We claim

1. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements being electrically interrelated; means comprising a series of switching devices to establish cryptographic relationships between said sets of elements; and means to cause said switching devices to perform cryptographic substitution, functions and cryptographic control functions.

- L. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said sets of elements being electrically interrelated; means comprising a series of commutators to establish cryptographic relationships between said sets of elements; means to cause said commutators to perform cryptographic substitution functions and cryptographic control functions; and displacement mechanisms to effect displacements of the commutators when performing substitution functions, said mechanisms being electrically controlled by said commutators when performing control functions,
- 3. In a cryptograph, a keyboard comprising character elements, and a plurality of signaling devices, said elements and said devices being electrically interrelated; means for establishing cryptographic relations between said devices and said elements, said means including a first set of commutators for performing cryptographic substitution functions, and a second set of commutators for performing cryptographic control functions.

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- 4. An apparatus us claimed in claim 3, in which homologous pomentators are interchanguable.
- 9. An apparatus as claimed in claim 2, in which said second pet of commutators controls the operation of the first set of commutators.
- 6. In a pryptograph, a keyboard comprising a set of character elements and a set of signaling devices; means comprising a set of substitution commutators for establishing operative cryptographic relations. between the said character elements and said signaling devices; displacement mechanisms to effect angular displacements of the substitution committators; and means including a set of control commutators for controlling the displacement mechanisms.
- 7. In a cryptograph, a set of character elements constituting a keyboard and a set of signaling devices electrically interrelated with said elements; means for establishing operative cryptographic relations between said devices and said elements, including a set of ciphering commutators; and means to effect the angular displacements of said commutators, including a set of control commutators adapted to effect the displacement operations individually.
- 6. In a cryptograph, we set of character elements constituting a keyboard, and a set of signalling devices electrically interrelated
  therewith; means for establishing cryptographic relations between said
  elements and said devices, including a set of ciphering computators; displacement machanisms to effect the angular displacements of said commutators;

and means to control the said mechanisms comprising a set of control commutators adapted to act upon said mechanisms individually.

- 9. In a cryptograph, a set of character elements neastituting a keyboard, and indicating devices in electrical semantication
  with said elements; means comprising a single set of commutators to
  establish operative cryptographic relations between said devices and said
  elements, including electrical means to cause the same set of commutators
  to perform both cryptographic substitution and cryptographic central functions.
- ing a keyboard, and indicating devices in electrical communication with said elements; means to establish cryptographic relationships between said devices and said elements, comprising a set of communication; means to very said relationships; and means to cause the same set of commutators to perform both draptographic substitution and draptographic control functions.
- ing a keyboard, and indicating devices in electrical communication with said elements; means to establish cryptographic relationships between said devices and said elements, comprising a set of communication; means to vary said relationships; and means to dame the same set of communicators to perferm both cryptographic substitution and cryptographic equirol functions, said means including separate contacts and associated conductors providing separate electrical channels through said communicators.

It. In a drystagraph, a set of character elements constituting a keyboard, and insignting devises in electrical communication with said elements; manus to actabilish cryptographic relationships between said devices and said elements, comprising a single set of commutators; and means to vary said relationships, including electrical conductors approximate with the commutators to cause the same set to perform both cryptographic cubulitation and cryptographic control functions, all commutators being interchangeable.

ing a heyboard, and a set of mignaling devices, said elements and said devices being electrically interrelated; means comprising a series of commutators to establish cryptographic relationships between said elements and said devices; and means to very said relationships, including a plurality of self-controlled ciphering commutators arranged in cascade.

14. An apparatus as claimed in the preceding claim, in which all commutators are interchargeable.

15. An apparatus as claimed in Claim 15, in which honologous semmetators are interchangeable.

ing a keyboard, and a not of signaling devices , means to establish styptographic relationships between said elements and each devices, said means including a plurality of self-controlled eighering commitators provided with a single derice of ring contacts; a circuit system interconnecting

sold elements and said desires, and including axid commutators; and means operative with said circuit system and isoluting therein a switch mechanism to parmit the same commutators to function alternately as tiphering commutators and as control commutators.

character elements, and a set of signaling devices, said elements and said devices being electrically interrelated; means for effecting varying cryptographic relationships between said elements and said devices comprising a plurality of angularly displaceable commutators, said commutators being provided with a single series of ring contacts; displacement mechanisms operative to effect the angular displacement of said commutators; and circuit means including a switching mechanism operative to cause the same set of contacts to function alternately for purposes of cryptographic controls.

characterizations ; a set of signaling devices in electrical relations with said elements; means for effecting varying cryptographic relationships between said elements and said devices, including a plurality of angularly displaceable commutators provided with a double series of ring contacts; displacement mechanisms operative to effect angular displacements of said commutators; means to provide electrical channels through one of the series of contacts to cause said commutators to perform functions of cryptographic substitution, and in sequential operations of said

mechanisms to provide electrical channels through the other of said series of contacts to sause said commutators to perform functions of cryptographic control.

- 19. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said sets of elements being electrically interrelated; means to establish and vary orpotographic relationships between said sets of elements, said means including a set of self-controlled commutators.
- 20. An apparatus as claimed in the preceding claim in which maid commitators are arranged in cascade.
- 21. In a styptograph, a set of character elements constituting a keyboard, and a set of indicating elements, end elements being electrically interrelated; means to establish styptographic relations between said sets of elements, said means including a plurality of self-controlled commutators arranged in cascade, said commutators being interchangeable.
- ing a keybeard, and a set of indicating elements ; a circuit system operatively connecting said sets of elements; means to establish cryptographic relationships between said sets of elements; including a plurality of self-controlled commutators arranged in cassader and means including a switch mechanism in said circuit system to cause said commutators to function alternately both as eighering commutators and me-control commutators.

23. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements being
electrically interreleted; means to establish cryptographic relation—
ships between said sets of elements, said means including a plurality
of self-controlled commutators; and means to cause said commutators
to perform both cryptographic substitution functions and cryptographic
control functions, said means including concentric rings of contacts
on the obserse face and a corresponding number of c noentric rings of
contacts on the reverse face of each commutator, and conductors selfcontacts on the reverse face of each commutator, and conductors selfcontacts within each commutator for connecting the contacts on the obverse face with homologous contacts on the reverse face.

24. In a cryptograph, set of character elements constituting a keyboard, and a set of indicating elements, said elements being
electrically interrelated; means for effecting varying cryptographic
relationships between said sets of elements, said means including a
switching commutator bearing two or more consentric rings of contacts
on the obverse face and a corresponding number of consentric rings of
contacts on the reverse face, and conductors self-contained within each
commutator and arranged irregularly for consecting the contacts on the
obverse face of each commutator with homologous contacts on the reverse
face.

25. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements being
electrically interrelated; means for effecting varying cryptographic

relationships between said sets of elements, said means including a reversing commutator bearing two or more contentric rings of even numbers of ematacts on one of its faces, and means for electrically coupling the individual contects of each ring in pairs.

26. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements
being electrically interrelated; means for effecting varying cryptographis relationships between said sets of elements, said means including a
set of juxtaposed, double-ring-contact switching commutators, one of
the two rings of contacts performing cryptographic substitution functions,
and the other of said ring of contacts performing cryptographic control

elements and corresponding signalling devices, and elements and said devices being electrically interrelated; means for varying the connections between said elements and said devices for the purpose of effecting oryptographic operations, said means including a set of juriaposed, rotatable single-ring-contact switching commitators mounted upon a common shaft; stepping mechanisms for effecting angular displacements of said descentiators individually; and electrical instrumentalities for controlling said stepping mechanisms whereby the same commitators are employed alternately for affecting cryptographic substitution famotions and cryptographic control functions, respectively.

26. In a cryptograph, a set of character elements constituting a keyboard and a set of indicating elements; a circuit system operatively connecting said sets of elements; means for establishing cryptographic relationships between said sets of elements, including a plurality of self-controlled commutators, said commutators being interchangeable and being provided with a single row of ring contacts on the observe and reverse faces, respectively; displacement sechenisms operative to effect angular displacements of said commutators; and means including a switch mechanism in said circuit system and effective in sequential operations of said mechanisms to provide electrical channels through said contacts to cause said channels to perform cryptographic substitution functions and cryptographic control functions alternately.

ing a keyboard and a set of signalling devices electrically interrelated with said elements; means for establishing operative cryptographic relationships between said devices and said elements, including a set of cophering commutators; and means to effect the angular displacements of said commutators, including a set of control commutators; and means eperative with said control commutators to effect the displacement operative with said control commutators to effect the displacement operations individually in single step displacements.

30. In a cryptograph, a set of character elements committeding a keyboard and a set of signalling devices electrically interrelated with said elements; means for establishing operative cryptographic REF ID: A39755

relationships between said devices and sold elements, including a set of ciphering commutators; and means to effect the angular displacements of said ciphering commutators, including a set of control commutators; and means operative with said control commutators to effect the displacement operations individually in plural step displacements.

ing a keyboard and a set of indicating elements, said elements being electrically interrelated; means comprising a set of substitution commutators for establishing operative cryptographic relationships between said sets of elements; displacement mechanisms to effect angular displacements of the substitution commutators; and means including a set of central commutators for permutatively effecting the displacement operations.

- ing a keyboard, and a set of signalling devices electrically interrelated therewith; means for establishing cryptographic relationships between said elements and said devices, including a set of elaboring commutators; displacement mechanisms to effect the angular displacements of said commutators; and means including a set of control commutators for effecting the displacement sperations permutatively in single step displacements.
- 53. In a cryptograph, a set of character elements constituting a keyboard, and a set of signalling devices electrically interrelated
  therewith ; means for establishing cryptographic relationships between said.

elements and said devices, imminding a set of exphaning commutators; displacement sections to effect the angular displacements of said commutators; and means to effect the angular displacements of said semmentators; including a set of control commutators; and means eparative with said control commutators to effect the displacement operations permatatively in plural step displacements.

We olaim : -

- 1. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements being electrically interrelated; means comprising a series of switching devices to establish cryptographic relationships between said sets of elements; and means to esuae said switching devices to perferm cryptographic substitution functions and cryptographic control functions.
- keyboard, and a set of indicating elements, said sets of elements being electrically interrelated; means comprising a series of commutators to establish cryptographic relationships between said sets of elements; connected to for a far a far-damp cryptographic substitution means to commutators to porfer cryptographic substitution functions and cryptographic control functions; and displacement mechanisms to effect displacements of the commutators when performing substitution functions, said mechanisms being electrically controlled by said commutators when performing control functions.
- 3. In a dryptograph, a keyboard compaising character elements, and a plurality of signaling devices, said elements and said devices being electrically interrelated; means for setablishing cryptographic relations between said devices and said elements, said means including a first set of computators for performing cryptographic substitution functions, and a second set of computators for performing cryptographic control functions.

- 4. An apparatus as claimed in plain 3, in which homelegons commutators are interchangeable.
- 5. An apparatus as elaised in claim 3, in which said second set of commutators sentrals the operation of the first set of commutators.
- 6. In a cryptograph, a beybeard comprising a set of character elements and a set of eigenling devices; means comprising a set of substitution commutators for establishing operative cryptographic relations between the said character elements and said eigenling devices; displacement mechanisms to effect angular displacements of the substitution semments are and means including a set of central commutators for controlling the displacement mechanisms.
- In a cryptograph, a set of character elements constituting a harboard and a set of cignaling devices electrically interrelated with said elements; means for establishing operative expetographic relations between said devices and said elements, including a set of ciphering elementators; and means to effect the angular displacements of said semmutators, including a set of control commutative adapted to effect the displacement operations individually.
- 8. In a cryptograph, a set of character elements constituting a keyboard, and a set of signalling devices alestrically interrelated
  therewith; means for establishing cryptographic relations between said
  elements and said devices, including a set of signatury commutators; displacement mechanisms to effect the angular displacements of said commutators;

and means to control the said mechanisms comprising a set of control commutators adapted to set upon said mechanisms individually.

stituting a heyboard, and indicating devices in electrical communication with said elements; means comprising a single set of communication establish operative cryptographic relations between said devices and said elements, including electrical means to cause the same set of commutators to perform both cryptographic substitution and cryptographic control functions, had abstract means constitute means are small in to more sent the commutators to summer and dericas as well in to more sent the commutators in an arryptograph, a set of character elements constituting a keyboard, and indicating devices in electrical communication with said elements; means to establish cryptographic relationships between to vary said relationships; and means to cause the same set of commutators ; means to vary said relationships; and means to cause the same set of commutators to perform both cryptographic substitution and cryptographic control functions, the last-named means accommissing means demand by the Commutators for more than the commutators.

ing a keyboard, and indicating devices in electrical communication with said elements; means to establish cryptographic relationships between said devices and said elements, comprising a set of commutators; means to vary said relationships; and means to cause the same set of commutators to perform both cryptographic substitution and sryptographic control functions, said means including separate contacts and associated conductors providing separate electrical channels through said commutators.

- 12. In a eryptograph, a set of character elements constituting a keyboard, and indicating devices in electrical communication with said elements; means to establish cryptographic relationships between said desires and said elements, comprising a single set of commutators; and means to vary said relationships, including electrical conductors associated with the commutators to cause the same set to perform both cryptographic substitution and cryptographic control functions, all commutators being interchangeable.
- ing a keyboard, and a set of signaling devices, said elements and said devices being electrically interrelated; means comprising a series of commutators to establish cryptographic relationships between said elements and said devices; and means to very said relationships, including a piwrality of self-controlled siphering commutators arranged in cascade.
- 14. An apparatus as claimed in the preceding claim, in which all commutators are interchangeable.
- 15. An apparatus as claimed in Claim 13, in which homologous commutators are interchangeable.
- 16. In a dryptograph, a set of character elements constituting a keyboard, and a set of signaling devices; means to establish cryptographic relationships between said elements and said devices, said means including a plurality of self-controlled eighering commutators provided with a single series of ring contacts; a circuit system interconnecting

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means operative with said circuit system and including said commutators; and means operative with said circuit system and including therein a switch mechanism to permit the same commutators to function alternately as eightring commutators and as control commutators.

character elements, and a set of eignating devices, said elements and said devices being electrically interrelated; means for effecting varying cryptographic relationships between said elements and said devices comprising a plurality of angularly displaceable commutators, said commutators being provided with a single series of ring contacts; displacement mechanisms operative to effect the angular displacement of said commutators; and sircuit means including a switching mechanism operative to cause the same set of contacts to function alternately for purposes of cryptographic substitution and oryptographic control.

charactersclaments; a set of signaling devices in electrical relation with said elements; means for effecting varying cryptographic relationships between said elements and said devices, including a planslity of angularly displaceable commutators provided with a double series of ring contacts; displacement mechanisms operative to effect angular displacements of said commutators; means to provide electrical channels through one of the series of contacts to cause said commutators to perform functions of cryptographic substitution, and in sequential operations of said

mechanisms to provide electrical channels through the other of said series of contacts to cause said commutators to perform functions of cryptographic control.

- 19. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said sets of elements being electrically interrelated; means to establish and vary cryptographic relationships between said sets of elements, said means including a set of self-controlled commutators, said means including a set of self-controlled commutators for attaching workment of the dominated of the commutators.
- 20. An apparatus as claimed in the preceding claim in which said commutators are arranged in cascade.
- 21. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements being electrically interrelated; means to establish cryptographic relations between said sets of elements, said means including a plurality of self-controlled commutators arranged in easeads, said commutators being interchangeable and including manuscribed therearth for morning the same according to a law dependent on the output of the commutators.

  22. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements; a circuit system operatively connecting said sets of elements; means to establish cryptographic relationships between said sets of elements, including a plurality of self-

relationships between said sets of elements, including a plurality of selfcontrolled commutators arranged in cascade; and means including a switch
mechanism in said circuit system to cause said commutators to function
alternately both as ciphering commutators and as control commutators.

- 23. In a cryptograph, a set of character elements constituting a keybeard, and a set of indicating elements, said elements being electrically interrelated; means to establish cryptographic relationships between said sets of elements, said means including a plurality of self-controlled commutators; and means to cause said commutators to perform both cryptographic substitution functions and cryptographic control functions, said means including concentric rings of contacts on the observe face and a corresponding number of concentric rings of contacts on the reverse face of each commutator, and conductors self-contacts on the reverse face on the reverse face.
- 24. In a cryptograph, and a set of character elements constituting a keyboard, and a set of indicating elements, said elements being electrically interrelated; means for effecting verying cryptographic relationships between said sets of elements, said means including a switching commutator bearing two or more concentric rings of contacts on the obverse face and a corresponding number of concentric rings of contacts on the reverse face, and conductors self-contained within each commutator and arranged irregularly for connecting the contacts on the obverse face of each commutator with homologous contacts on the reverse face.
- 25. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements being
  electrically interrelated; means for effecting varying cryptographic

relationships between said sets of elements, said means including a reversing commutator bearing two or more commutator rings of even numbers of contacts on one of its faces, and means for electrically soupling the individual contacts of each ring in pairs.

- 26. In a cryptograph, a set of character elements constituting a keyboard, and a set of indicating elements, said elements
  being electrically interrelated; means for effecting varying cryptographic relationships between said sets of elements, said means including a
  set of juxtapesed, double-ring-contact switching commutators, one of
  the two rings of contacts performing cryptographic substitution functions,
  and the other of enid ring of contacts performing cryptographic control
  functions.
- elements and corresponding signalling devices, said elements and said devices being electrically interrelated; means for earlying the connections between said elements and said devices for the purpose of effecting cryptographic operations, said means including a set of juxtaposed, rotatable eingle-ring-contact switching commutators mounted upon a common shaft; stepping mechanisms for effecting angular displacements of said commutators individually; and electrical intellities for controlling said stepping mechanisms whereby the same commutators are employed alternately for effecting cryptographic substitution functions and cryptographic control functions, respectively.

- 26. In a cryptograph, a set of character elements constituting a keyboard and a set of indicating elements; a circuit system operatively connecting said sets of elements; means for setablishing cryptographic relationships between said sets of elements, including a plurality of self-sentrolled commutators, said commutators being interchangeable and being provided with a single row of ring contacts on the obverse and reverse faces, respectively; displacement mechanisms operative to effect angular displacements of said commutators; and means including a switch mechanism in said circuit system and effective in sequential eperations of said mechanisms to provide electrical channels through said contacts to cause said commutators to perform cryptographic substitution functions and cryptographic substitution functions
  - 29. In a cryptograph, a s t of character elements constituting a keyboard and a set of signalling devices electrically interrelated with said elements; means for establishing operative cryptographic relationships between said devices and said elements, including a set of edpharing commutators; and means to effect the angular displacements of said commutators, including a set of control commutators; and means operative with said control commutators to effect the displacement operations individually in single step displacements.
  - 30. Is a cryptograph, a set of character elements constituting a keyboard and a set of signalling devices electrically interrelated with said elements; means for establishing operative cryptographic

relationships between said devices and said elements, including a set of eighering commutators; and means to affect the angular displacements of said eighering commutators, including a set of control commutators; and means operative with said control commutators to effect the displacement operations individually in plural step displacements.

II. In a styptograph, a set of character elements constituting a keyboard and a set of indicating elements, said elements being
electrically interrelated; means comprising a set of substitution commutators for establishing operative cryptographic relationships between
said sets of elements; displacement machanisms to effect angular displacements of the substitution commutators; and means including a set of
control commutators for permutatively effecting the displacement operations.

ing a keyboard, and a set of signalling devices electrically interrelated therewith; means for establishing dryptographic relationships between said elements and said devices, including a set of siphering commutators; displacement mechanisms to effect the angular displacements of said semmentators; and means including a set of control commutators for effecting the displacement operations permutatively in single step displacements.

33. In a cryptograph, a set of character elements constituting a keyboard, and a set of signalling devices electrically interrelated
therewith ; means for establishing cryptographic polationships between said

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elements and said devices, including a set of cophering commutators; displacement mechanisms to effect the angular displacements of said commutators; and means to effect the angular displacements of said commutators, including a set of control commutators; and means sperative with said control commutators to effect the displacement sperations permatatively in plural step displacements.

34. 35. 36. 37. 38. See Actron July 27,14+2