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2,426,570

THIN PLACE DETECTOR FOR LOOMS

Filed April 8, 1946

2 Sheets-Sheet 1

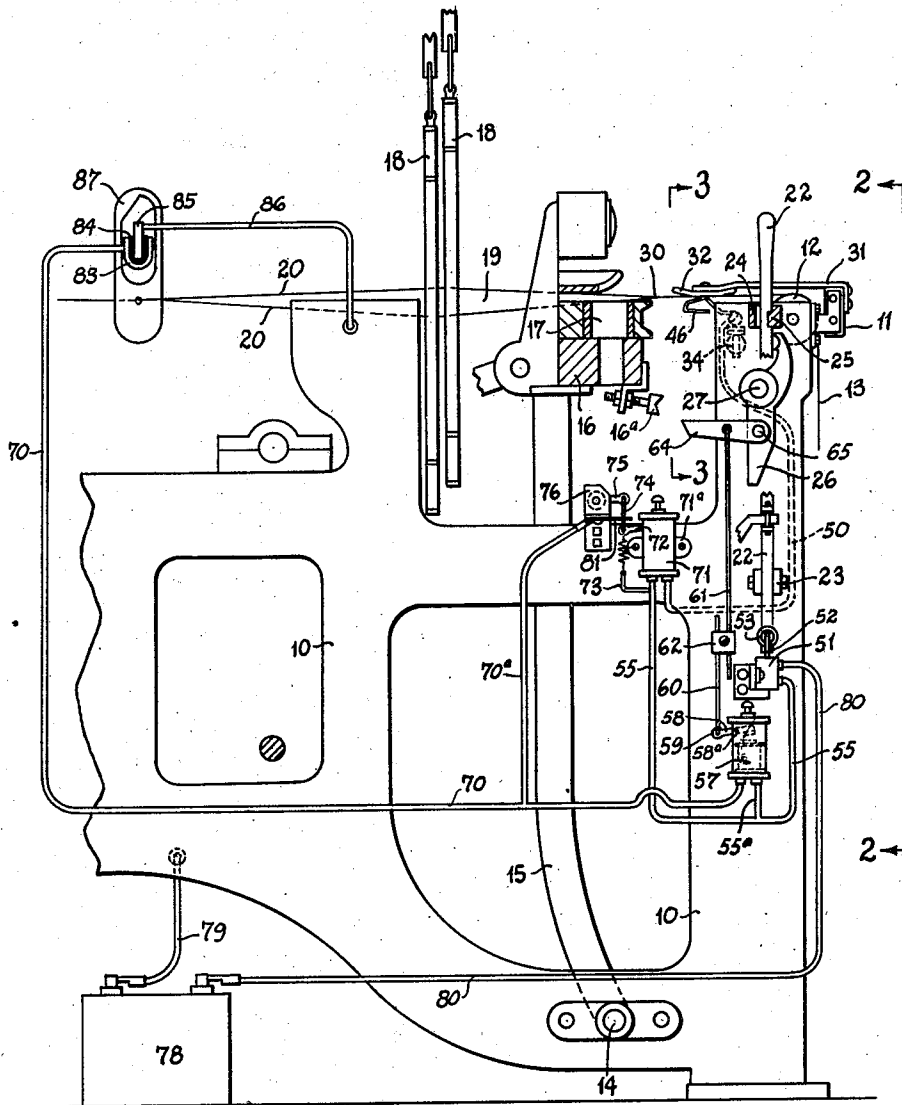


Fig-1

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Fig-2

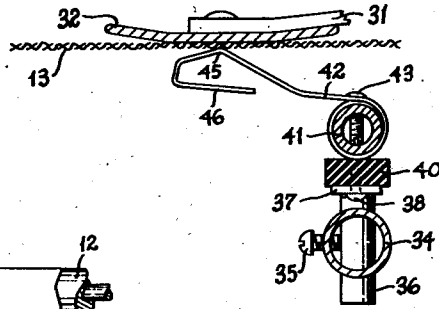
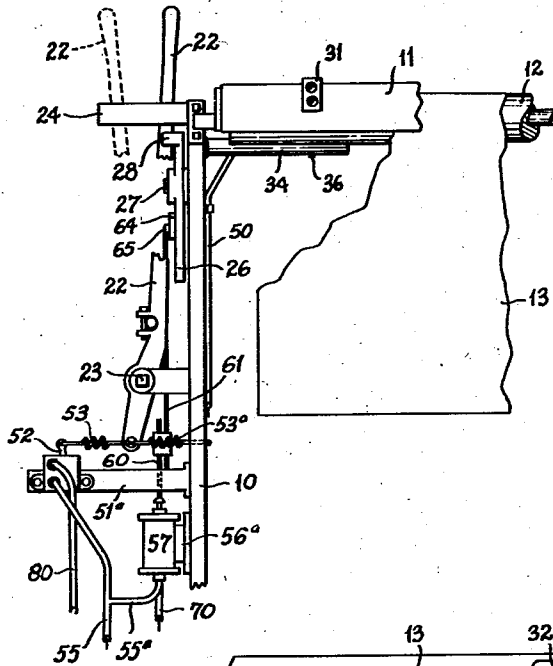
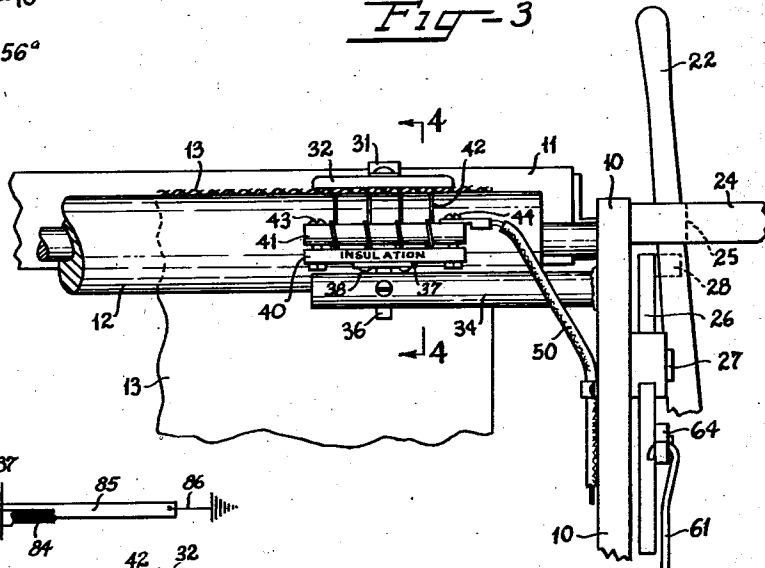


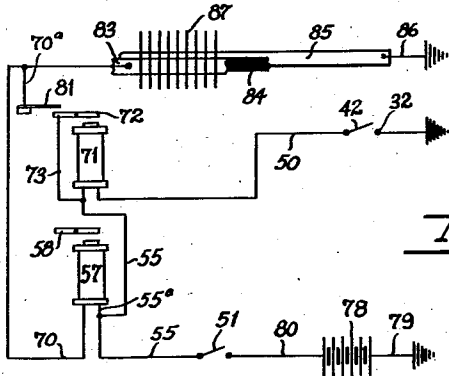
Fig-4

Fig-3



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Fig-5



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UNITED STATES PATENT OFFICE

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THIN PLACE DETECTOR FOR LOOMS

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10 Claims. (Cl. 139—348)

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This invention relates to a thin place detector in cloth being woven on a loom. In a weaving operation in a loom, as the shuttle is thrown back and forth as sheds are formed in the warp threads, it sometimes happens that the shuttle will be passed across the shed with no filling thread being left by the shuttle as it travels across the loom; thus, resulting in thin places in the fabric being woven, because as the lay beats up a predetermined amount each time, if there are no filling threads present for a pick or two, then there will be a thin place in the cloth which should be detected and the cause remedied and the cloth severed and a new cloth roll started to remove the defective piece of cloth.

I am aware that heretofore various types of thin place detectors have been provided, practically all of them being of the mechanical type wherein certain pointed instruments would pass through the thin places in the cloth to actuate a train of mechanisms to stop the loom.

It is an object of this invention to provide an electrical thin place detector for looms wherein, when a thin place occurs, a circuit will be established between a metallic plate disposed above the cloth and a feeling finger disposed below the cloth thus to complete a circuit to energize a magnet to cause the shipper lever to be knocked off to stop the loom and, at the same time, another magnet may be energized, if desired, to operate a conventional counter to indicate the number of times a loom has been stopped on account of thin places within a given period.

It is another object of this invention to provide a circuit in a loom with a contact in one portion of the circuit being disposed above the cloth being woven and another contact disposed below the cloth, so that in the event of a thin place being present in the cloth, the two contacts will engage each other, thus, to energize a magnet to cause a member to be disposed in the path of the bunter on the lay of the loom, to automatically unlock the shipper lever and allow it to move to stopping position on the loom under the impulse of a conventional spring for moving the shipper lever to stopping position.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of one end of the loom, showing parts broken away;

Figure 2 is an elevation of one side of one end of the loom taken substantially along the line 2—2 in Figure 1;

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Figure 3 is a vertical sectional view with parts in elevation and taken substantially along the line 3—3 in Figure 1;

Figure 4 is a vertical sectional view taken substantially along the line 4—4 in Figure 3.

Figure 5 is a schematic wiring diagram of the invention.

Referring more specifically to the drawings, the numeral 10 indicates a loom frame, there being a similar frame on the other side of the loom, not shown. This frame has a breast beam 11 spanning the distance between the two frames, and in the upper right hand portion of the frame in Figure 1 is rotatably mounted a roller 12 over which the cloth 13 passes on its travel to the conventional takeup roll and cloth roll not shown. This loom also has a rocker shaft 14 on which swords 15 are oscillatably mounted, said swords having mounted on the upper end thereof a loom lay 16, the lay 16 having a conventional bunter 16a secured thereon. At each end of this lay is disposed a shuttle box 17.

The loom also has a plurality of harness frames 18 for forming a shed 19 in warp threads 20 and through which shed 19 a shuttle is projected from one side to the other to weave cloth.

The loom is also equipped with a conventional shipper lever 22 pivoted in any conventional manner as at 23 and having its upper ends mounted in a suitable slotted lock member 24, which has a projection 25 for holding the shipper lever in running position as shown in full lines in Figure 2. This shipper lever controls suitable knockoff mechanism for stopping the loom when the shipper lever is moved to dotted line position in Figure 2.

There is also conventional means for knocking this shipper lever to off position which comprises a dagger lever 26 pivoted as at 27 and having an outwardly turned lug 28 resting behind the shipper lever 22.

The mechanism thus far described is conventional, and it is with this conventional mechanism on the loom that my thin place detector mechanism is adapted to cooperate. From the point 30 to the right in Figure 1, the filling threads have been beaten up to form the cloth. I provide a bracket 31 having one end secured to the breast beam 11 of the loom and having a metallic plate 32 secured on its other end whereby the plate 32, bracket 31, and breast beam 11 are all grounded to the frame of the loom. Below the bracket 31 and plate 32 and on the lower side of the cloth 13, I provide a bracket 34, which may be a pipe welded to the frame of the loom, and in this pipe

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34 I secure by means of a set screw 35, a shank 36 of a plate 37 having screws 38 penetrating the same and threadably embedded in an insulating plate 40. Insulating plate 40 has mounted on top of the same a metallic member such as a pipe 41 which has secured thereto in any suitable manner, such as being wound therearound, a plurality of wires 42. This member 41 is secured to the insulating plate by means of a pair of bolts 43 and 44. Each of the wires projects upwardly and has a slight point as at 45 and then projects downwardly and is reversely bent into a portion 46 so that the point 45 will ride against the cloth 13 and press it against the plate 32, the wires 42 being of spring steel to cause them to press upwardly at all times against the cloth 13.

The bolt 44 secures one end of a wire 50 which is connected to one side of a solenoid 71 supported at 71a and a wire 55 leads from the solenoid 71 to one side of a switch 51, which has a lever 52 connected by a spring 53 to the shipper lever 22. Another spring 53a is connected to the lower end of the shipper lever and to the loom frame for moving the shipper lever to off position, when the stop-motion mechanisms are operated.

From the other side of switch 51, there is a wire 80, which leads to one side of a battery 78, and a wire 79 leads from the other side of the battery and is grounded to the loom frame. A branch wire 73 leads from wire 55 to a lever 72 of the magnet, which is the armature lever and this lever 72 has also connected thereto a line 74, which is connected to lever 75 of a counter 76. This wire 73 is electrically connected to the armature arm 72, so that when it is raised it touches a contact member 81 to which is connected a wire 70a, which in turn is connected to wire 70. The wire 55 has a branch wire 55a, which is connected to one side of a magnet 57, and wire 70 is connected to the other side of magnet 57, and leads to the outer trough shaped conductor bar 83 of a conventional electrical stop-motion bar, which is insulated, as at 84, from a conducting bar 85, which bar is grounded by a wire 86 to the loom frame. This warp stop-motion has a plurality of drop wires 87 mounted thereon, through which the warp threads 20 pass and operate in a conventional manner. The magnet 57 has a pivoted armature lever 58 pivoted, as at 58a, and pivotally connected, as at 59, to a rod 60, which by means of connection 62 is connected to a wire 61, which is pivotally connected to a dagger 64, which is pivoted on the knock-off lever 26, as at 65.

The magnet housing is supported by a suitable bracket 56a. The switch 51 is supported by a suitable bracket 51a.

Method of operation

While the loom is weaving and forming the cloth by beating up of filling threads thrown across through the shed 19, perfect cloth is formed and points 45 of fingers 42 will be held out of contact with plate 32 on account of the fact that the cloth will be disposed between points 45 of wires 42 and the plate 32. When filling fails to be thrown across the shed and a thin place is thus made in the cloth, and when this thin place reaches the point where it passes between the wires 42 and the plate 32, one or more of the fingers 42 makes contact with plate 32 and a circuit is established through wire 50, magnet 71, wire 73, contact 81, wire 70a, wire 70, through magnet 57, through wire 55 and through switch 51, which is closed and through wire 80, battery 78, and ground wire 79 to complete the circuit.

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This will operate both the stopping magnet and the counter magnet, and will cause the pivoted dagger 64 to be lifted to where bunter 16a will strike it and operate the throw-off lever 26 to relieve the shipper lever to stop the loom. This will also give a count of the number of times a thin place has occurred in the cloth.

Now, let us assume that a thin place is not present in the cloth, but a warp thread breaks, which will allow one of the drop wires 87 to fall, which will close a circuit between the bars 83 and 85, and a circuit will flow through wire 86, bar 85, one of the drop wires 87, outer bar 83, wire 70, magnet 57, wire 55, through switch 51, wire 80, battery 78, wire 79 to the ground to complete the circuit, which will stop the loom, but will not operate the counter magnet 71.

It is thus seen that I have provided an electrical stop-motion associated with both the drop wire stop-motions and with the dagger of the loom, whereby when either a thin place occurs or a warped thread breaks, the loom will be stopped and a counter is provided, which will be actuated only when a thin place occurs in the cloth.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a thin place detector for looms, a metallic plate mounted on one side of the cloth, a plurality of spring pressed fingers mounted on the other side of the cloth and being held out of contact with the plate by the passage of cloth therebetween, but being adapted to contact the plate when a thin place occurs in the cloth, a circuit leading from the spring pressed fingers, a pair of magnets in said circuit, one of the magnets when energized operating a counter mechanism and the other magnet when energized, moving a dagger, said loom having a layer provided with a bunter which is adapted to engage the dagger when moved by its associated magnet to move the shipper lever from operating position, and spring means for moving the shipper lever when released to non-operating position to stop the loom.

2. In a loom for weaving cloth and having an oscillating lay equipped with a bunter, a shipper lever and means for holding the shipper lever in operating position to cause the loom to operate, said loom having a dagger lever associated with the shipper lever and which, when moved, being adapted to move the shipper lever, spring means for moving the shipper lever to inoperative position when released, said dagger lever having a dagger thereon, normally out of the path of the swinging bunter, a pair of electrical contact members between which the cloth is adapted to pass after being woven, electrical means for moving the dagger on the dagger lever to engage the bunter, a counter mounted on the loom and electrical means for moving the counter, a circuit leading from the two electrical contact members through the two magnets so that when a thin place occurs in the cloth and the electrical contact members are allowed to contact each other, a circuit will be closed through the magnets to move the dagger into the path of the bunter to cause the dagger lever to move the shipper lever from its operative position, a spring for moving the shipper lever to inoperative position when released, and a switch in said electrical circuit, and means connecting the switch to the shipper lever

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for opening the switch when the shipper lever moves to inoperative position.

3. In a loom for weaving cloth, an electrical contact member disposed on one side of the cloth and a second electrical contact member disposed on the other side of the cloth and normally pressed into contact with the cloth, a source of electrical energy connected to the two electrical contact members, means operable upon the two contact members engaging each other when a thin place occurs in the cloth for automatically stopping the loom, and means for breaking the circuit when the loom is stopped.

4. In a loom for weaving cloth and having a shipper lever, a dagger lever, a dagger, and a bunter disposed on the lay of the loom, means for holding the shipper lever in operative position, electrical contact members disposed on opposed sides of the cloth and normally pressing against the cloth, an electrical circuit having its two sides connected to the two electrical contact members, and said electrical contact members being adapted to contact each other when a thin place occurs in the cloth being woven, and electrical means for moving the dagger into the path of the bunter for moving the dagger lever to unlock the shipper lever to stop the loom when the two electrical contact members are allowed to contact each other due to a thin place in the cloth.

5. In a loom for weaving cloth and having a shipper lever, a dagger lever, a dagger, and a bunter disposed on the lay of the loom, means for holding the shipper lever in operative position, electrical contact members disposed on opposed sides of the cloth and normally pressing against the cloth, an electrical circuit having its two sides connected to the two electrical contact members, and said electrical contact members being adapted to contact each other when a thin place occurs in the cloth being woven, electrical means for moving the dagger into the path of the bunter for moving the dagger lever to unlock the shipper lever to stop the loom when the two electrical contact members are allowed to contact each other due to a thin place in the cloth, and a switch in the circuit and connected to the shipper lever and whereby the switch will be moved to open position when the shipper lever moves to inoperative position.

6. In a loom for weaving cloth and having a shipper lever, a dagger lever, a dagger, and a bunter disposed on the lay of the loom, means for holding the shipper lever in operative position, electrical contact members disposed on opposed sides of the cloth and normally pressing against the cloth, an electrical circuit having its two sides connected to the two electrical contact members, and said electrical contact members being adapted to contact each other when a thin place occurs in the cloth being woven, electrical means for moving the dagger into the path of the bunter for moving the dagger lever to unlock the shipper lever to stop the loom when the two electrical contact members are allowed to contact each other due to a thin place in the cloth, and a switch in the circuit and connected to the shipper lever and whereby the switch will be moved to open position when the shipper lever moves to inoperative position, a counter mounted on the loom and other electrical means operable when the circuit is closed due to the two electrical contact members touching each other for moving the counter to register one stopping of the loom.

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7. In a loom having a lay with a bunter thereon and having a knock-off lever with a dagger pivoted thereon and having a shipper lever with spring means normally urging it to knock-off position, a magnet having connection with the dagger for raising the same into the path of the bunter, a switch connected to the shipper lever and being in closed position, when the shipper lever is in running position, said magnet having an armature and in connection between the armature and the pivoted dagger for moving it into the path of the bunter when the magnet is energized, a second magnet having an armature, a counter mechanism and a connection between the counter magnet and the counter mechanism for operating the same when the counter magnet is energized, a warp stop-motion having a plurality of drop wires, which when allowed to fall to lowest position by the parting of a warp thread are adapted to close a circuit, a plurality of spring pressed fingers mounted on the lower side of the cloth and adapted to press against the cloth, a plate mounted above the cloth and grounded to the loom frame, a circuit leading from the fingers to the counter magnet, a circuit leading from the counter magnet through one side of the dagger operating magnet, a circuit leading from the other side of the dagger operating magnet to the switch and a circuit leading from one side of the stop-motion mechanism to the frame of the loom, and a circuit leading from the other side of the stop-motion drop wire mechanism to the other side of the dagger operating magnet, whereby when a thin place occurs in the cloth, the first magnet will be energized to move the dagger into the path of the bunter to stop the loom and to operate the second magnet to actuate the counter mechanism, and when a drop wire falls the circuit will be passed through the dagger operating magnet to stop the loom, but will not be passed through the counter actuating magnet to actuate the counter.

8. In a loom having a lay provided with a bunter and having a knock-off lever provided with a dagger, and having a shipper lever adapted to be moved to knock-off position by actuation of the knock-off lever, a switch having one of its sides disposed below the cloth being woven by the loom and the other side disposed above the cloth and adapted to be closed by a thin place appearing in the cloth, a counter mechanism and a magnet for actuating the counter mechanism, a dagger operating magnet and a connection between the magnet and the dagger for raising the dagger, when the dagger magnet is energized, a switch adapted to be held in closed position by the shipper lever, when it is in running position, and electrical stop-motion mechanism having a plurality of drop wires thereon, and having a pair of insulated conducting bars, one of said bars being grounded to the loom and the other of said bars having a circuit connected thereto and also connected to the dagger operating magnet, a wire leading from the switch associated with the cloth to one side of the counter operating magnet, a wire leading from the other side of the counter operating magnet to the armature of the counter operating magnet, a contact member adapted to be engaged by the counter magnet armature when it is energized, a circuit leading from said contact to one side of the dagger operating magnet, a circuit leading from the other side of the dagger operating magnet to said switch and a circuit leading from said switch to a source of energy, and a connec-

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tion between said source of energy and the frame of the loom, a circuit leading from one side of the counter operating magnet to one side of the dagger operating magnet, whereby when a thin place occurs in the cloth to close a switch associated with the cloth, the counter operating magnet will be actuated to operate the counter and the dagger operating magnet will be actuated to actuate the dagger to move it into the path of the bunter to stop the loom, and when a warp thread is dropped, a circuit will be established between the electrical warp stop-motion mechanism and the dagger operating magnet to stop the loom.

9. In a loom having an electrical warp stop-motion and a switch between which the cloth passes after being woven, means operable as said switch becomes closed due to a thin place in the cloth for stopping the loom and means actuated by the closing of said switch for keeping a record of the number of times the loom has been stopped, due to a thin place in the cloth and means for also stopping the loom when the electrical warp

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stop-motion is actuated, due to a parting of a warp.

10. In a loom having an electrical warp stop-motion and having a switch between whose two contacts cloth after being woven is passed, means operable by closing of the switch as a result of a thin place in the cloth passing between the two contacts of said switch for stopping the loom, said means for stopping the loom also being operable by the closing of the circuit in the electrical stop-motion.

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15 The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,426,570.

August 26, 1947.

ARTHUR S. THOMAS

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Column 4, line 43, claim 1, for the word "layer" read *lay*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of October, A. D. 1947.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.
