

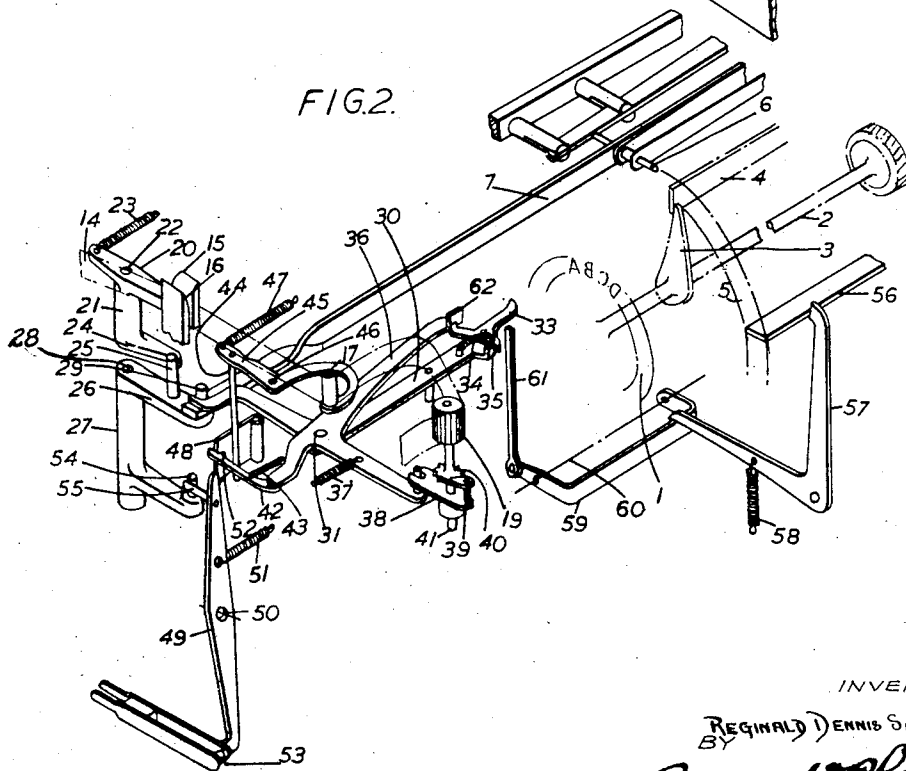
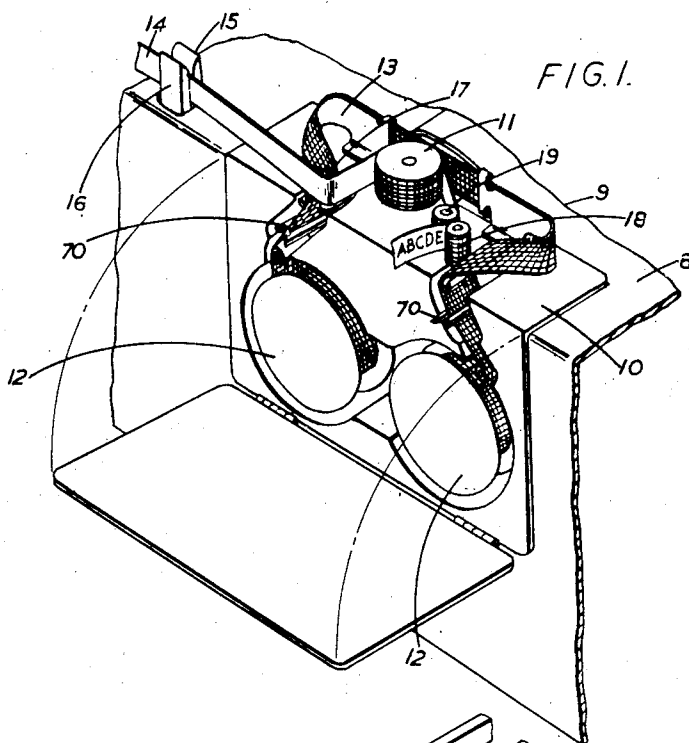
Aug. 30, 1949.

R. D. SALMON
ALARM DEVICE FOR INDICATING FAILURE OF THE
PAPER FEED MECHANISM IN TELEPRINTERS

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Filed April 19, 1945

3 Sheets-Sheet 1



INVENTOR

REGINALD DENNIS SALMON

BY *Edward D. Phinney*
ATTORNEY

ATTORNEY

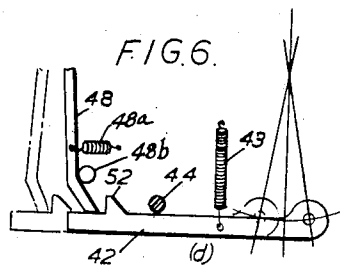
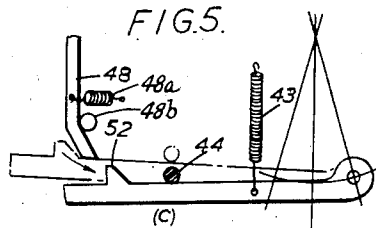
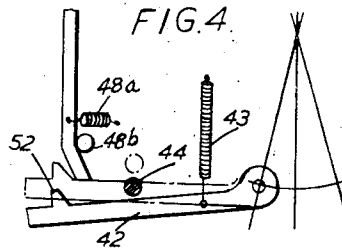
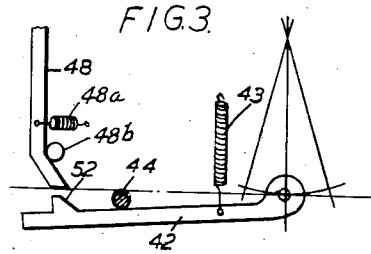
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3 Sheets-Sheet 2



INVENTOR
REGINALD DENNIS SALMON
By *Edward D. Plummer*
ATTORNEY.

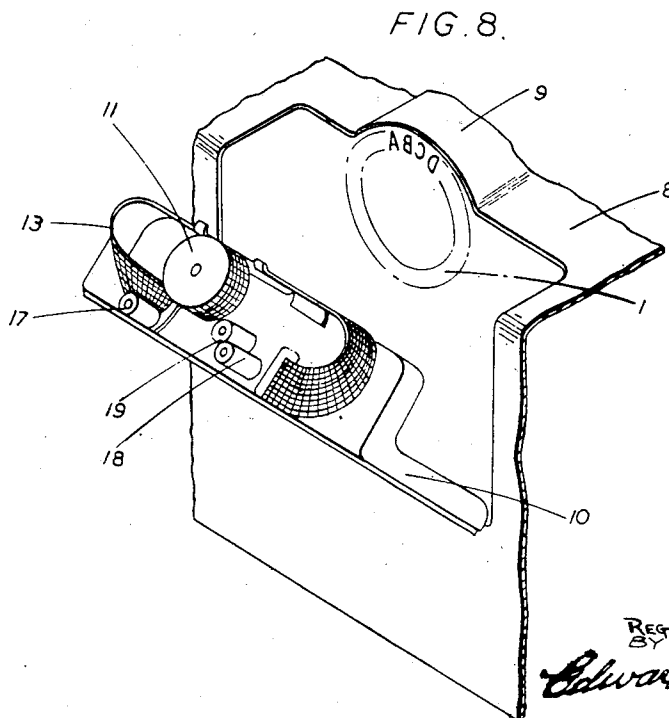
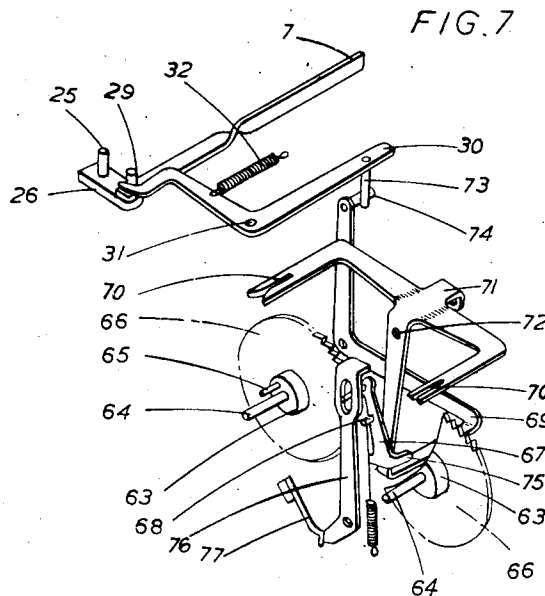
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3 Sheets-Sheet 3



INVENTOR

REGINALD DENNIS SALMON

Edward D. Hinney
ATTORNEY

UNITED STATES PATENT OFFICE

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ALARM DEVICE FOR INDICATING FAILURE
OF THE PAPER FEED MECHANISM IN TELE-
PRINTERSReginald Dennis Salmon, Croydon, England, as-
signor to Creed and Company Limited, Croydon,
England, a British companyApplication April 19, 1945, Serial No. 589,247
In Great Britain March 24, 1944Section 1, Public Law 690, August 8, 1946
Patent expires March 15, 1965

3 Claims. (Cl. 200—52)

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This invention relates to paper feeding mechanism for feeding the tape in a teleprinter past the printing point and to alarm devices for indicating failure of proper operation of said feeding mechanism.

In British specification No. 490,368 there is described and claimed an arrangement in which devices associated with a paper feeding mechanism and with the paper itself are so arranged that if an operation of the paper feeding mechanism is not accompanied or followed by a movement of the paper an alarm is given. In the arrangement described therein the alarm is given by means of a slow operating relay. Contacts in the circuit of the relay are closed by the operation of the paper feeding mechanism and are opened by the movement of the paper accompanying or following the operation of the paper feeding mechanism so that if the paper feeds correctly there is insufficient time during which the contacts are closed for the relay to operate whereas if there is no movement of the paper the relay is able to operate.

According to one feature of the present invention an arrangement for a tape teleprinter comprises paper feeding mechanism and mechanically actuated means for closing alarm contacts in the event of failure of proper operation of said feeding mechanism.

The arrangement is thus one which acts positively and mechanically without recourse to time relays to give an alarm.

One embodiment of the invention is hereinafter described and illustrated in the accompanying drawings in which:

Fig. 1 is a view, with parts broken away, of the external portion of a frame on which part of the paper feeding and ink ribbon feeding and reversing mechanism for a tape teleprinter is mounted.

Fig. 2 is a view of the paper feeding mechanism including the alarm mechanism shown in relation to the teleprinter but with the supporting framework and cover omitted for the sake of clearness.

Figs. 3, 4, 5 and 6 are detail views illustrating the action of part of the mechanism.

Fig. 7 is a view of the ink ribbon and reversing mechanism, with the supporting frame omitted;

Fig. 8 shows the mounting frame of Fig. 1 swung away from the typewheel to allow of access to the latter.

The embodiment illustrated in the drawings is applied to the teleprinter receiver of the kind described in British specification No. 228,842. In this embodiment a length of paper tape is gripped

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at a short distance before the printing point and is formed into a loop around a roller between the point at which it is gripped and the printing point. In the normal operation of the feeding action this loop of tape is tensioned and the roller aforesaid moved. This movement of the roller prevents closure of the alarm contacts. Subsequently the grip on the tape is momentarily released to allow a further portion of tape to be withdrawn from the feed roll, spring means tending to return the roller aforesaid to its original position effecting this, and the tape is again gripped in preparation for another tape feeding action. Should, however, the operation of the tape feeding motion of the mechanism not result in the loop of tape being tensioned the alarm contacts will be closed.

Referring to the drawings, a typewheel 1 carrying type segments adapted to be struck forward perpendicularly to the plane of the typewheel, as described in British specification No. 311,684 is fixed to a horizontal shaft 2 Fig. 2. The shaft 2 is rotated by a motor (not shown) through a friction clutch and stopped in the position required for printing by engagement of an arm 3 fixed to the shaft 2 with a selector bar 4. A plurality of such selector bars is arranged around the periphery of a set of comb discs 5 and these comb discs are moved selectively to present a series of aligned notches to a required selector bar 4 to allow said selector bar to move into the path of the arm 3. The comb discs 5 are set by the action of a striker pin 6 traversed along a set of comb setting fingers by means of a link 7 and selectively moved towards each comb setting finger in turn as described in British specification No. 228,842. As also described in the last mentioned specification the link 7 is moved longitudinally by a cam (not shown) from a normal position first in one direction and then back to and beyond the normal position and finally returned in the same direction as the first movement back to normal position.

The printing wheel 1 is indicated in Fig. 2 out of its true position in order to show its relation to the other parts just described without interfering with the view of the paper feeding and alarm mechanism, but as shown in Fig. 8 it is positioned close to an aperture in the cover 8 of the machine. This cover 8 is formed with a portion 9 in the form of a circular arc which is over the upper part of the typewheel and the aperture in the cover 8 is closed by means of a frame 10 except for the upper portion of the typewheel from which printing takes place, as shown

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in Fig. 1. The frame 10 carries on its exterior a printing platen 11 and on its interior the spools 12 for an ink ribbon 13 and part of the ink ribbon and paper feeding mechanism to be described.

The paper tape 14 passes from a tape roll (not shown) between a moveable plate 15 and a fixed plate 16, between which it is normally gripped, in a loop round a pulley roller 17, round the printing platen 11 and then between feeding rollers 18, 19. The fixed plate 16 is fixed to the exterior of the cover 8. The moveable plate 15 protrudes through an aperture in the cover 8 and is fixed on an arm 20 of a lever 21 pivoted below the cover at 22. A spring 23 serves to hold the plate 15 gripping the tape 14 against the fixed plate 16 and also holds an arm 24 of lever 21 against a pin 25 fixed to an arm 26 of a lever 27 pivoted at 28. A pin 29 on the arm 26 fits into an aperture in link 7 and serves to pivot the arm 26 to the link 7.

A bell crank lever 30 is pivoted at 31 on the interior of the frame 10 and is held by a spring 32 Fig. 7 in engagement with the pin 29. A pawl 33 is pivoted at the end of one arm of bell crank lever 30 and is held by a spring 34 against a stop 35. A three armed lever 36 is also pivoted at 31 and held by a spring 37 with one of its arms against the pawl 33. The end of another arm is linked to a pawl lever 38 carrying a paper feed pawl 39. The pawl 39 acts on a ratchet wheel 40 fixed to a spindle 41 journaled in the frame 10 carrying the feed roller 19. The third arm of the three armed lever 36 carries, pivoted there-to a trip arm 42 held by a spring 43 against a pin 44. The pin 44 is fixed to a lever 45 pivoted at 46 to the frame 10 and carrying the roller 17 which protrudes through an aperture in the frame 10 to the exterior thereof. A spring 47 tends to rotate lever 45 in a clockwise direction but the tension of the paper tape round the roller 17 rotates it in a counter clockwise direction against the spring 47 thus causing pin 44 to hold trip arm 42 clear of a latch 48, as shown in Fig. 3.

The latch 48 is held by a spring 48a tending to rotate it counter clockwise in Figs. 2 and 3 against a stop 48b. A lever 49 pivoted on a horizontal axis 50 is held by a spring 51 against the latch 48.

Paper feeding operation

The normal paper feeding action of the mechanism above described is as follows:

The paper tape 14 is normally gripped between plates 15 and 16, passes in a loop around roller 17, to the printing platen 11 and thence round the printing platen and between feed rollers 18 and 19. The tension in the loop acting on roller 17 holds lever 45 against spring 47 and so holds pin 44 against trip lever 42 in the position shown in Fig. 3. The link 7 in moving the striker pin 6 moves first to the right in Fig. 2 then back to the left to a position beyond its normal position and then moves to the right to return to its normal position.

The first movement to the right of link 7 rotates lever 26 counter clockwise and thus pin 25 rotates lever 21 counter clockwise to move plate 15 and release the grip on the tape 14. The spring 47 then causes lever 45 to rotate clockwise and pull a length of paper tape from the roll. The rightward movement of link 7 allows spring 32 to rotate lever 30 clockwise about its pivot 31 and lever 36 is thus also enabled to rotate clockwise under the influence of its spring 37, the end of an arm of lever 36 following the pawl 33. The pawl lever 38 is rotated counter clockwise to move pawl 39 to engage another tooth of ratchet 40.

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The clockwise movement of lever 36 moves trip lever 42 to the left in Figs. 2 and 3 and it assumes the position shown in Fig. 4, moving into the position shown in dotted lines in Fig. 4 as the pin 44 moves inward.

When link 7 moves to the left it rotates lever 27 clockwise and the pin 25 thereon moves away from lever 21 thus allowing spring 23 to rotate the latter clockwise to move plate 15 to grip the paper tape against plate 16. The pin 29 rotates bell crank lever 30 counterclockwise against spring 32 and pawl 33 thereon pushes three armed lever 36 counterclockwise thus moving trip arm 42 to the right. The trip arm 42 is formed with a projection 52 formed with a cam surface on one side, as shown in Figs. 3, 4 and 5 and the end of latch 48 is shaped as shown in those figures so that during movement of trip arm 42 to the right it is cammed outwardly by engagement of projection 52 with the end of latch 48. The counter clockwise movement of three armed lever 36 also causes pawl lever 38 to be rotated clockwise so that pawl 39 carried thereon steps ratchet wheel 40 through the space of one tooth thereby rotating feed roller 19. This rotation of feed roller 19 feeds the tape 14 past the printing point on platen 11 and since the tape 14 is gripped between plates 15 and 16 the loop of tape round roller 17 is shortened thus rotating lever 45 counter clockwise and bringing pin 44 into the position shown in full lines in Fig. 5 and preventing trip arm 42 from moving inwards towards latch 48 from the position into which it was cammed by engagement of projection 52 with the end of latch 48 during the movement of trip arm 42 to the right.

The link 7 then moves to the right into its initial position restoring the parts to the position shown in Fig. 2, the trip arm 42 moving to the left back to the position shown in Fig. 3.

Alarm actuation

Failure of proper action of the paper feeding mechanism may occur if the roller 19 fails to rotate; if the roller 19, though rotating fails to grip the paper tape sufficiently against roller 18 to feed the tape past the printing point, or if the paper tape be broken between the plate 15 and the roller 19. In each of these cases the action of the mechanism fails to tension the tape and accordingly the spring 47 can hold the lever 45 in its extreme clockwise position and the pin 44 thereon is held away from the trip arm 42. Thus after the trip arm in its movement to the right has been cammed outwards to the position shown in full lines in Fig. 5 the pin 44 fails to move from the position shown in dotted outline in that figure and trip arm 42 is drawn by its spring 43 into the position shown in full lines in Fig. 6.

When the link 7 is moving to the right after the pawl 39 should have rotated the ratchet wheel 40 and the trip arm 42 is in consequence moving to the left the projection 52 thereon engages the latch 48 and moves it, as indicated by dotted lines in Fig. 6. The latch 48 is thus removed from the path of lever 49 and the spring 51 rotates this lever sufficiently to close alarm contacts 53. Contacts 53 may close the circuit of a local audible and/or visual alarm signal and may, in addition open the circuit of the teleprinter motor and also the circuit of a magnet which actuates a key of a teleprinter transmitter to send an alarm signal to the distant station from which the message being printed is received. If the teleprinter motor is not stopped immedi-

ately and a further signal combination is received a pin 54 on lever 27 engaging a pin 55 on lever 49 restores it to initial position during the initial movement of link 7. The alarm signal will however again be given since the same sequence of events will be followed.

Paper feed suppression

If the code combination received is one for which feeding of the paper is not required, such for example as letter shift or other similar function, a selector bar such as 56, Fig. 2 will be allowed to fall into a series of aligned notches in the comb discs 5. Each such selector bar for which paper feeding is to be suppressed is so located in relation to a bell crank lever 57 that in the nonselected position it holds the corresponding lever 57 against the tension of a spring 58. One arm of each of the levers 57 rests on a bail 59 pivoted on a horizontal axis 60 and carrying a rod 61 which extends upwardly just below the path of movement of pawl 33. If a selector bar such as 56 for which paper feeding is to be suppressed, falls into a series of aligned notches in comb discs 5, the corresponding bell crank lever 57 is allowed to be rotated counterclockwise by its spring 58 and bail 59 is thereby rotated clockwise to bring rod 61 into the path of pawl 33. When therefore the bell crank lever 30 is rotated in a clockwise direction during the initial movement of link 7, pawl 33 strikes the rod 61 and is rotated counterclockwise against spring 33.

When the bell crank lever 30 is rotated in a counterclockwise direction the pawl 33 misses an upturned portion 62 on the three armed lever 36 with which it normally engages and thus the pawl 33 fails to rotate the three armed lever 36 to effect stepping of the ratchet 40, or to effect movement of the trip arm 42 into position to engage latch 48.

Ink ribbon feeding mechanism

Ink ribbon spools 12 are mounted on hubs 63, Fig. 7, carrying pins 64 journaled in the frame 10 and carrying pins 65 fitting into apertures in the spools 12 whereby these spools are driven by rotation of hubs 63. Fixed to the hubs 63 are ratchet wheels 66 and one or other of these ratchet wheels is engaged by a pawl fixed on a pawl arm 67, pivoted at 68 on a lever 69. The ink ribbon 13 passes through notches 70 on a frame 71 pivoted at 72. Buttons (not shown) fixed on the ink ribbon near the extremities thereof act upon frame 71 when the ribbon has been nearly exhausted from one of the spools 12 to tilt the frame. The mechanism is substantially the same as that described in British specification No. 457,821. Each time bell crank lever 30 is moved by link 7 in a counterclockwise direction a pin 73 thereon engages a pin 74 on lever 69 and lever 69 is thus caused to reciprocate pawl arm 67 to bring turned over portions 75 thereon into contact with the central arm of frame 71 and also to impart a step to one of the ratchet wheels 66. A retaining pawl 76 is linked to pawl arm 67 and held in contact with the teeth of a ratchet wheel 66 by a jockey spring 77. In Fig. 7 the pawl arm 67 is shown in such position that the feeding pawl and the retaining pawl 76 engage with the left hand ratchet wheel. When the ink ribbon on the right hand spool is nearing exhaustion a button on the ink ribbon engages the right hand notch 70 in frame 71 and rotates that frame counterclockwise. On the next movement of lever 69 the right hand por-

tion 75 on the pawl arm 67 engages the central limb of frame 71 and is rotated clockwise carrying retaining pawl 76 with it so that the pawls engage with the right hand ratchet wheel.

It will be noted that the ink ribbon feeding and reversing mechanism and the paper feeding and alarm mechanism are mounted on the frame 10 and only engage the mechanism of the teleprinter itself or such mechanism as is mounted on the cover 8 by the engagement of lever 30 with pin 29 and of pin 55 on lever 49 with pin 54. Thus the frame 10 may be readily swung away from its normal position, as indicated in Figs. 1 and 8 for access to the typewheel 1, to clean the type for example.

Modifications to this apparatus may be made within the scope of the invention. For example it will be evident to those skilled in the art how the mechanism may be modified in the case in which the link 7 or the equivalent operating lever in a teleprinter of some other construction than that shown in British specification No. 228,842 is moved from one extreme position to the other and back again to its initial position instead of starting from a midposition.

What is claimed is:

1. Alarm actuating means for use with a tape feeding mechanism comprising a roller shiftable laterally upon slackening of the tape, an alarm operating element comprising a pair of switch contacts and a rocker arm centrally pivoted and spring biased to said operating position, a latch rotatable about an axis disposed at a right angle to the locking axis of said rocker arm, said latch having its free end normally in engagement with the end of said rocker arm, that is remote from the switch operating end thereof, and means responsive to lateral shifting of said roller to move said latch out of engaging position, thereby freeing said rocker arm for switch operating movement.

2. In an alarm actuating means as in claim 1, a pawl and ratchet mechanism for feeding the tape, mechanically operable means for interrupting the ratcheting action whenever the operated key is such as to require no tape advance, and means for preventing alarm operation during and immediately after operating of said mechanically operable means, said preventing means including key operated means for shifting the position of the linkage normally operating to move the latch out of engaging position.

3. In an alarm actuating mechanism as in claim 1, means for resetting said latch in alarm controlling position in response to re-tensioning of the tape.

REGINALD DENNIS SALMON.

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