June 30, 1931. J. H. HINDLE ET AL 1,812,206

DRIVING AND CONTROLLING MECHANISM OF LOOMS FOR WEAVING

Filed Feb. 19, 1930 3 Sheets-Sheet 1

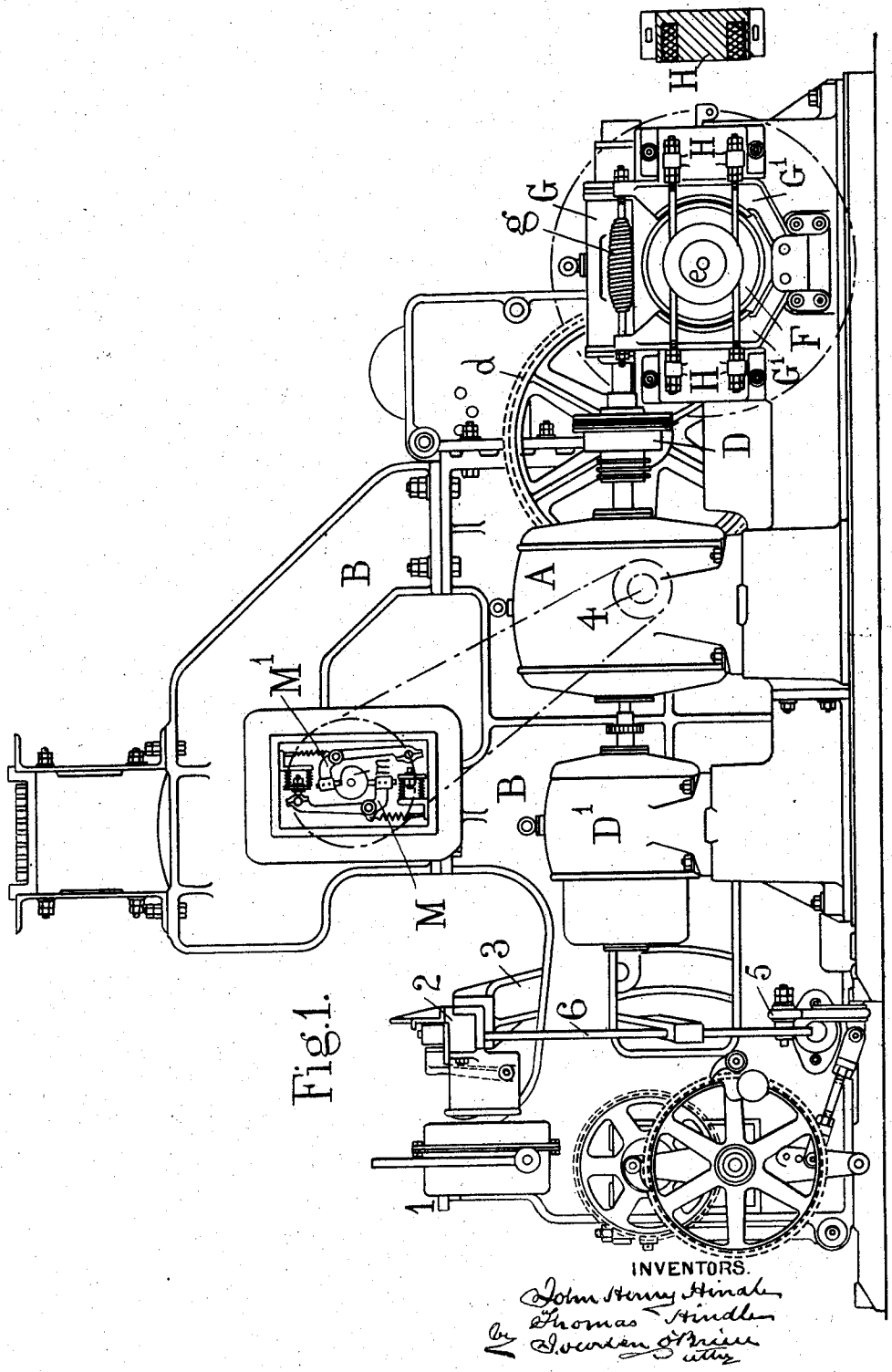


Fig. 1.

INVENTORS.
John Henry Hindle
Thomas Hindle
By Scrivener & Prince
Attys

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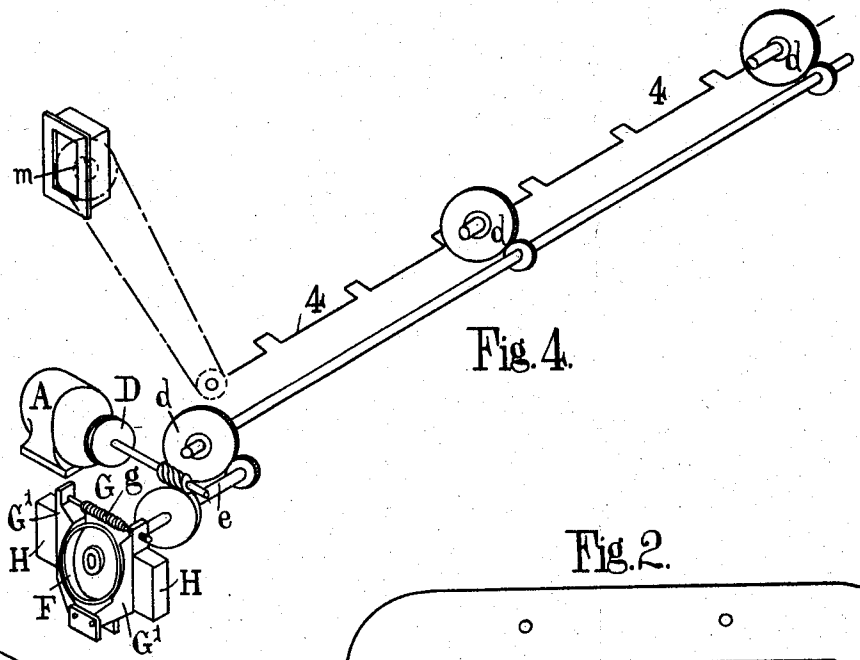
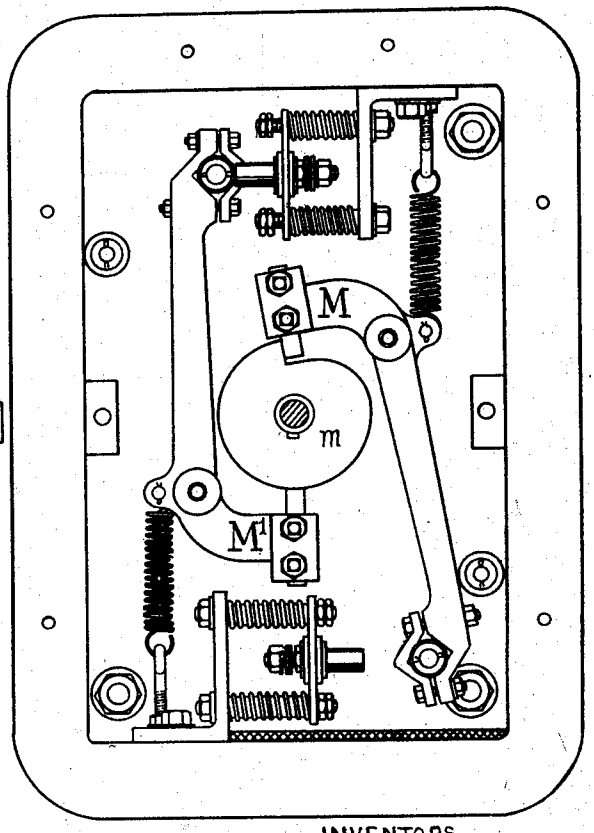


Fig.4.

Fig.2.



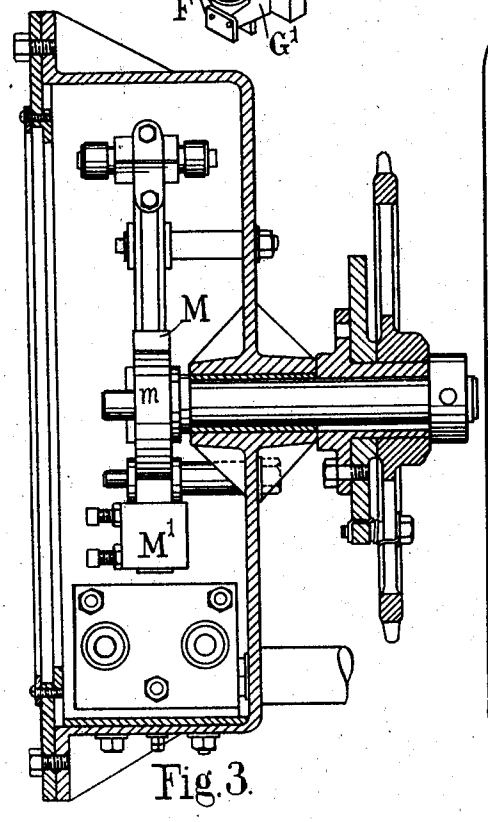


Fig.3.

INVENTORS.

John Henry Hindle
Thomas Hindle
by J. Owden O'Brien
atty

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DRIVING AND CONTROLLING MECHANISM OF LOOMS FOR WEAVING

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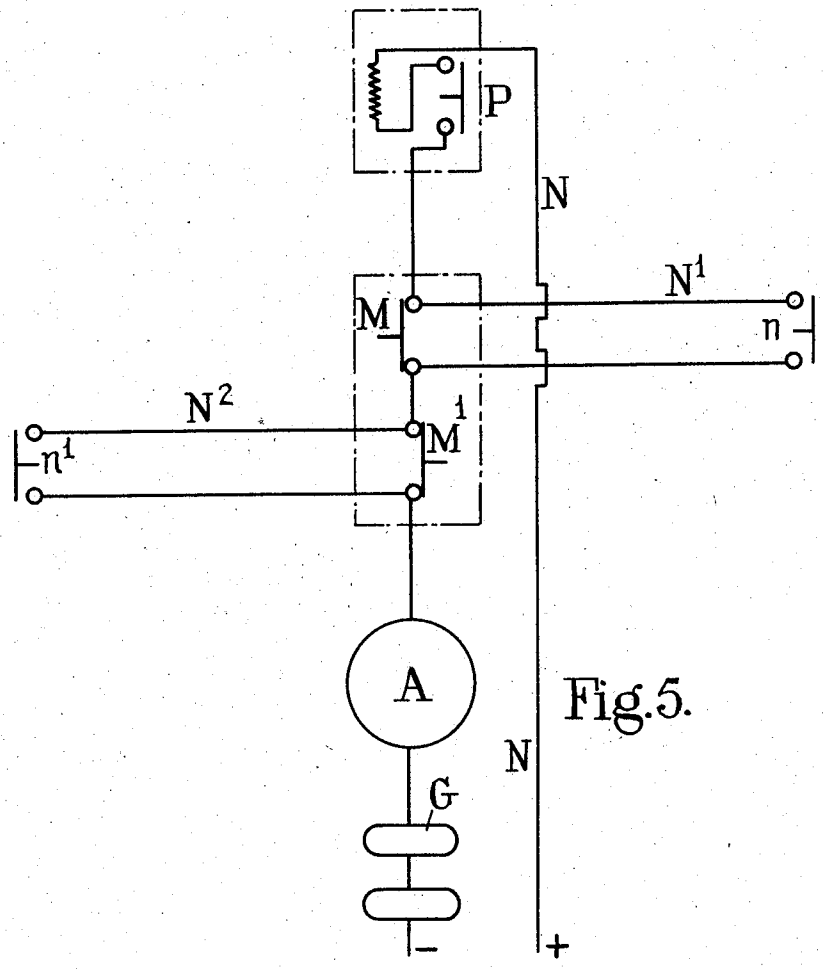


Fig.5.

INVENTORS

John Henry Hindle

Thomas Hindle

By Howard O'Brien

atty.

Patented June 30, 1931 1,812,206

UNITED STATES PATENT OFFICE

JOHN HENRY HINDLE AND THOMAS HINDLE, OF HASLINGDEN, ENGLAND

DRIVING AND CONTROLLING MECHANISM OF LOOMS FOR WEAVING

Application filed February 19, 1930, Serial No. 429,726, and in Great Britain April 25, 1929.

This invention relates to looms such as are employed for weaving heavy wide fabrics of cotton, wool or other fibres in which the slay is mounted on a number of intermediate slay swords and actuated by a corresponding number of cranks and supported by intermediate frames.

In such looms which may be up to 400 inches or more in width the mechanism for protecting the warp in case the shuttle remains in the shed consists of a number of "frogs" which automatically come into action against an abutment if the shuttle fails to arrive in its box, and arrest the motion of the loom abruptly, heavy springs being employed to take up the shock. Further, the driving power actuating the loom only commences to be shut off at the moment of impact and consequently the shock is thereby accentuated.

The object of this invention is to dispense with the mechanical knocking off motion heretofore employed and to provide an effective electrical drive for the loom, thereby facilitating the combination therewith of an electric warp protection mechanism, which brings the slay to a standstill without any mechanical shock whatever, in a safe position to avoid damage to the cloth, should the shuttle fail to enter the shuttle box, and likewise to disconnect the driving force simultaneously at the commencement of the operation of stopping the loom.

According to the invention the driving of the loom is controlled by an electric current the circuit of which is timed to be broken at each revolution as the shuttle should enter the shuttle box, an auxiliary or by-pass circuit on the entry of the shuttle therein being closed by two additional switches, one on each shuttle box, thereby maintaining the circuit of the electric current which actuates simultaneously a magnetic clutch through which the power is transmitted to the loom, and also brake magnets which release a powerful brake, the closing of which rapidly brings the loom to rest.

The invention will be fully described with reference to the accompanying drawings:—

Fig. 1 is an end elevation of loom constructed in accordance with the invention.

Fig. 2 is a front elevation of cam operated contactors.

Fig. 3 is a side elevation partly in section.

Fig. 4 is a perspective view of cam shaft.

Fig. 5 is a wiring diagram.

The loom is constructed of any desired length with a breast beam 1 and a slay 2, supported on a plurality of slay swords 3, a crank shaft 4 with any required number of cranks and a picking motion 5 with picker stick 6 at each end all of known construction.

An electric motor A is mounted on the gable B and coupled by a magnetic clutch D through suitable gears *d* to a crank shaft 4 or intermediate shaft running longitudinally of the loom and to other operative parts of the loom. The magnetic clutch D is of known construction and operated by a direct current from a small D. C. generator D^1 driven by the main motor A or other source of power.

An electro magnetic brake G fitted on the crank shaft 4, or on a shaft *e* geared therewith, comprises a drum F with two shoes G^1, one at either side drawn together by strong spring *g* and held off by powerful electro-magnets H which on being de-magnetized instantly release the shoes G^1 and allow the brake to be applied. The magnetic clutch D and the brake magnets H are on the same electric circuit so that they act simultaneously the brake being released and the clutch engaged on closing the circuit and vice versa the clutch being disengaged and the brake applied on the opening or breaking of the circuit.

The D. C. current required is a comparatively weak current of say 110 volts and may be obtained from a small generator D^1 on the loom or from an independent source of power.

In the main circuit N of the controlling current a pair of cam operated contactors M, M^1 connected in series (see Figs. 2 and 3) are placed, the cam *m* of which is rotated by a chain or gears from any rotary part of the loom such as the crank shaft 4. The

contacts M, M^1 are timed to open alternately after each pick and break the circuit, the contact M as the shuttle should enter the right hand shuttle box and the contact M^1 as the shuttle should enter the left hand shuttle box, and consequently should the shuttle fail to enter either shuttle box the loom is promptly stopped by the disengaging of the magnetic clutch D and the simultaneous application of the electro-magnetic brake G.

The terminals of each of the cam operated contactors M, M^1 are connected or short circuited by an auxiliary or by-pass circuit N^1 carried to the right hand shuttle box and an auxiliary or by-pass circuit N^2 carried to the left hand shuttle box. The circuits N^1 and N^2 are in parallel. Switches n and n^1 are fitted to the auxiliary or by-pass circuits N^1, N^2 on the shuttle boxes respectively. These switches n and n^1 are normally open but are closed by the movement of the swell as the shuttle enters the box and opened as the shuttle leaves the box. Thus at any time only one swell switch n or n^1 is effective in determining whether the loom shall continue to run, and this switch is that to which the shuttle is being sent. If the shuttle does not arrive in the particular box, the circuit is broken, even though the swell of the other box is held out by a broken stick or picker, and the loom is stopped almost instantaneously and without shock, preventing any possibility of damage to the warp, shuttle or reed. As the shuttle enters the box the auxiliary or by-pass circuit N^1 or N^2 is closed so that the current in the main circuit N is not broken by the opening of the cam operated contactors M or M^1 and the loom continues to run.

A starting switch P with a no-volt release is inserted in the main circuit N and additional stop switches may be inserted at one or both ends of the loom or other places in the main circuit.

For extremely wide looms a modification of the electrical connections may be adopted, whereby the loom comes to a standstill as the shuttle is discharged from one box and automatically re-starts when the shuttle arrives at its destination in the opposite box. In such an arrangement the contactors M M^1 are so timed that the circuit is broken and the loom stopped at a predetermined period after the shuttle has left the shuttle box.

Provision may also be made to short circuit the cam contacts or alternatively to short circuit the swell switches to enable the loom to be run without the shuttle picking across and also the brake may be independently released, by means of a switch suitably connected.

What we claim as our invention and desire to protect by Letters Patent is:—

1. A loom constructed with an electric controlling circuit, a magnetic driving clutch and an electro-mechanically released brake in the same circuit functioning simultaneously, contactors to make and break the circuit, means to operate the contactors alternately at successive boxings of the shuttle timed to break the circuit when the shuttle should enter its respective shuttle box an auxiliary by-pass circuit leading to each shuttle box, and a switch thereon closed by the entry of the shuttle into the box to maintain the circuit intact.

2. A loom constructed with an electric controlling circuit, a magnetic driving clutch and an electro-mechanically released brake in the same circuit which function simultaneously, contactors to make and break the circuit, a cam to operate the contactors alternately timed to break the circuit at each successive boxing of the shuttle, an auxiliary by-pass circuit leading to each shuttle box, and a switch thereon closed by the entry of the shuttle into the box to maintain the circuit intact.

3. A loom constructed with a magnetic driving clutch an electro-magnetic brake, a main electric controlling circuit passing through the clutch and brake which act simultaneously to start and stop the loom, a cam operated contactor timed to break the circuit when the shuttle should enter a box, an auxiliary by-pass circuit to each shuttle box and a switch thereon operated by the shuttle as it enters the box to maintain the circuit.

4. A loom constructed with a magnetic clutch by which it is driven, an electro-magnetic brake to stop the loom both on the same electric circuit to operate simultaneously, contactors operated alternately from a rotating part of the loom to open and break the circuit at any predetermined position of the shuttle, an auxiliary by-pass circuit to each shuttle box normally open and a switch thereon connected to the swell of the shuttle box operated to complete the circuit on the entry of a shuttle into the shuttle box.

In testimony whereof we have hereunto set our hands.

JOHN HENRY HINDLE.
THOMAS HINDLE.