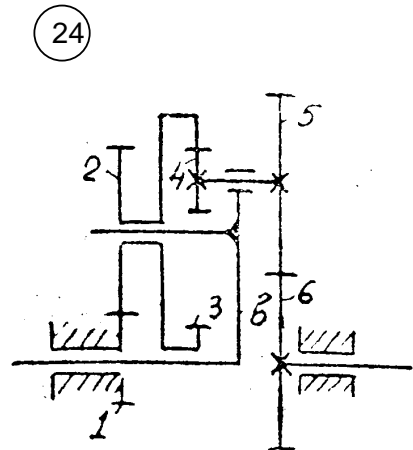
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$



$$U_{68} = \frac{\omega_6}{\omega_8} ?$$

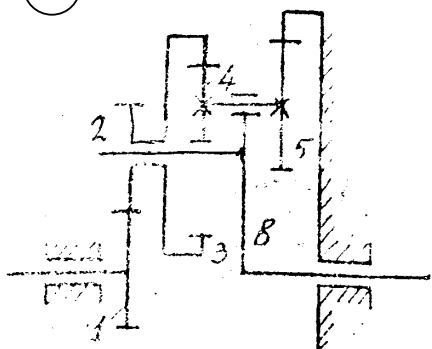


$$U_{68} = \frac{\omega_6}{\omega_8} ?$$



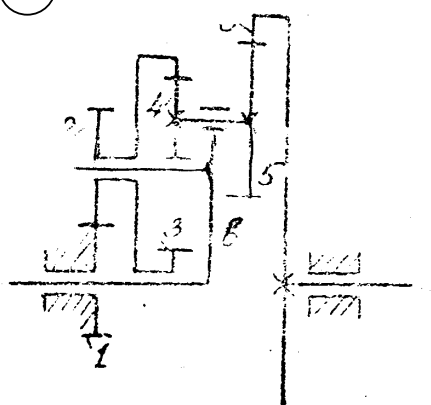
$$U_{68} = \frac{\omega_6}{\omega_8} ?$$

(25)



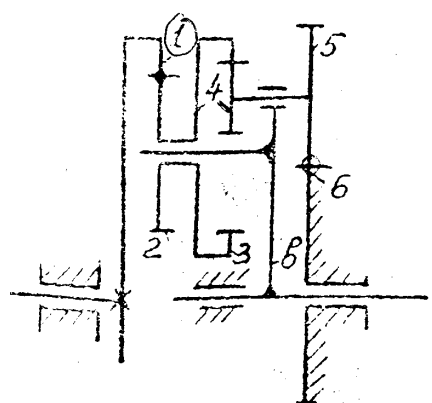
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(26)



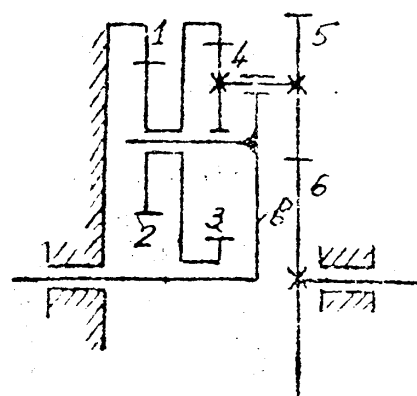
$$U_{66} = \frac{\omega_6}{\omega_6} ?$$

(27)



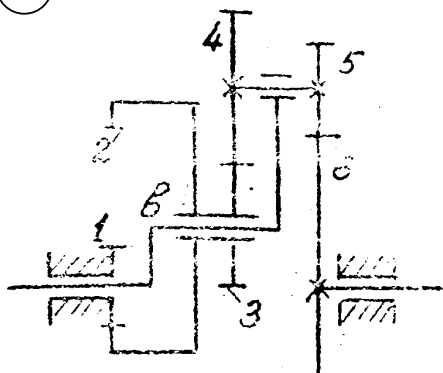
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(28)



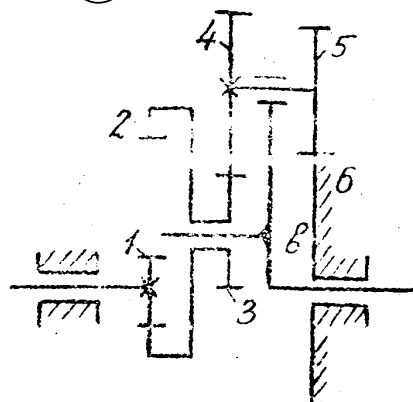
$$U_{66} = \frac{\omega_6}{\omega_6} ?$$

(29)



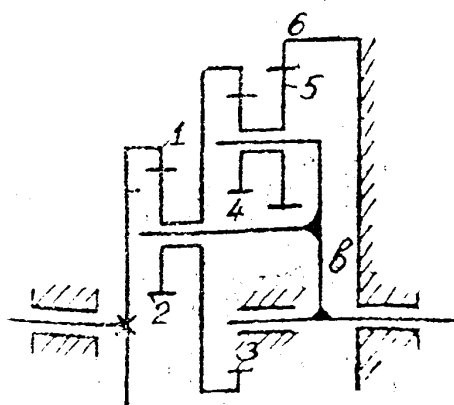
$$U_{6e} = \frac{\omega_6}{\omega_8} ?$$

(30)



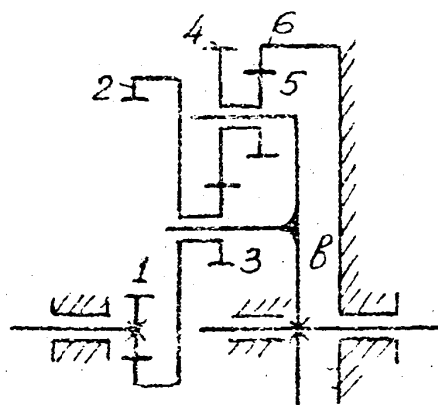
$$U_{1e} = \frac{\omega_1}{\omega_8} ?$$

(31)



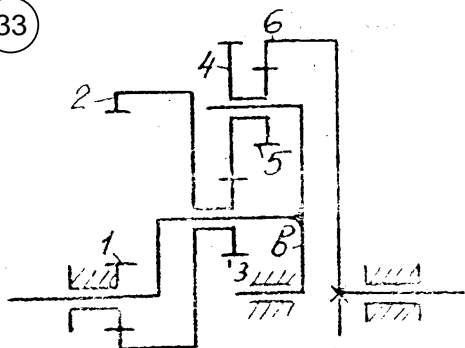
$$U_{1e} = \frac{\omega_1}{\omega_8} ?$$

(32)



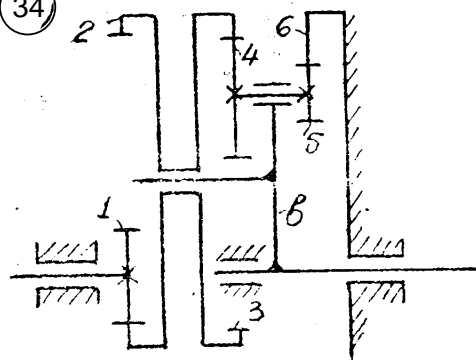
$$U_{1e} = \frac{\omega_1}{\omega_8} ?$$

(33)



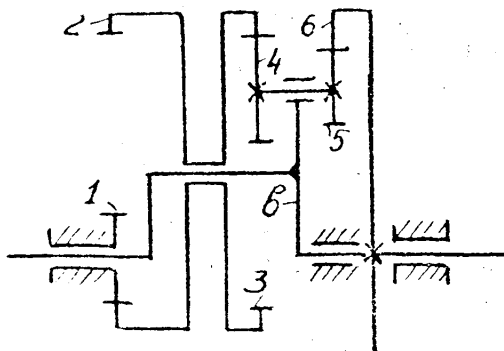
$$U_{62} = \frac{\omega_6}{\omega_2} ?$$

(34)



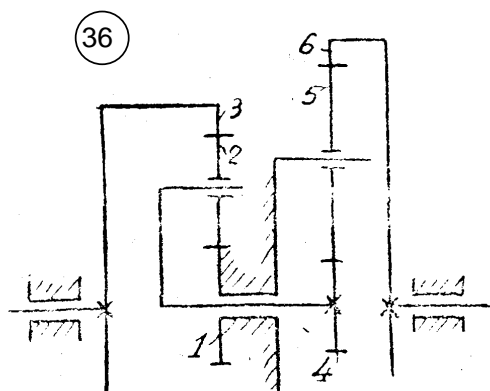
$$U_{62} = \frac{\omega_6}{\omega_2} ?$$

(35)

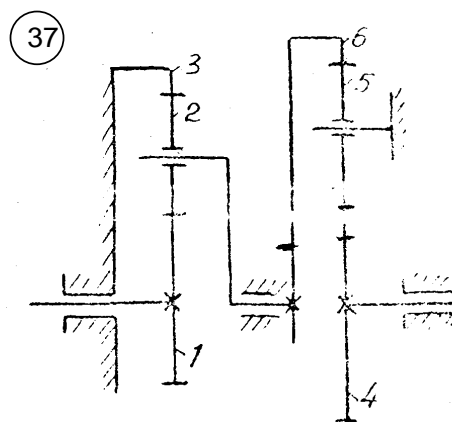


$$U_{62} = \frac{\omega_6}{\omega_2} ?$$

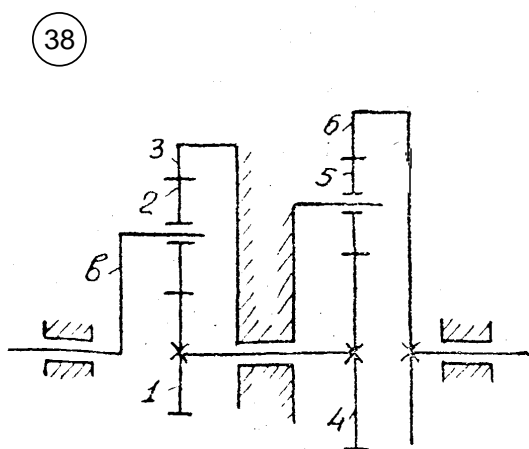
4. Простые планетарные соединенные с многоступенчатыми передачами



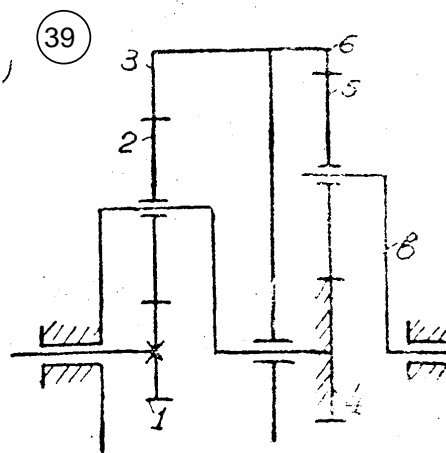
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$



$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

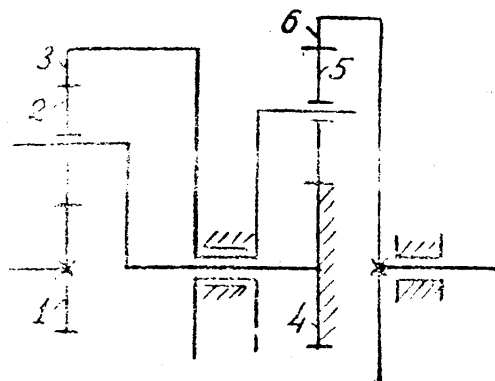


$$U_{e6} = \frac{\omega_e}{\omega_6} ?$$



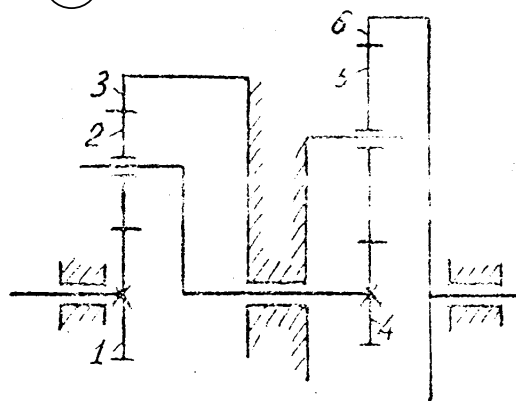
$$U_{1e} = \frac{\omega_1}{\omega_e} ?$$

(40)



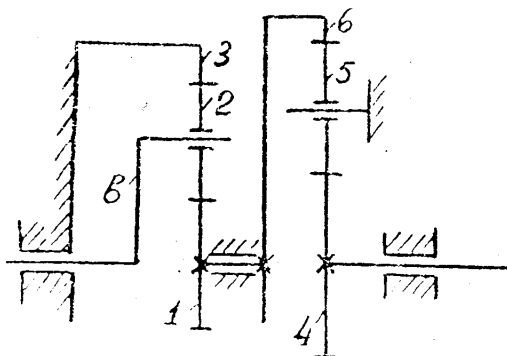
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(41)



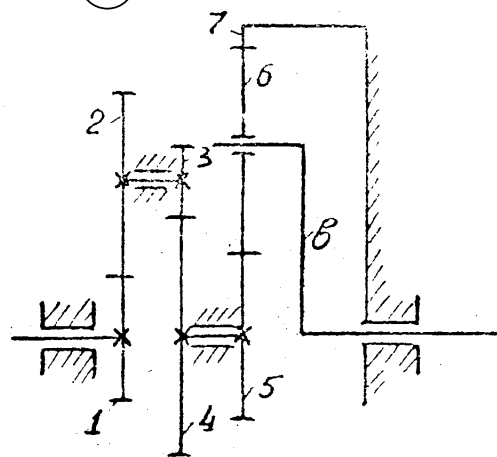
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(42)

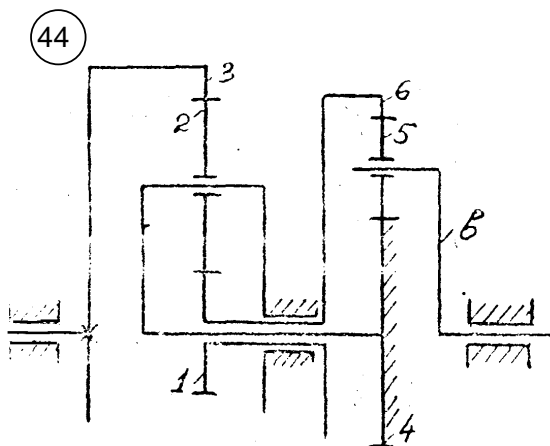


$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

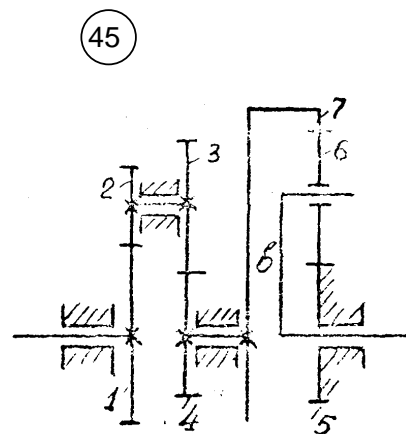
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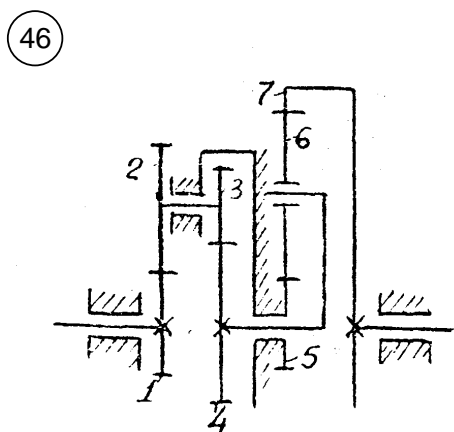
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$



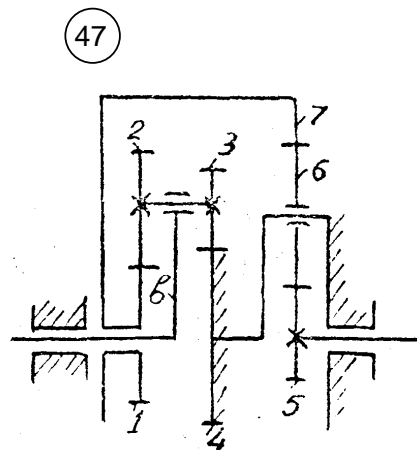
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$



$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

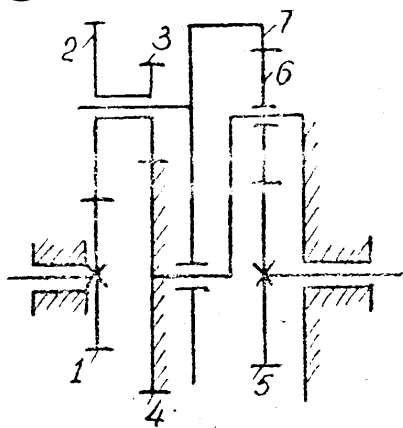


$$U_{17} = \frac{\omega_1}{\omega_7} ?$$



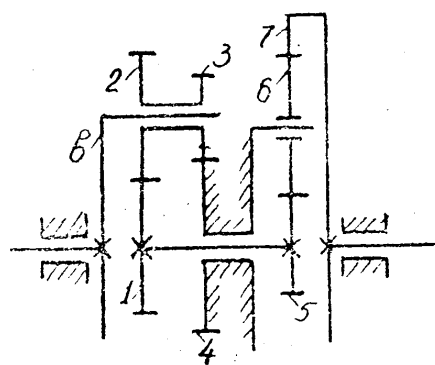
$$U_{65} = \frac{\omega_6}{\omega_5} ?$$

(48)



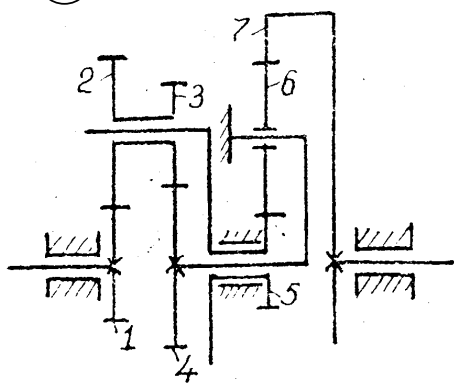
$$U_{15} = \frac{\omega_1}{\omega_5} ?$$

(49)



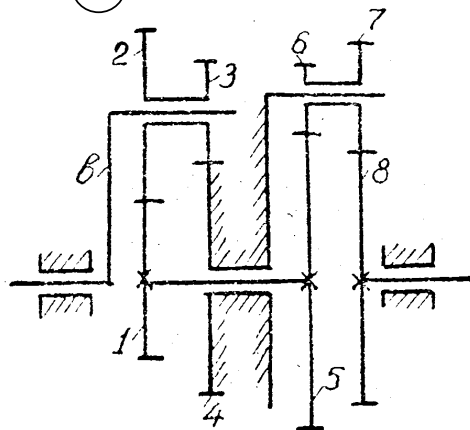
$$U_{67} = \frac{\omega_6}{\omega_7} ?$$

(50)



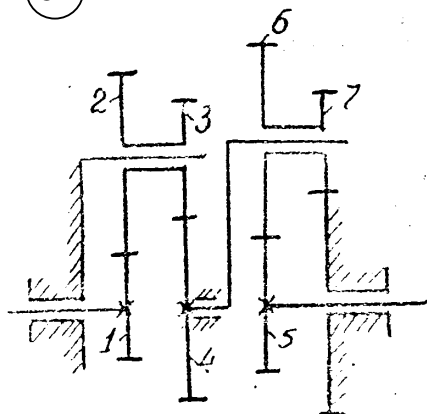
$$U_{17} = \frac{\omega_1}{\omega_7} ?$$

(51)



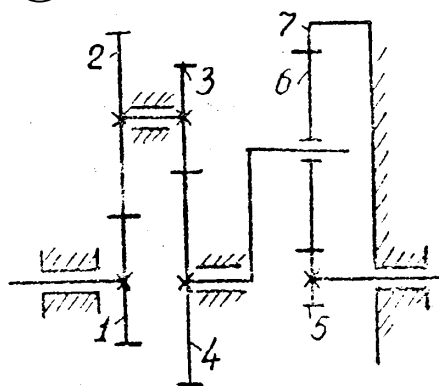
$$U_{68} = \frac{\omega_6}{\omega_8} ?$$

52



$$U_{15} = \frac{\omega_1}{\omega_5} ?$$

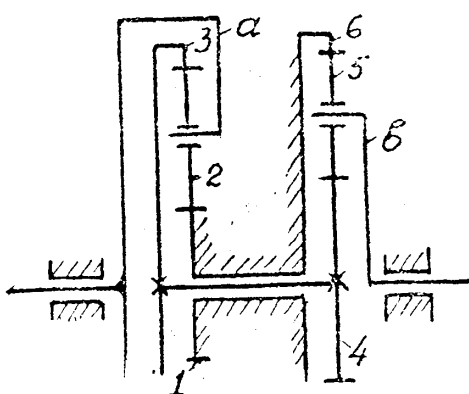
53



$$U_{15} = \frac{\omega_1}{\omega_5} ?$$

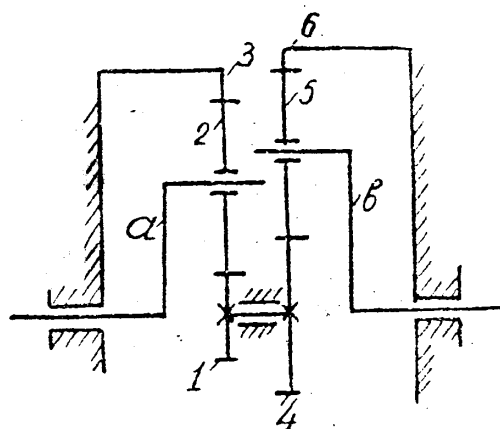
5. Планетарные двухкратные

54



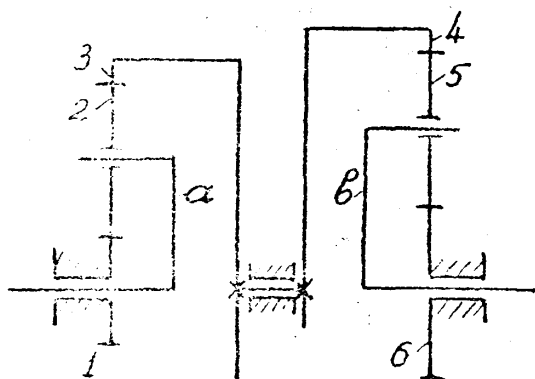
$$U_{a\beta} = \frac{\omega_a}{\omega_\beta} ?$$

55



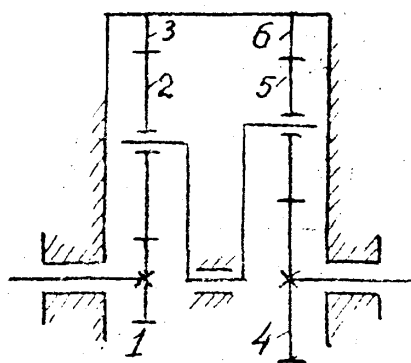
$$U_{a\beta} = \frac{\omega_a}{\omega_\beta} ?$$

(56)



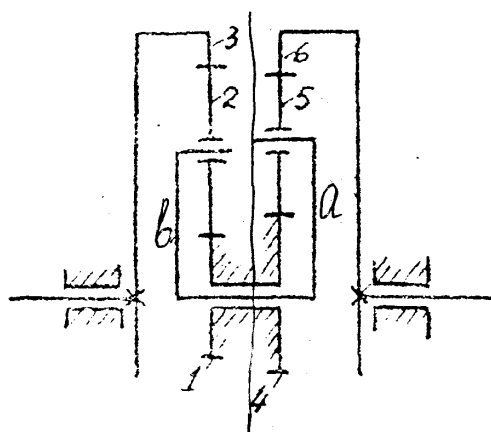
$$U_{a6} = \frac{\omega_a}{\omega_6} ?$$

(57)



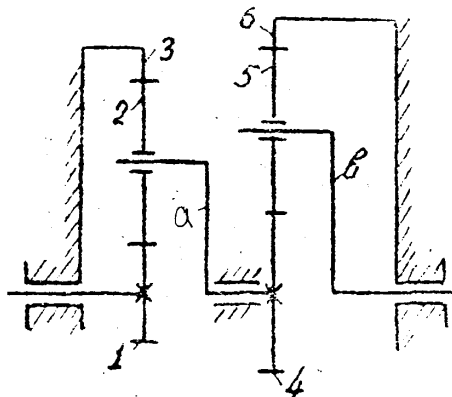
$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

(58)



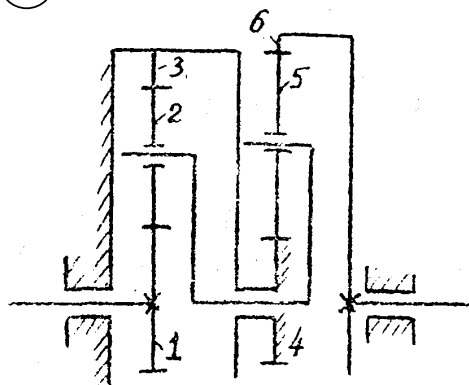
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

(59)



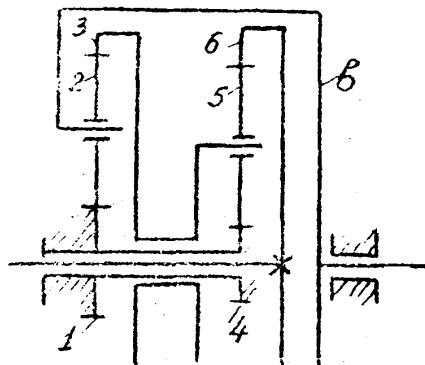
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(60)



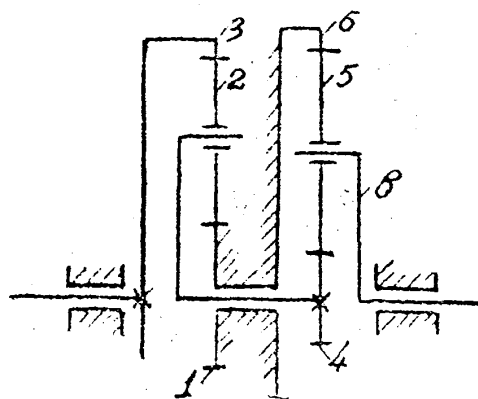
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(61)



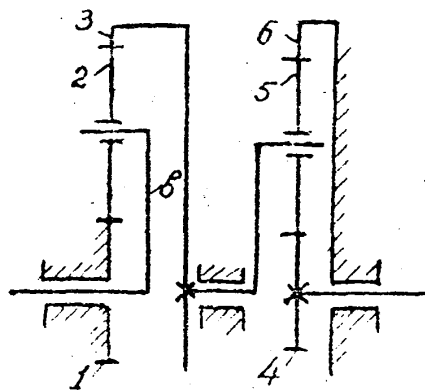
$$U_{66} = \frac{\omega_6}{\omega_6} ?$$

(62)



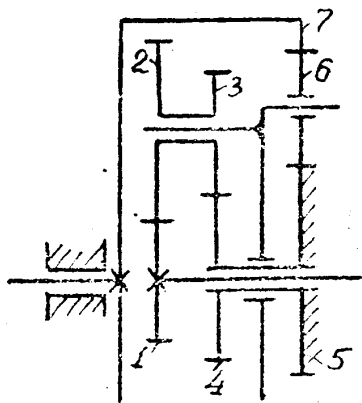
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

(63)



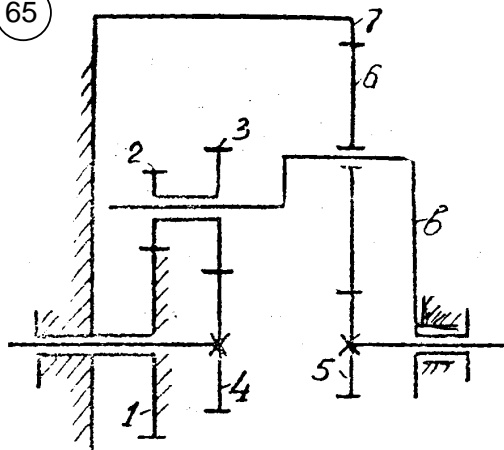
$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

(64)



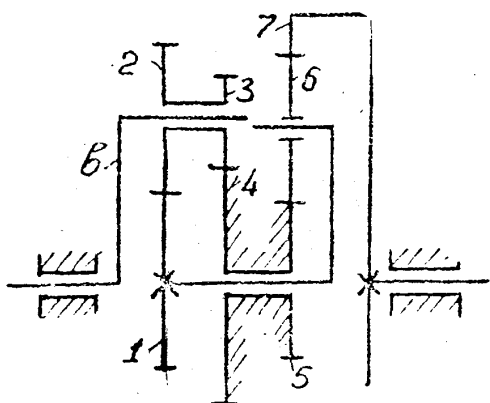
$$U_{71} = \frac{\omega_7}{\omega_1} ?$$

(65)



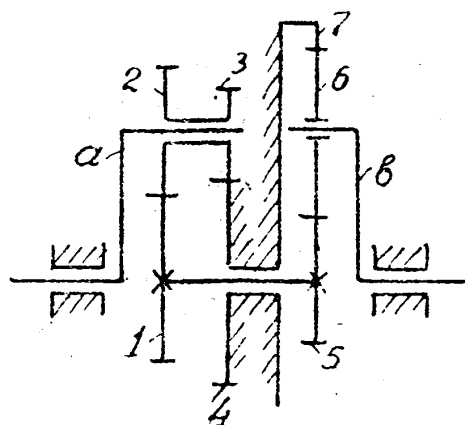
$$U_{45} = \frac{\omega_4}{\omega_5} ?$$

(66)



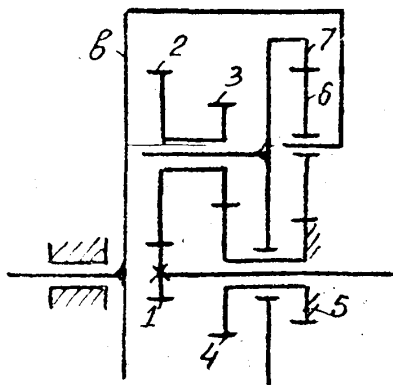
$$U_{67} = \frac{\omega_6}{\omega_7} ?$$

(67)



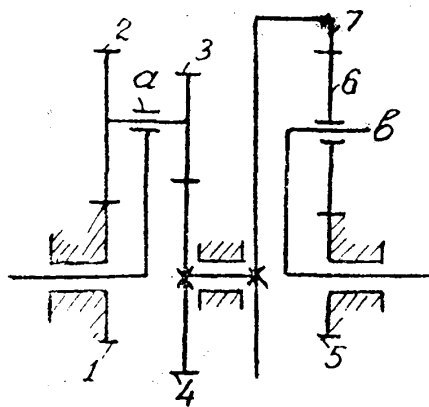
$$U_{a6} = \frac{\omega_a}{\omega_6} ?$$

(68)



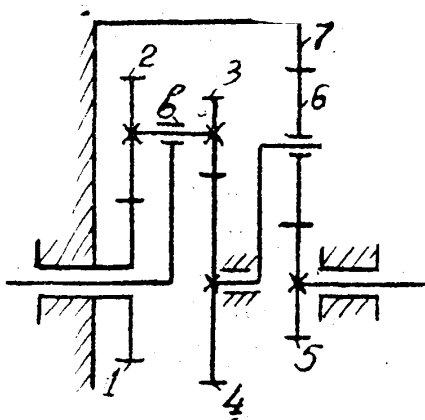
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(69)



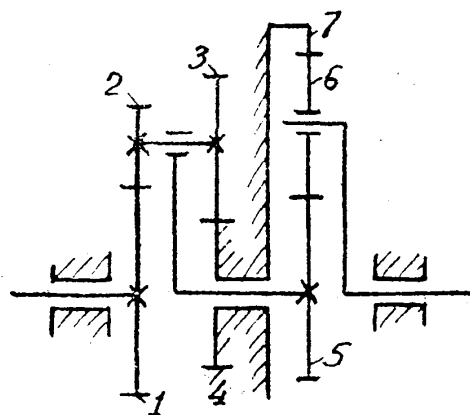
$$U_{a6} = \frac{\omega_a}{\omega_6} ?$$

(70)



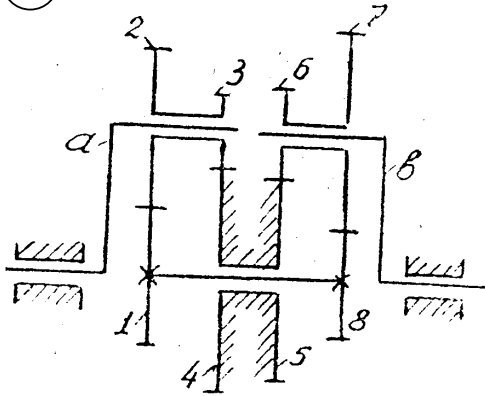
$$U_{65} = \frac{\omega_6}{\omega_5} ?$$

(71)



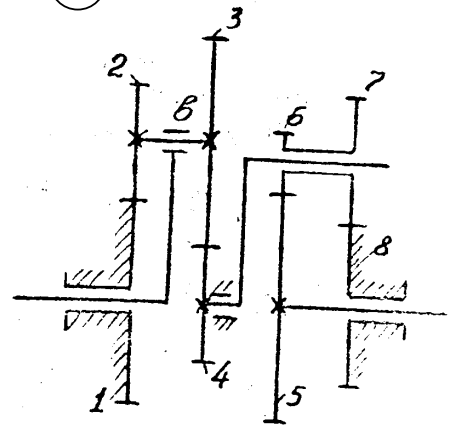
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(72)



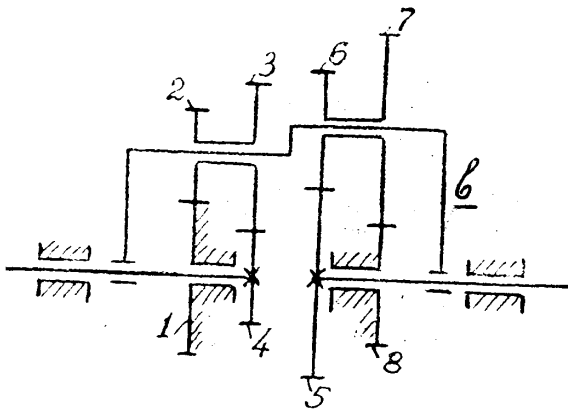
$$U_{a6} = \frac{\omega_a}{\omega_6} ?$$

(73)



$$U_{b5} = \frac{\omega_b}{\omega_5} ?$$

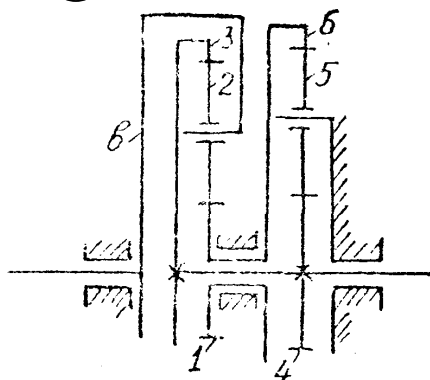
(74)



$$U_{45} = \frac{\omega_4}{\omega_5} ?$$

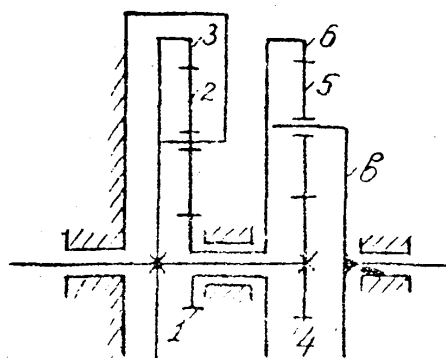
6. Дифференциалы с замыкающей цепью

(75)



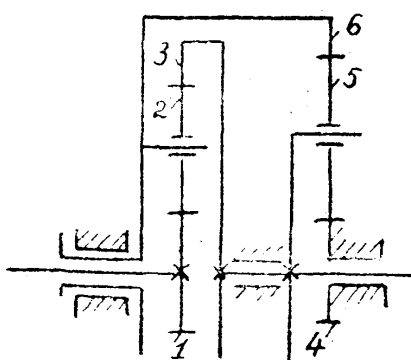
$$U_{46} = \frac{\omega_4}{\omega_6} ?$$

(76)



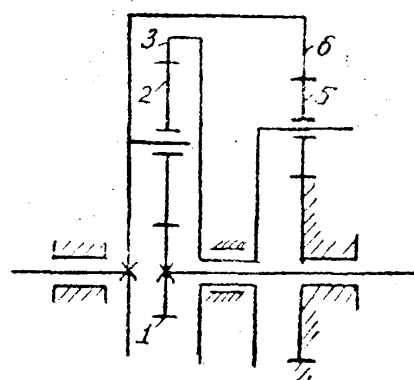
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

(77)

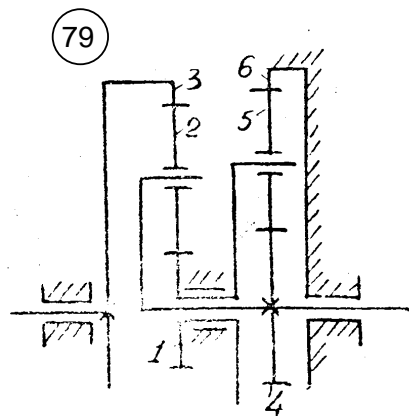


$$U_{13} = \frac{\omega_1}{\omega_3} ?$$

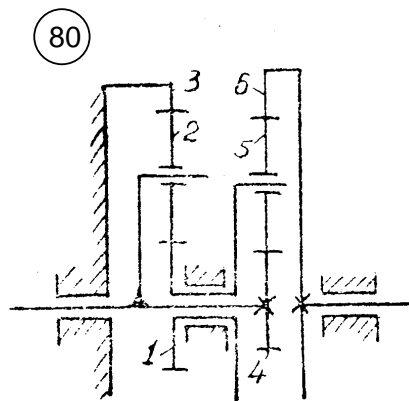
(78)



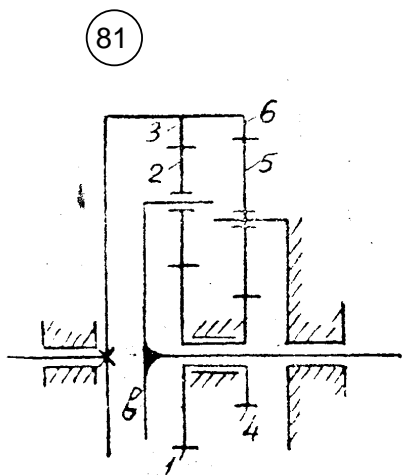
$$U_{61} = \frac{\omega_6}{\omega_1} ?$$



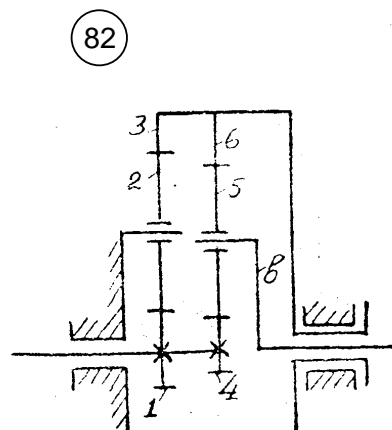
$$U_{34} = \frac{\omega_3}{\omega_4} ?$$



$$U_{46} = \frac{\omega_4}{\omega_6} ?$$

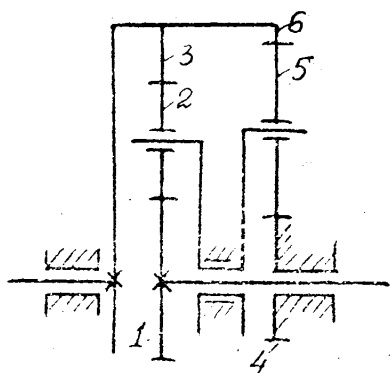


$$U_{36} = \frac{\omega_3}{\omega_6} ?$$



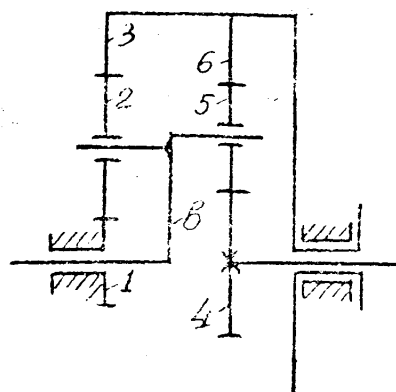
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(83)



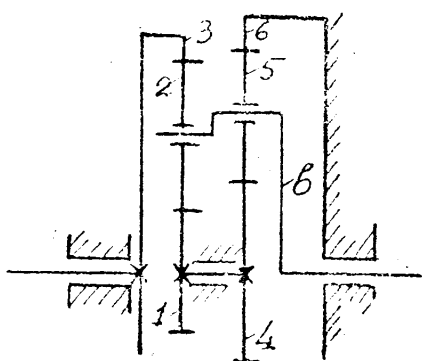
$$U_{31} = \frac{\omega_3}{\omega_1} ?$$

(84)



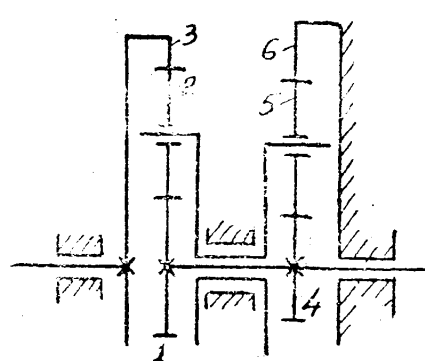
$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

(85)



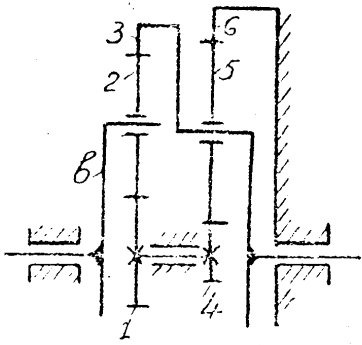
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

(86)



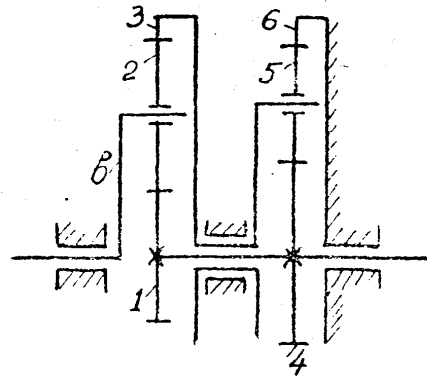
$$U_{34} = \frac{\omega_3}{\omega_4} ?$$

(87)



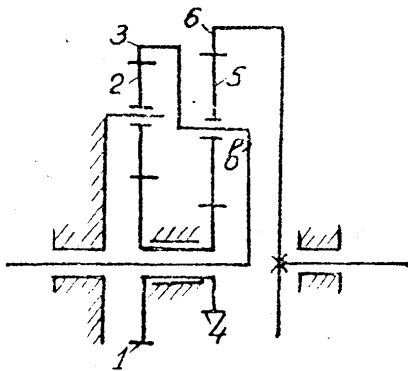
$$U_{63} = \frac{\omega_6}{\omega_3} ?$$

(88)



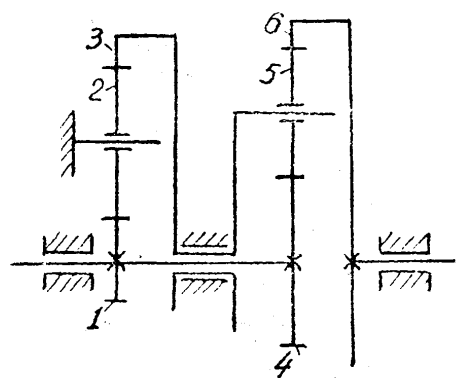
$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

(89)



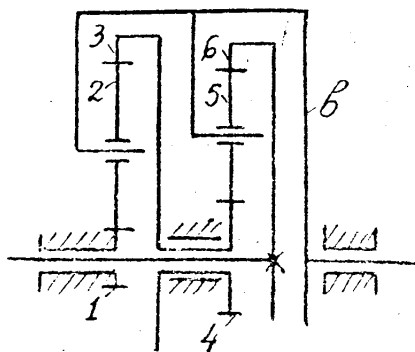
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

(90)



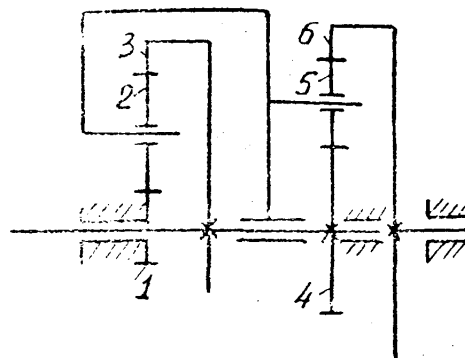
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

91



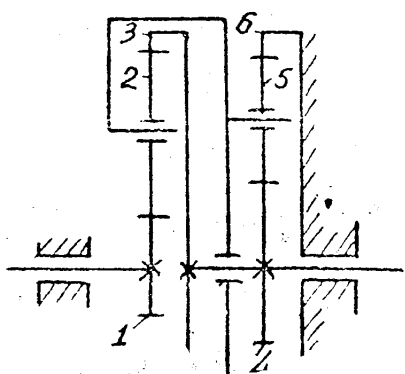
$$U_{66} = \frac{\omega_6}{\omega_6} ?$$

92



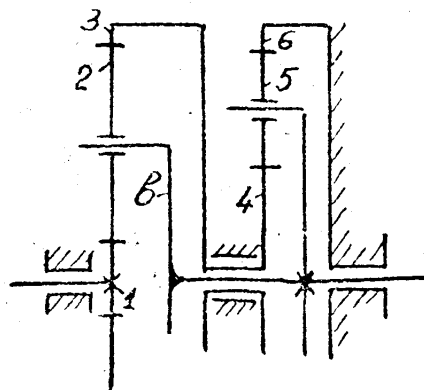
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

93



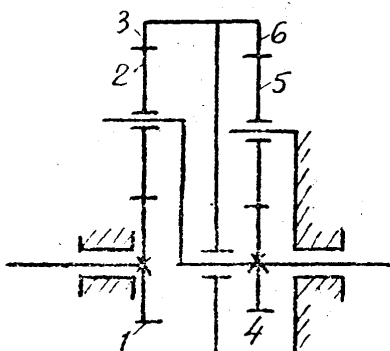
$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

94



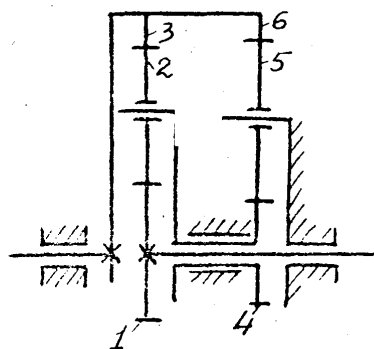
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(95)



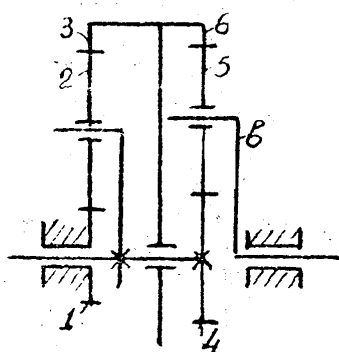
$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

(96)



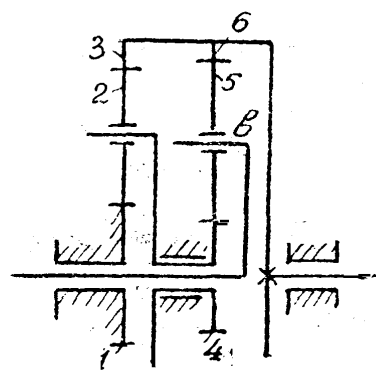
$$U_{31} = \frac{\omega_3}{\omega_1} ?$$

(97)



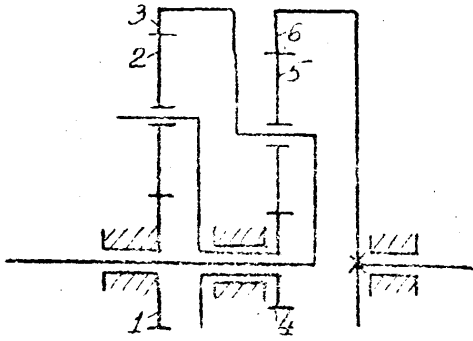
$$U_{46} = \frac{\omega_4}{\omega_6} ?$$

(98)



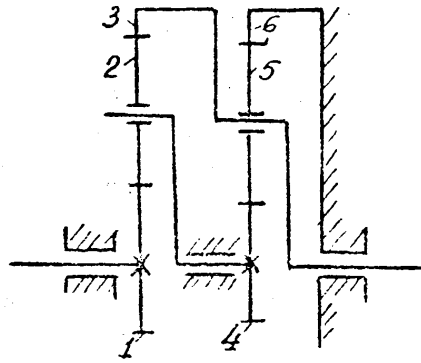
$$U_{66} = \frac{\omega_6}{\omega_6} ?$$

(99)



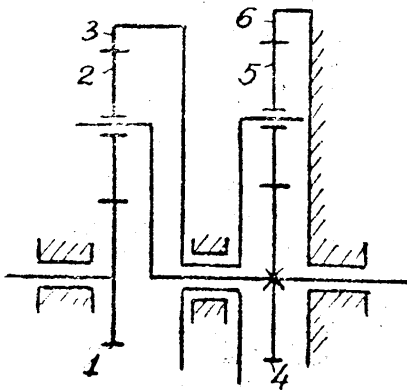
$$U_{36} = \frac{\omega_3}{\omega_6} ?$$

(100)



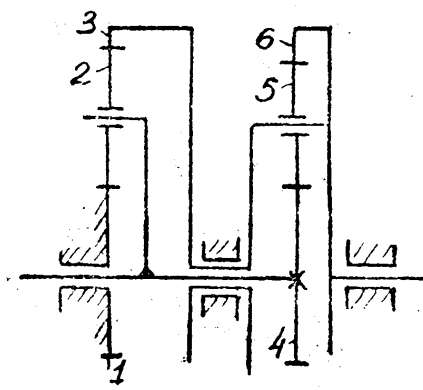
$$U_{13} = \frac{\omega_1}{\omega_3} ?$$

(101)



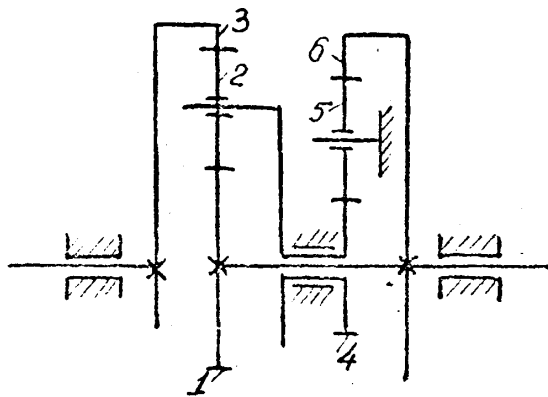
$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

(102)



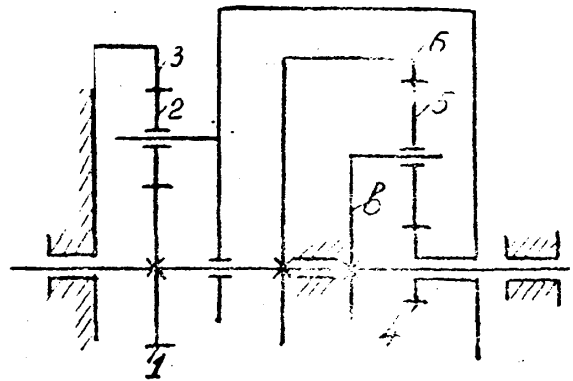
$$U_{46} = \frac{\omega_4}{\omega_6} ?$$

(103)



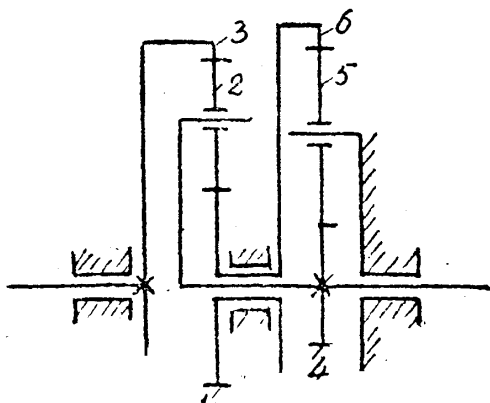
$$U_{13} = \frac{\omega_1}{\omega_3} ?$$

(104)



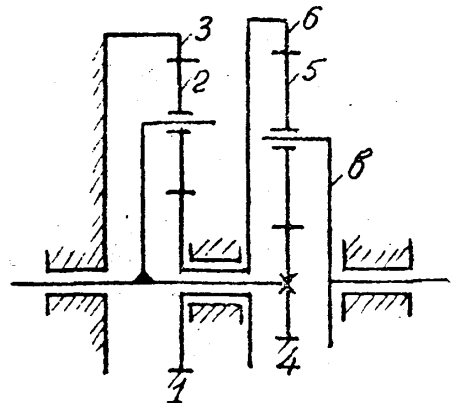
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(105)



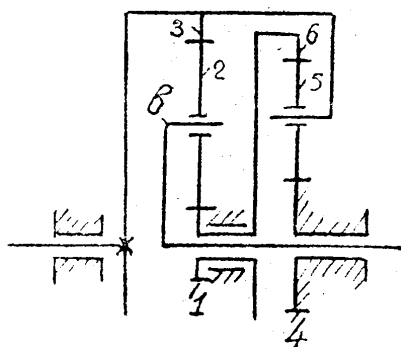
$$U_{34} = \frac{\omega_3}{\omega_4} ?$$

(106)



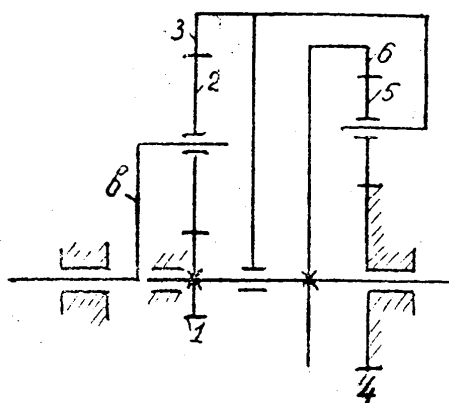
$$U_{46} = \frac{\omega_4}{\omega_6} ?$$

(107)



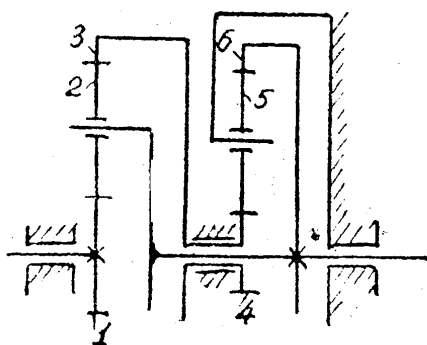
$$U_{3\delta} = \frac{\omega_3}{\omega_6} ?$$

(108)



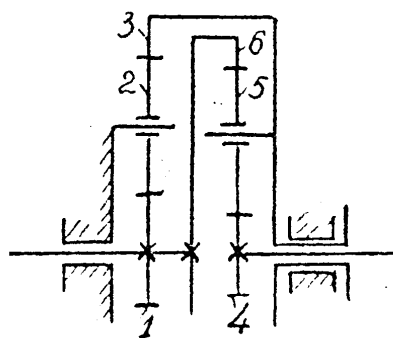
$$U_{6\delta} = \frac{\omega_6}{\omega_6} ?$$

(109)



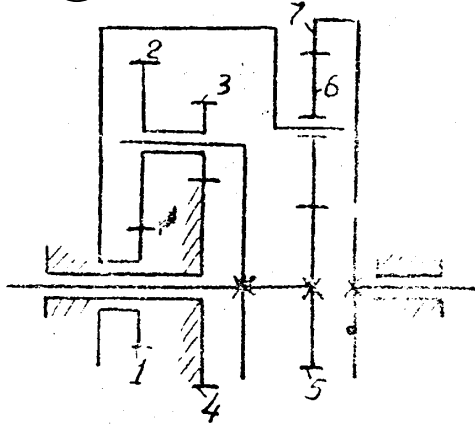
$$U_{1\delta} = \frac{\omega_1}{\omega_6} ?$$

(110)



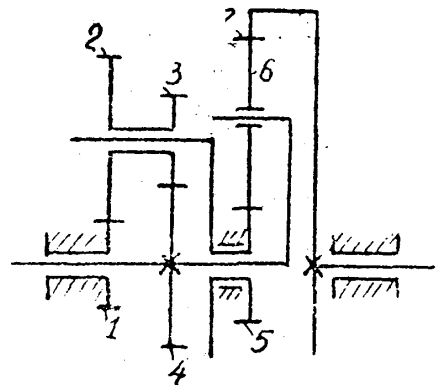
$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

(111)



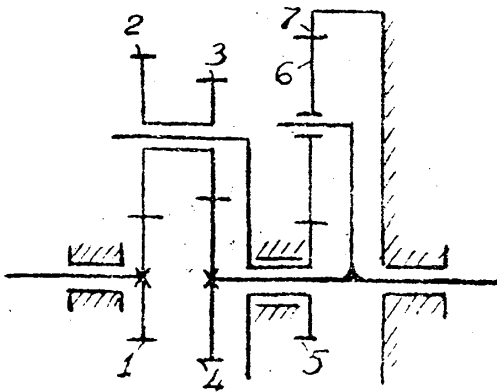
$$U_{57} = \frac{\omega_5}{\omega_7} ?$$

(112)



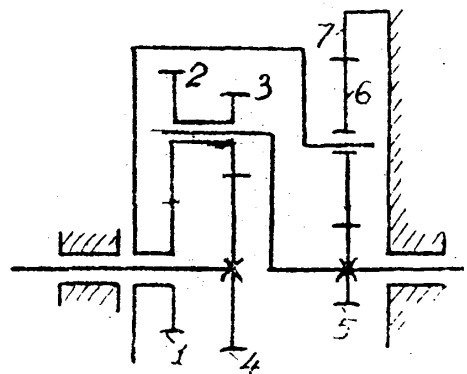
$$U_{47} = \frac{\omega_4}{\omega_7} ?$$

(113)



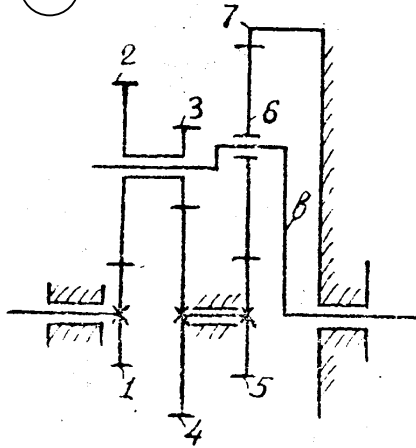
$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

(114)



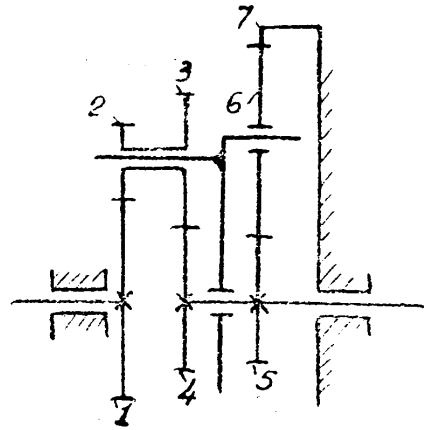
$$U_{45} = \frac{\omega_4}{\omega_5} ?$$

(115)



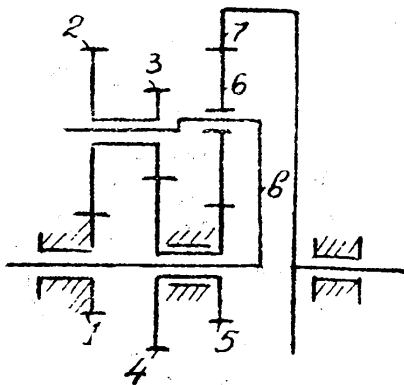
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(116)



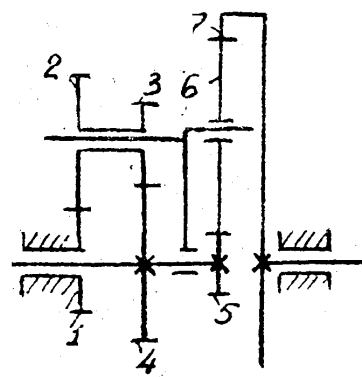
$$U_{15} = \frac{\omega_1}{\omega_5} ?$$

(117)



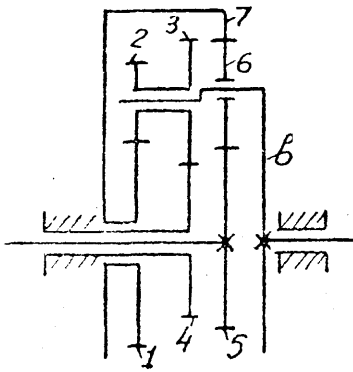
$$U_{67} = \frac{\omega_6}{\omega_7} ?$$

(118)



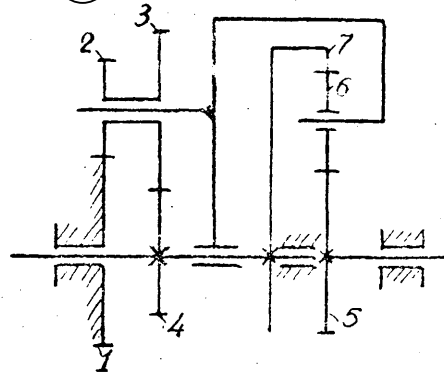
$$U_{47} = \frac{\omega_4}{\omega_7} ?$$

(119)



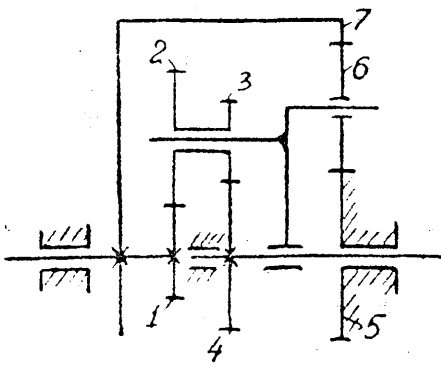
$$U_{5e} = \frac{\omega_5}{\omega_b} ?$$

(120)



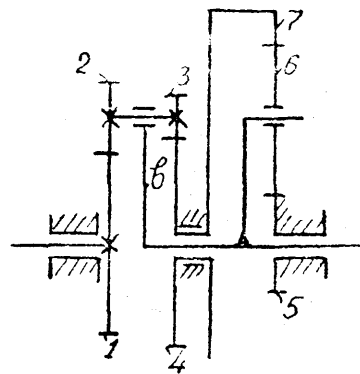
$$U_{45} = \frac{\omega_4}{\omega_5} ?$$

(121)

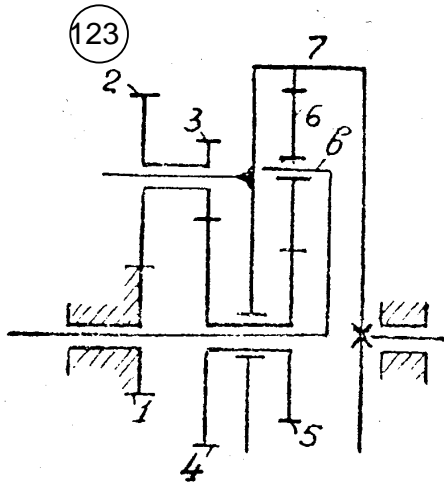


$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

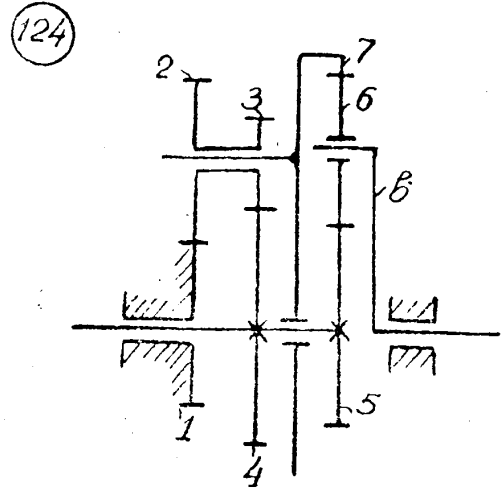
(122)



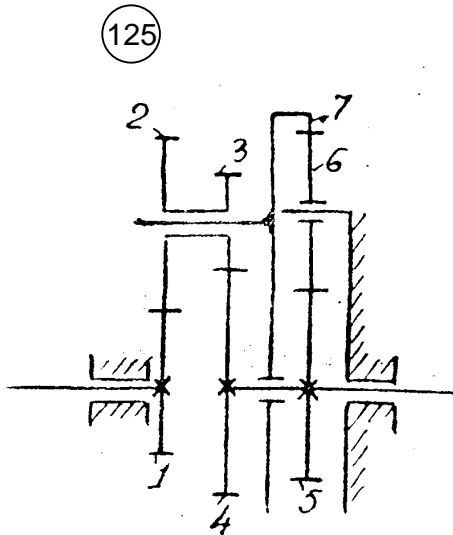
$$U_{1e} = \frac{\omega_1}{\omega_e} ?$$



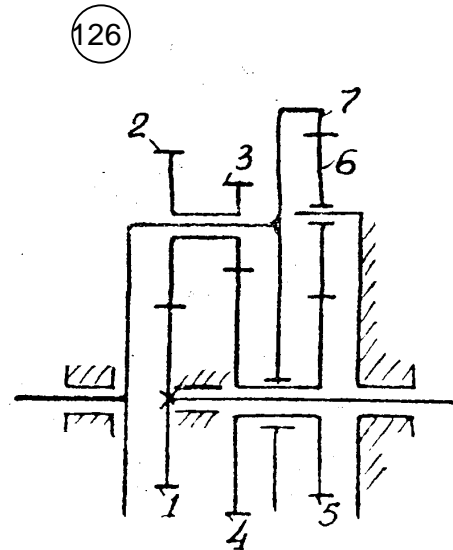
$$U_{67} = \frac{\omega_6}{\omega_7} ?$$



$$U_{46} = \frac{\omega_4}{\omega_6} ?$$

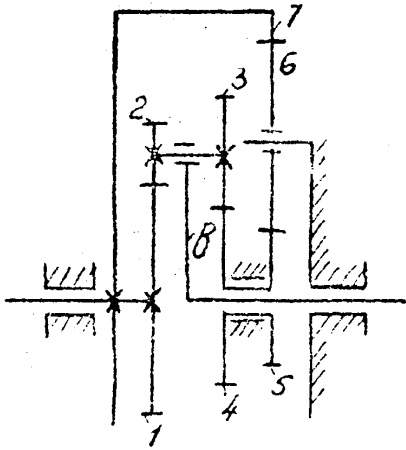


$$U_{15} = \frac{\omega_1}{\omega_5} ?$$



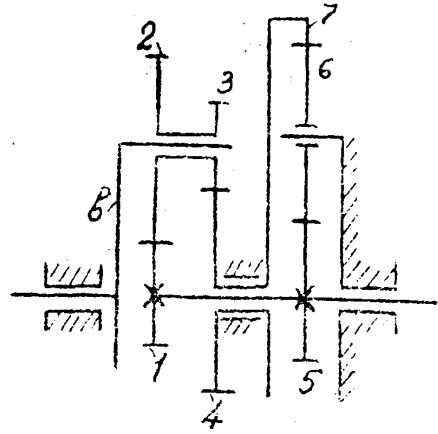
$$U_{71} = \frac{\omega_7}{\omega_1} ?$$

(127)



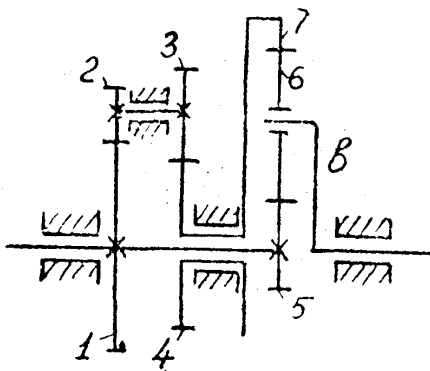
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(128)



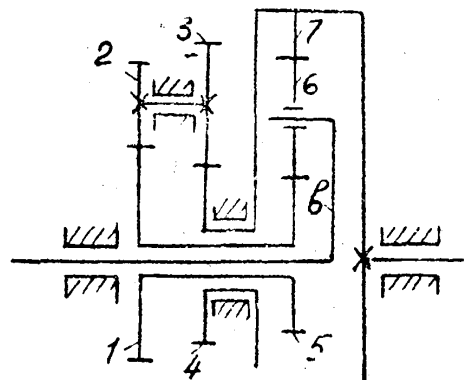
$$U_{65} = \frac{\omega_6}{\omega_5} ?$$

(129)



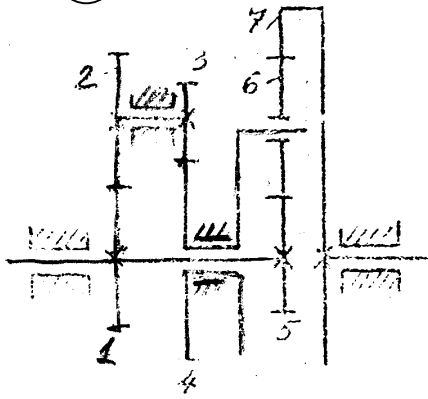
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(130)



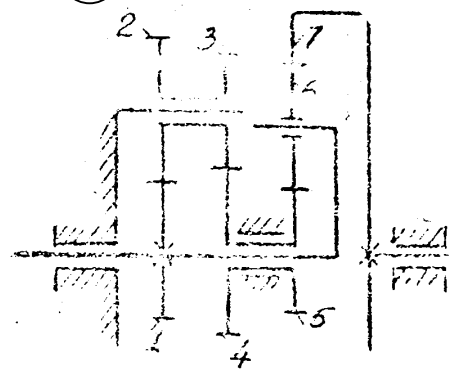
$$U_{67} = \frac{\omega_6}{\omega_7} ?$$

(131)



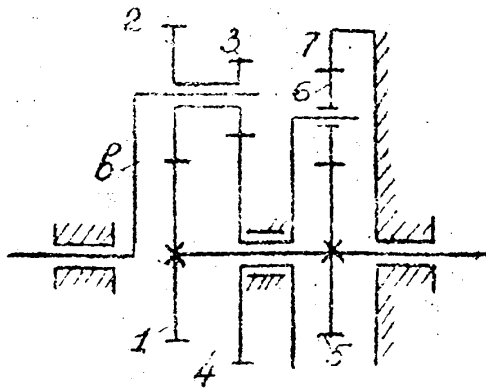
$$U_{17} = \frac{\omega_1}{\omega_7} ?$$

(132)



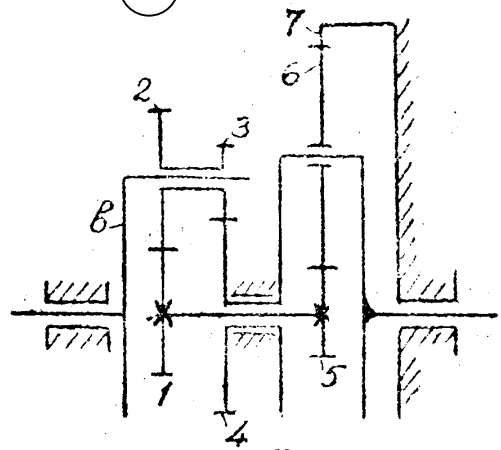
$$U_{17} = \frac{\omega_1}{\omega_7} ?$$

(133)

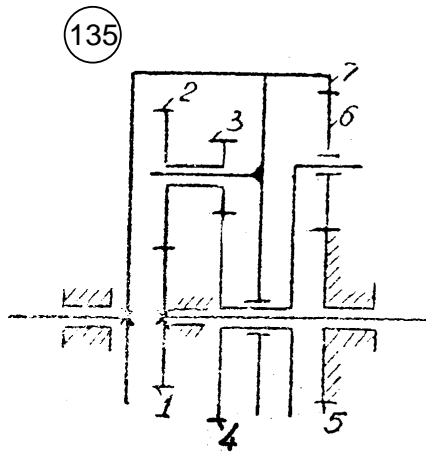


$$U_{65} = \frac{\omega_6}{\omega_5} ?$$

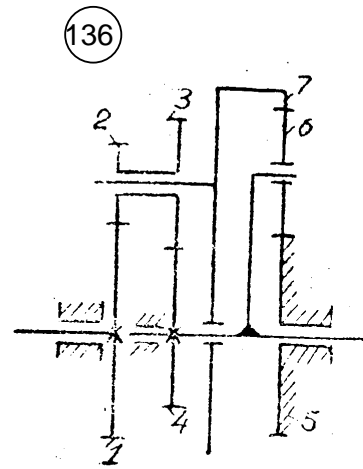
(134)



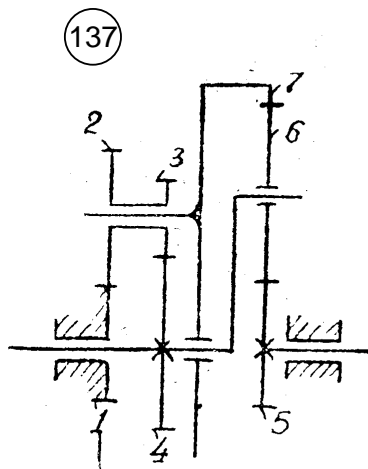
$$U_{64} = \frac{\omega_6}{\omega_4} ?$$



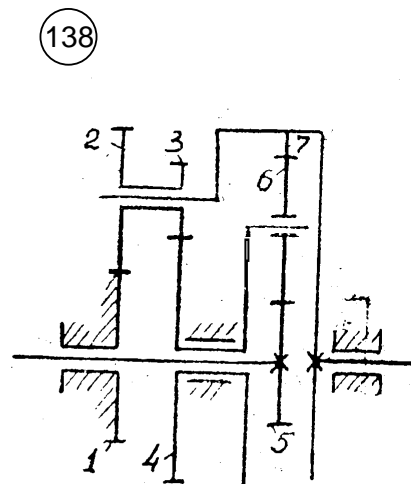
$$U_{71} = \frac{\omega_7}{\omega_1} ?$$



$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

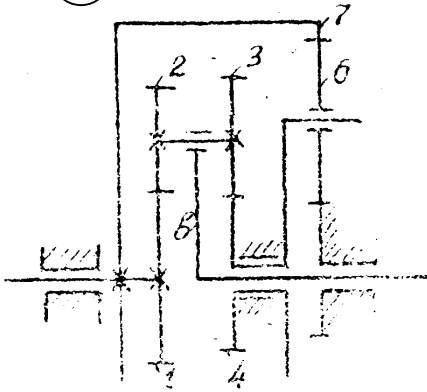


$$U_{45} = \frac{\omega_4}{\omega_5} ?$$



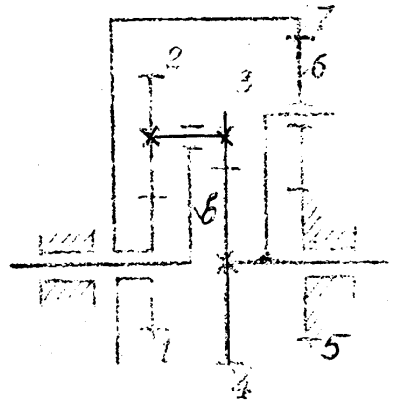
$$U_{57} = \frac{\omega_5}{\omega_7} ?$$

(139)



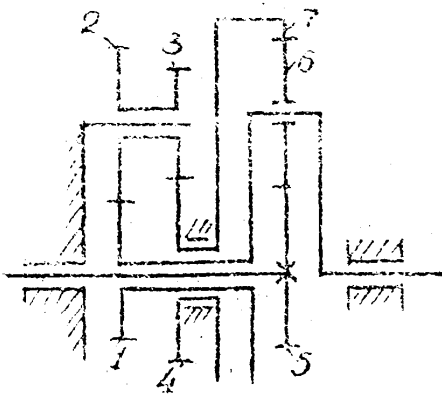
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(140)



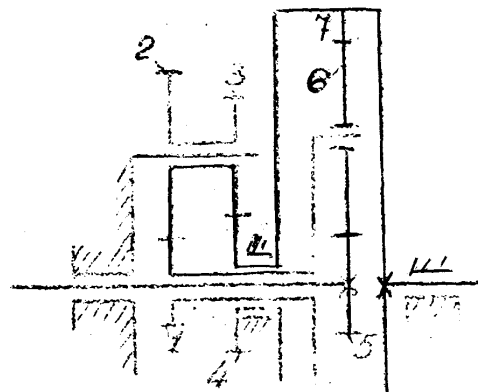
$$U_{64} = \frac{\omega_6}{\omega_4} ?$$

(141)



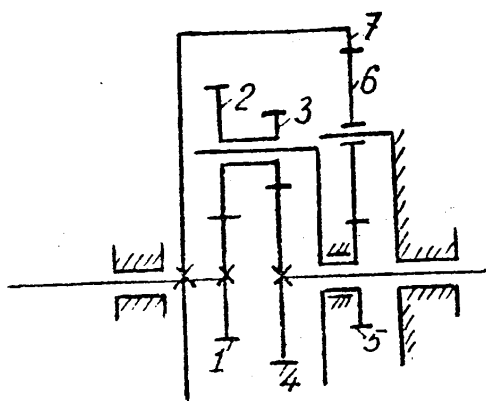
$$U_{51} = \frac{\omega_5}{\omega_1} ?$$

(142)



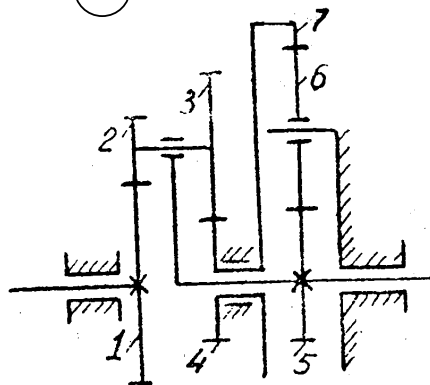
$$U_{57} = \frac{\omega_5}{\omega_7} ?$$

(143)



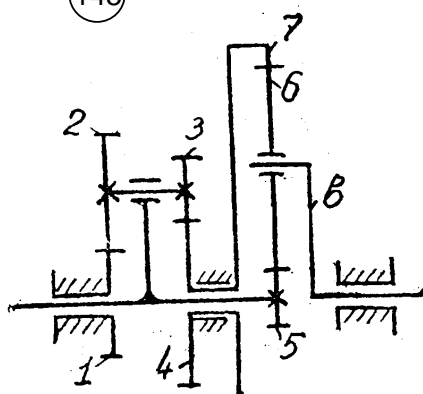
$$U_{14} = \frac{\omega_1}{\omega_4} ?$$

(144)



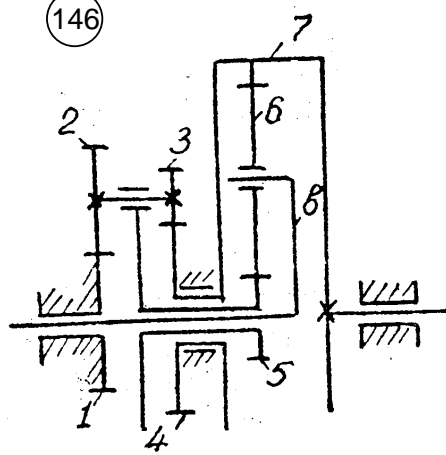
$$U_{15} = \frac{\omega_1}{\omega_5} ?$$

(145)



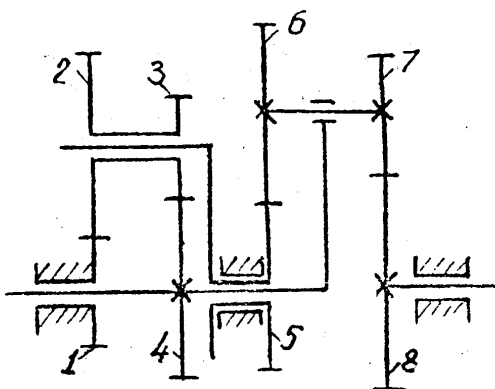
$$U_{56} = \frac{\omega_5}{\omega_6} ?$$

(146)



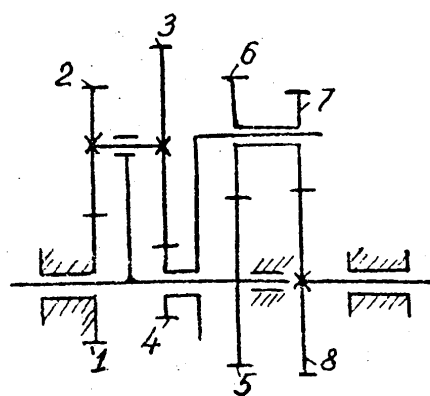
$$U_{67} = \frac{\omega_6}{\omega_7} ?$$

(147)



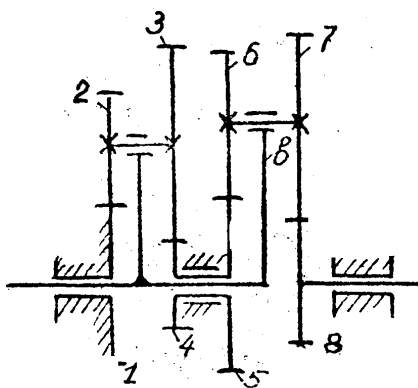
$$U_{18} = \frac{\omega_1}{\omega_8} ?$$

(148)



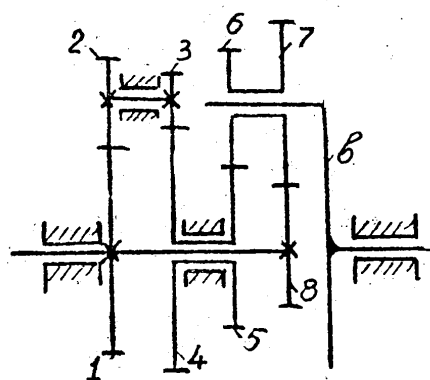
$$U_{58} = \frac{\omega_5}{\omega_8} ?$$

(149)



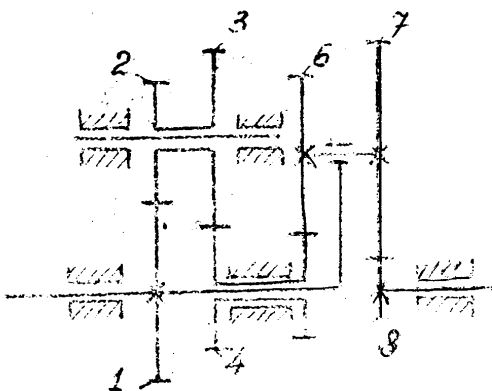
$$U_{68} = \frac{\omega_6}{\omega_8} ?$$

(150)



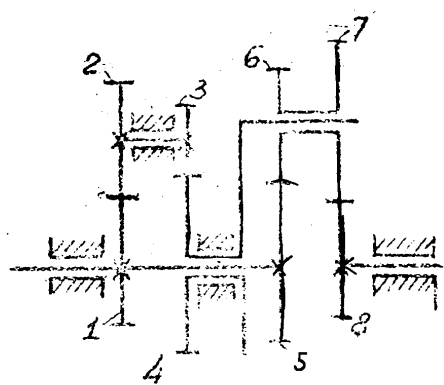
$$U_{16} = \frac{\omega_1}{\omega_6} ?$$

(151)



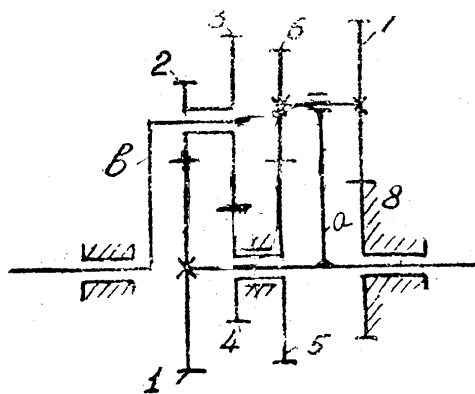
$$U_{18} = \frac{\omega_1}{\omega_8} ?$$

(152)



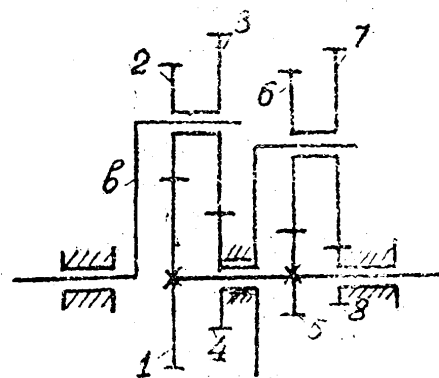
$$U_{18} = \frac{\omega_1}{\omega_8} ?$$

(153)



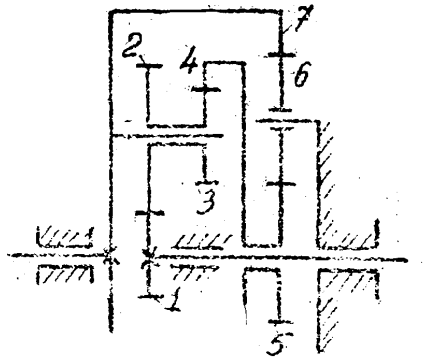
$$U_{61} = \frac{\omega_6}{\omega_1} ?$$

(154)



$$U_{61} = \frac{\omega_6}{\omega_1} ?$$

155



$$U_{17} = \frac{\omega_1}{\omega_7} ?$$

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