(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 386 878 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
04.02.2004 Bulletin 2004/06

(51) Int Cl.[7]: **B66C 1/44**

(21) Application number: **03077162.0**

(22) Date of filing: **10.07.2003**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **31.07.2002 NL 1021187**

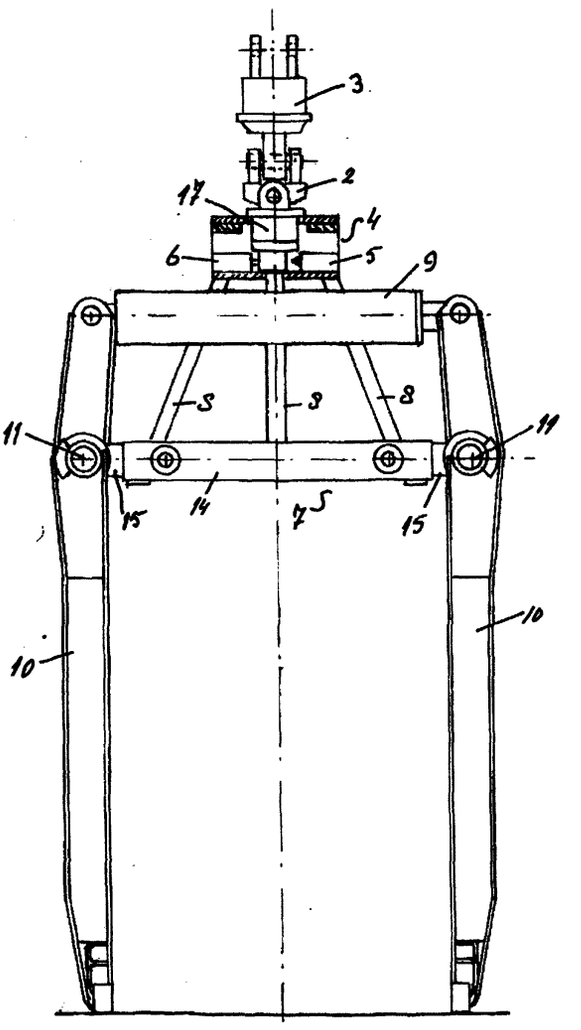
(71) Applicant: **Kennis, Joseph Jacobus**
6021 RE Budel (NL)

(72) Inventor: **Kennis, Joseph Jacobus**
6021 RE Budel (NL)

(54) Hydraulic stone grab with means to incite additional functions

(57) To adjust a hydraulically actuated stone grab (1) to stone packets of different dimensions, locking pins (13) have to be operated by auxiliary cylinders (12). To operate the auxiliary cylinders (12), a switching mechanism, comprising cam operated valves (5,6), is installed in the grab impression to that the hydraulic fluid is sent to the auxiliary cylinders (12) or to the hydraulic clamping cylinder (9).

FIG 1



EP 1 386 878 A1

Description

[0001] The invention concerns a stone grab of the type where with the help of a hydraulic cylinder a packet stones or such is clamped to be transported. This type especially used with hydraulic cranes.

[0002] Because the to be transported packets differ in dimension the stone grab is adjustable. For this purpose a part is expandable where the adjustment is fixed with lock pins. These lock pins are removed by hand , after which with the hydraulic clamping cylinder will be adjusted and then the lock pins are reset by hand and locked.

[0003] This operation requires manual effort and walking from the operator seat to the grab and visa versa causes a considerable interruption of the labour.

[0004] The invention contains a solution where with auxiliary cylinders the lock pins are operated where no extra hydraulic components have to be added to the crane or suspension. An often used type grab has in the hydraulic rotator a connection for the supply and discharge conduit for the clamping cylinder. To operate the stone grab according to the invention the existing connections and operation valves can be used.

[0005] To operate the auxiliary cylinders there is a switching mechanism installed where conduits of the clamping cylinder are switched to one of the lock pins and after that served from the operator seat. The width of the grab is set with the help of the clamping cylinder and after that the lock pin is reset after switching over. The switching over is accomplished by placing the stone grab on the ground and lower the crane some centimetres after that. The rotator will be disconnected and can rotate free by which the rotator operates the switching part with a cam the switching valves. By turning the rotator into the lifting position and lift the stone grab the clamping cylinder will be activated for clamping the packet stones and the stone grab is rotating fixed to the rotator.

[0006] Optional to the hydraulic version the rotator can be used to operate the lock pins in a direct mechanical way.

[0007] The invention will be explained with the help of the drawing.

Fig. 1 shows partly in cross section the stone grab on the side.
Fig. 2 shows in cross section the switching box in switching position.
Fig. 3 shows in cross section the switching box in lifting position.
Fig. 4 shows cross section IV-IV
Fig. 5 shows cross section V-V.
Fig. 6 shows the hydraulic diagram according to the invention.
Fig. 7 shows the mechanism for adjustment.
Fig. 8 shows a cross section over the lock pin.
Fig. 9 shows schematic a mechanical operation of the lock pins in closed position
Fig. 10 shows the mechanical operation in the position where two lock pins are retracted.

[0008] In Fig. 1 is with stone grab (1) the stone grab indicated. Stone grab (1) is connected to the crane with swing (2) on rotator (3). Stone grab (1) has near the suspension switching box (4) in which are located the hydraulic valves (5) and (6). The adjustment mechanism (7) is suspended by rods (8). Clamping cylinder (9) is connected with clamping arms (10) which pivot around pivots (11). In adjustment mechanism (7) are two lock pin cylinders (12) which are double acting and each is foreseen with two lock pins (13).

[0009] The adjustment mechanism consists of two hollow profiles (14) having inside draw bars (15) with borings (16). By adjusting the draw bars (15) the length can be adjusted.

[0010] The switching box (4) is connected to switching part (17) with suspension eye (18). Switching part (17) is foreseen with coupling plate (19). Coupling plate (19) is oblong and is locked in the lifting position by plates (20) which have fitting notches. Between suspension eye (18) and coupling plate (19) is a cylindric part (21) which permits axial movement and rotating in switching box (4). Cam (22) is connected to coupling plate (19) which can operate valves (5) and (6) on rotating switching part (17). Cam (22) has such a position that in lifting position valves (5) and (6) are in point of departure.

[0011] In Fig. 6 the hydraulic diagram is given. Conduit (23) to press out cylinder (9) goes via valve (5) and valve (6) where in point of departure the connection is open. The return conduit (24) is connected with the return conduits of lock pin cylinders (12). When valve (5) or (6) is activated conduit (23) is closed and connected with conduit (25) or (26) with lock pin (12) and are operated by the operating handles of clamping cylinder (9)

[0012] For keeping stone grab (1) in balance it is necessary to have the same adjustment on both sides.

[0013] An optional version of the invention consists of a direct mechanical operation of the lock pins. In Fig. 9 is in place of a cam (22) on switching part (17) foreseen of a drive to crankshaft (28) and crankshaft (29) with a chain or toothed belt. To crankshaft (28), (29) is a double crank (30), (31), which are pivoting connected with rods (32) to lock pins (13). The double cranks are placed under an angle of 90 degrees where the cranks are placed under an angle of 45 degrees in relation to he centre line of lock pins (13).

[0014] When switching part (17) 45 degrees is rotated from the point of departure according to arrow (33) double crank (30) will give a large displacement (35) to lock pins (13) and draw bars (15) are set free. Double crank (31) will give then lock pins (13) a small oscillating movement (36) by which the locking remains. A rotating according to arrow (34) will unlock the other set of lock pins the same way and keep the first locked.

[0015] The procedure is as follows:

[0016] The stone grab (1) is placed on the ground.
[0017] The arm of the crane is lowered.
[0018] With the rotator (3) switching part (17) is turned a quarter turn so that valve (5) is activated.
[0019] With the handle of clamping cylinder (9) draw bars (15) are made free with lock pin cylinder (12).
[0020] With the rotator (3) switching part (17) is returned in the departing position.
[0021] With the handle of the clamping cylinder (9) the stone grab (1) is set on the correct clamping width.
[0022] With the rotator (3) switching part (17) is turned a quarter turn so that valve (5) is activated.
[0023] With the handle of the clamping cylinder (9) draw bars (15) are secured with lock pin cylinder (12).
[0024] With the rotator (3) switching part (17) is returned in the departing position.
[0025] To adjust the other draw bars (15) the same procedure is executed with the help of valve (6).
[0026] After adjustment coupling plate (19) is lifted and locked between plates (20) by lifting the stone grab (1).
[0027] The mechanical version requires only turning of switching part (17) to set a set of lock pins (13) free where at the returning the lock pins (13) come to position.

Claims

1. Hydraulic stone grab of the type that is connected with a rotator to a mobile hydraulic crane with a switching appliance for hydraulic additional functions **characterised by** that stone grab (1) is connected to the switching part (17) where switching part (17) is sliding and in slided-in position revolving and cam (22) can activate one or more valves (5, 6) where the operation of the principal function is switched to the additional function.

2. Hydraulic stone grab according to claim 1 **characterised by** that switching part (17) is foreseen with a suspension eye (18) and an oblong plate (19) which at slided-in position comes free from notches in plate (20) where by revolving of switching part (17) cam (22) activates valves (5, 6).

3. Hydraulic stone grab according to claim 1 and 2 **characterised by** that stone grab (1) is foreseen with an adjusting mechanism where draw bars (15) in hollow profile (14) are locked with lock pins (13) which are activated by cylinders (12).

4. Hydraulic stone grab according to claim 1, 2 and 3 **characterised by** that switching part (17) is slided in by placing the stone grab (1) on the ground and lowering the crane.

5. Hydraulic stone grab according to claim 1, 2, 3 and 4 **characterised by** that switching part (17) drives a set double cranks (28, 29) where double cranks (28, 29) are placed under an angle of 90 degrees and under an angle of 45 degrees in relation to the centre line of lock pins (13) where the lock pins (13) are connected to double cranks (28, 29) with rods (32).

FIG 1

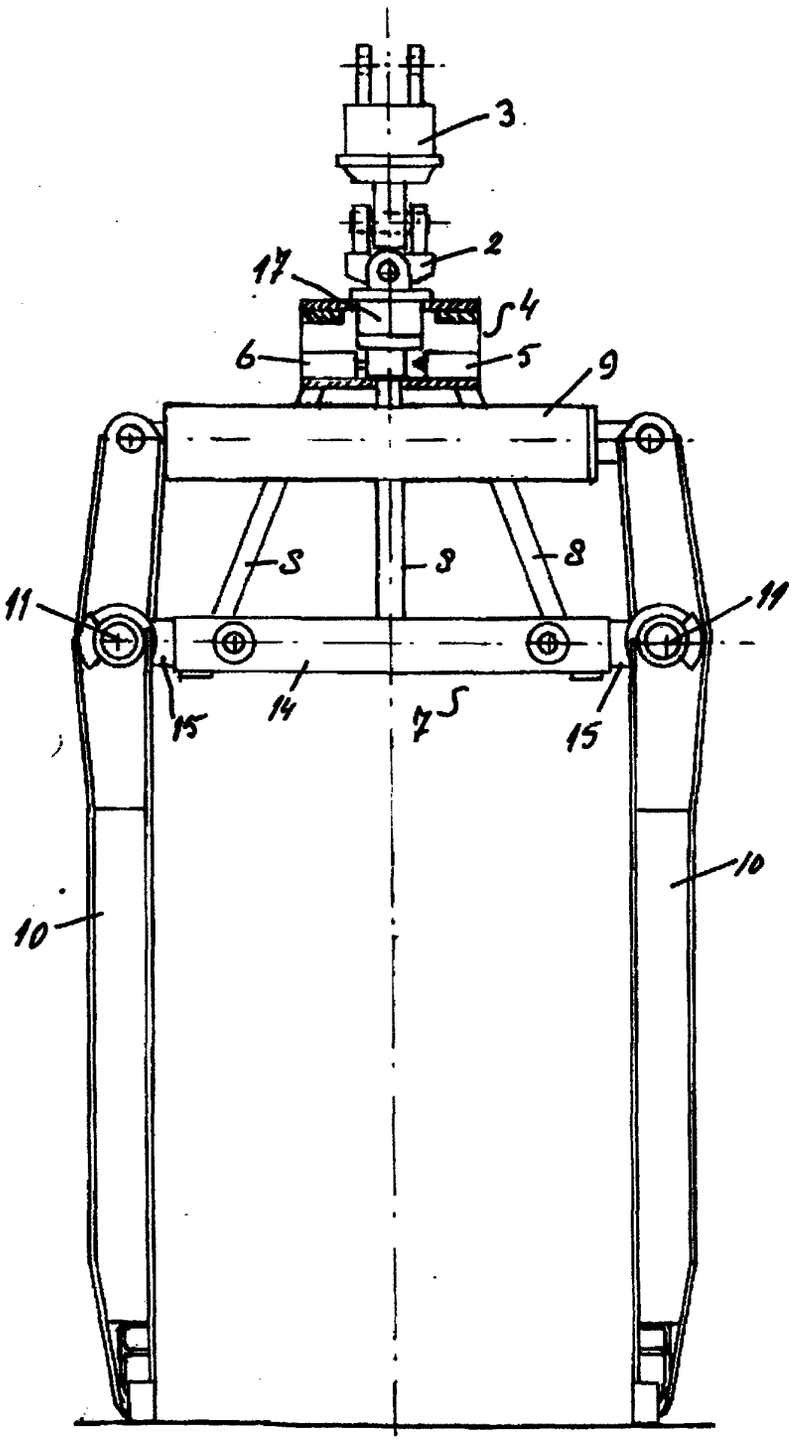


FIG 2

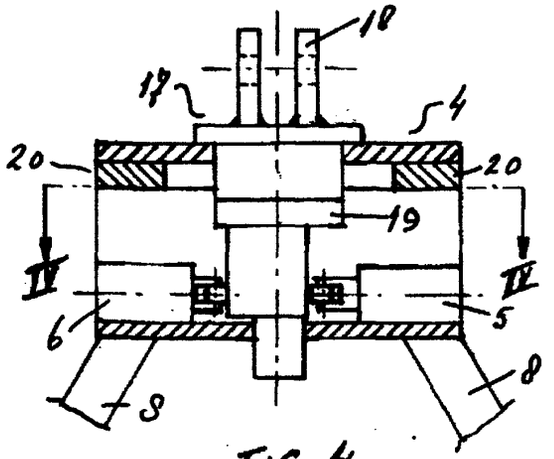


FIG 3

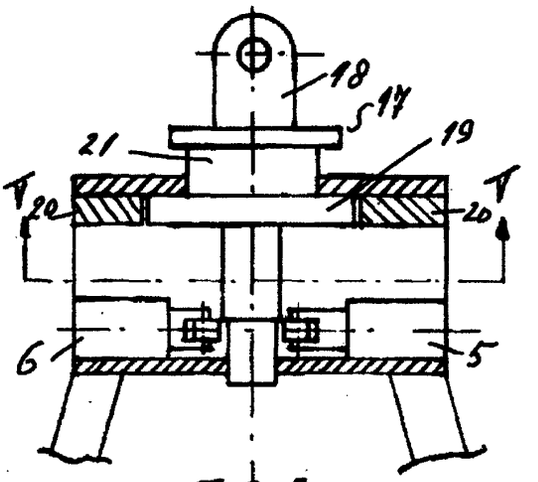


FIG 4

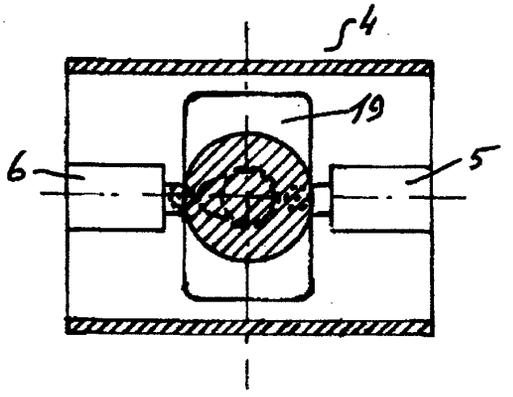


FIG 5

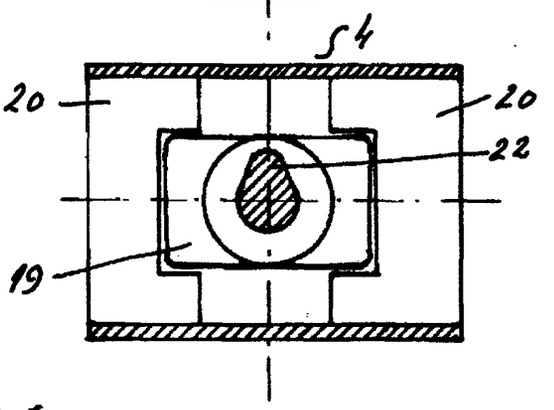


FIG 6

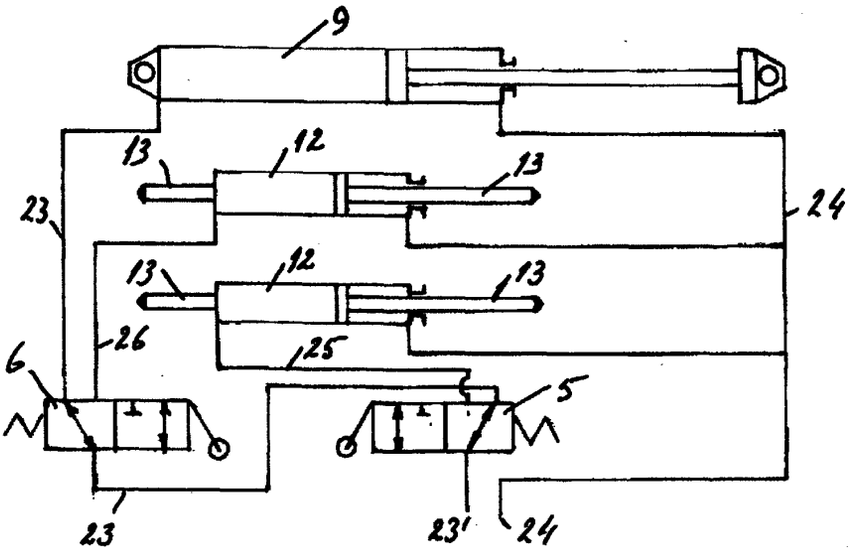


FIG 7

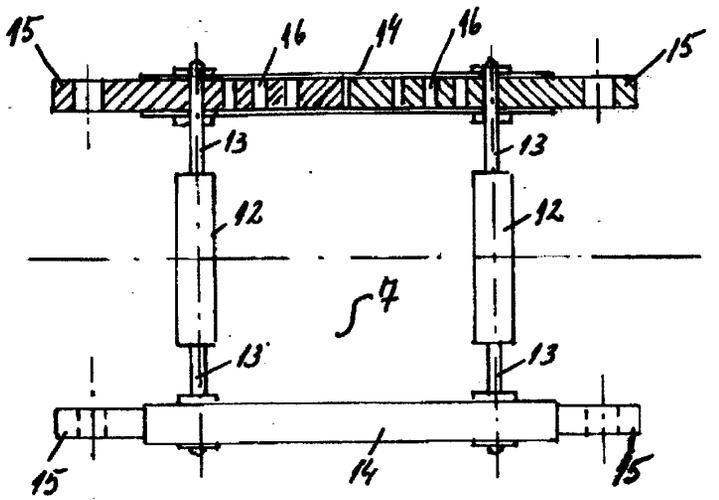


FIG 8

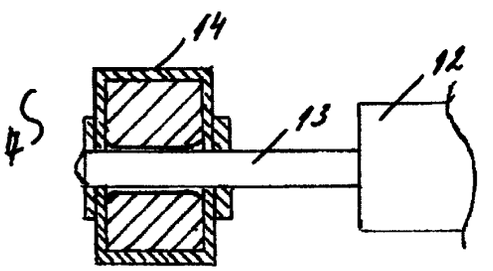


FIG 9

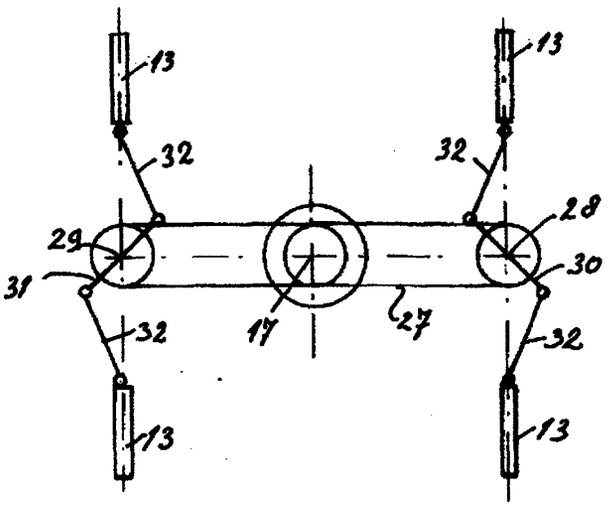
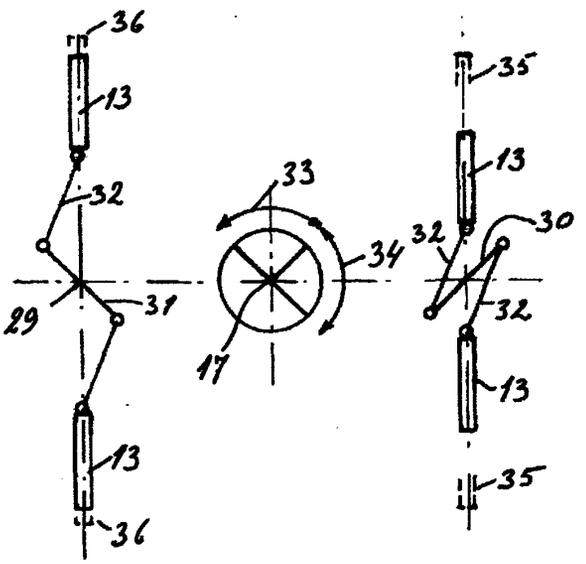

13
13
32
32
28
29
30
31
32
32
17
27
13
13

FIG 10


36
13
35
13
33
32
30
32
34
29
31
32
17
13
13
36
35

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 07 7162

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	DE 297 17 320 U (HERMANN STEINWEG BAUMASCHINENFABRIK) 8 January 1998 (1998-01-08) * page 6, paragraph 1 - page 8, paragraph 3 *	1	B66C1/44
A	US 2 370 528 A (FONTAINE) 27 February 1945 (1945-02-27) * the whole document *	1	
A	FR 2 159 342 A (LE BRUN) 22 June 1973 (1973-06-22)		
A	US 2 564 357 A (FALKNER) 14 August 1951 (1951-08-14)		
A	GB 1 556 369 A (HY-MAC) 21 November 1979 (1979-11-21)		

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B66C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31 October 2003	Van den Berghe, E

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 07 7162

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-10-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29717320 U	08-01-1998	DE 29717320 U1	08-01-1998
US 2370528 A	27-02-1945	NONE	
FR 2159342 A	22-06-1973	FR 2159342 A1	22-06-1973
US 2564357 A	14-08-1951	US 2527922 A	31-10-1950
GB 1556369 A	21-11-1979	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82