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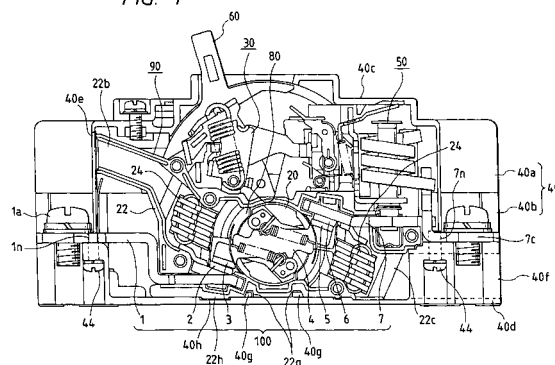
(54) Circuit breaker

(57) It is an object of the present invention to provide a circuit breaker excellent in safety by electrically insulating the trip unit from the main circuit, and capable of performing a proper wiping of the movable contact carrier, resulting in reduction of electrical resistance at the contacts. Further, a circuit breaker excellent in workability in assembling processes is also provided.

In the circuit breaker of the present invention, a housing means (22) contains a main circuit (100) including a power supply side stationary contact carrier (1) with a stationary contact (2), a movable contact carrier (4) with a power supply side movable contact (3) and a load side movable contact (5), and a load side stationary contact carrier (7) with a load side stationary contact (6). The housing means is made of insulating material and disposed in the casing (40) also made of insulating material. The circuit breaker includes a make-and-break mechanism (30), a tripping mechanism (50). The tripping mechanism (50) is unitedly connected to the load side stationary contact carrier (7) and to the load side terminal (7c) therebetween. The tripping means (50) includes a converting mechanism (51) for converting electromagnetic force to mechanical force for tripping, which is supported on the housing means (22) and is electrically insulated from the main circuit (100). The make-and-break mechanism (30) is mounted on the housing means (22) and is electrically insulated from the main

circuit (100).

FIG. 1





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# EUROPEAN SEARCH REPORT

Application Number  
EP 99 30 5863

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 788 128 A (HITACHI LTD) 6 August 1997 (1997-08-06) * column 8, line 31 - column 12, line 12; figures 2,3,12,13 *	1,5	H01H71/02 H01H73/04 H01H71/24
A	FR 2 445 011 A (FLIGUE WLADIMIR) 18 July 1980 (1980-07-18) * page 3, line 31 - line 40; figure 1 *	1,5	
A	EP 0 518 791 A (MERLIN GERIN) 16 December 1992 (1992-12-16) * column 2, line 29 - column 3, line 6; figure *	1,5	
A	FR 2 682 531 A (MERLIN GERIN) 16 April 1993 (1993-04-16) * the whole document *	1,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H01H
<del>The present search report has been drawn up for all claims</del>			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>6 June 2000</b>	Examiner <b>Ramírez Fueyo, M</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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#### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

#### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-8



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**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-8

Circuit breaker with insulated operating mechanism

2. Claims: 9-11

Rotatory contact bridge with improved contact wipe

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 30 5863

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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06-06-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0788128 A	06-08-1997	JP 9270225 A	14-10-1997
		WO 9728546 A	07-08-1997
		WO 9810455 A	12-03-1998
-----			
FR 2445011 A	18-07-1980	NONE	
-----			
EP 0518791 A	16-12-1992	FR 2677807 A	18-12-1992
		DE 69209155 D	25-04-1996
		DE 69209155 T	02-10-1996
		ES 2086702 T	01-07-1996
-----			
FR 2682531 A	16-04-1993	AT 137058 T	15-05-1996
		AU 659219 B	11-05-1995
		AU 2639792 A	22-04-1993
		BR 9203982 A	27-04-1993
		CA 2080063 A	16-04-1993
		CN 1071785 A,B	05-05-1993
		DE 69209972 D	23-05-1996
		DE 69209972 T	31-10-1996
		EP 0542636 A	19-05-1993
		ES 2087493 T	16-07-1996
		JP 6028964 A	04-02-1994
		MX 9205923 A	01-04-1993
		US 5281776 A	25-01-1994
		ZA 9207903 A	21-04-1993
-----			