May 26, 1931. G. SPIESS 1,806,866

DEVICE FOR ADJUSTMENT OF THE PILE FEED IN SHEET FEEDING MACHINES

Filed May 24, 1929 4 Sheets-Sheet 1

Fig. 1.

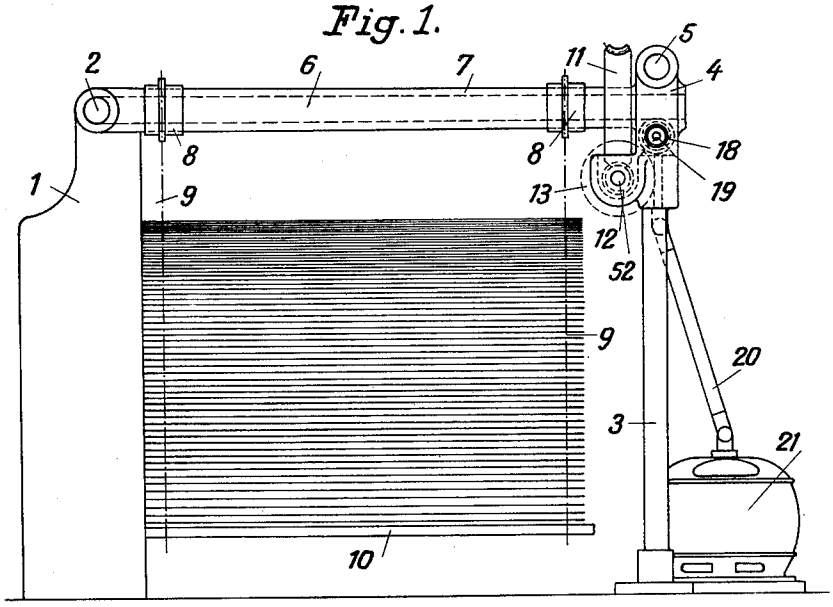
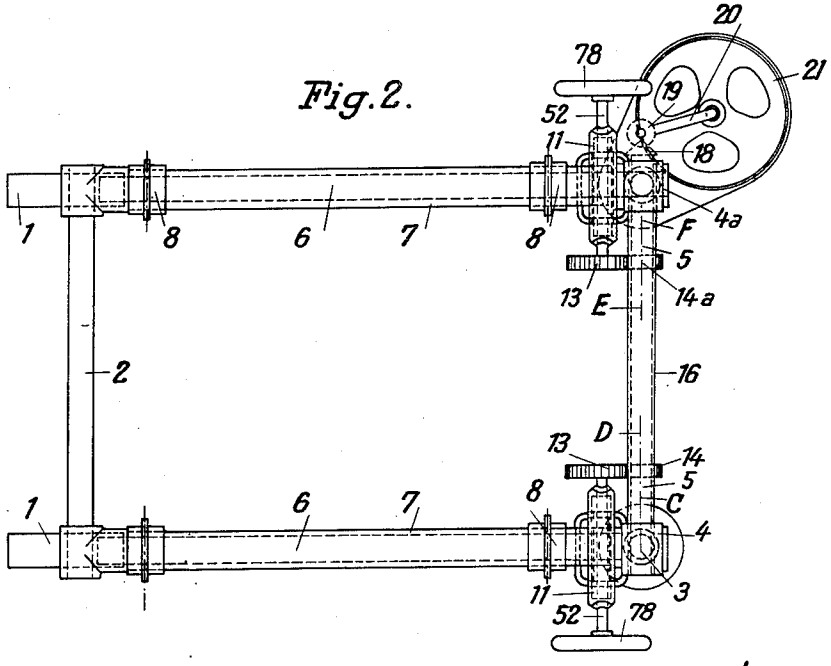


Fig. 2.



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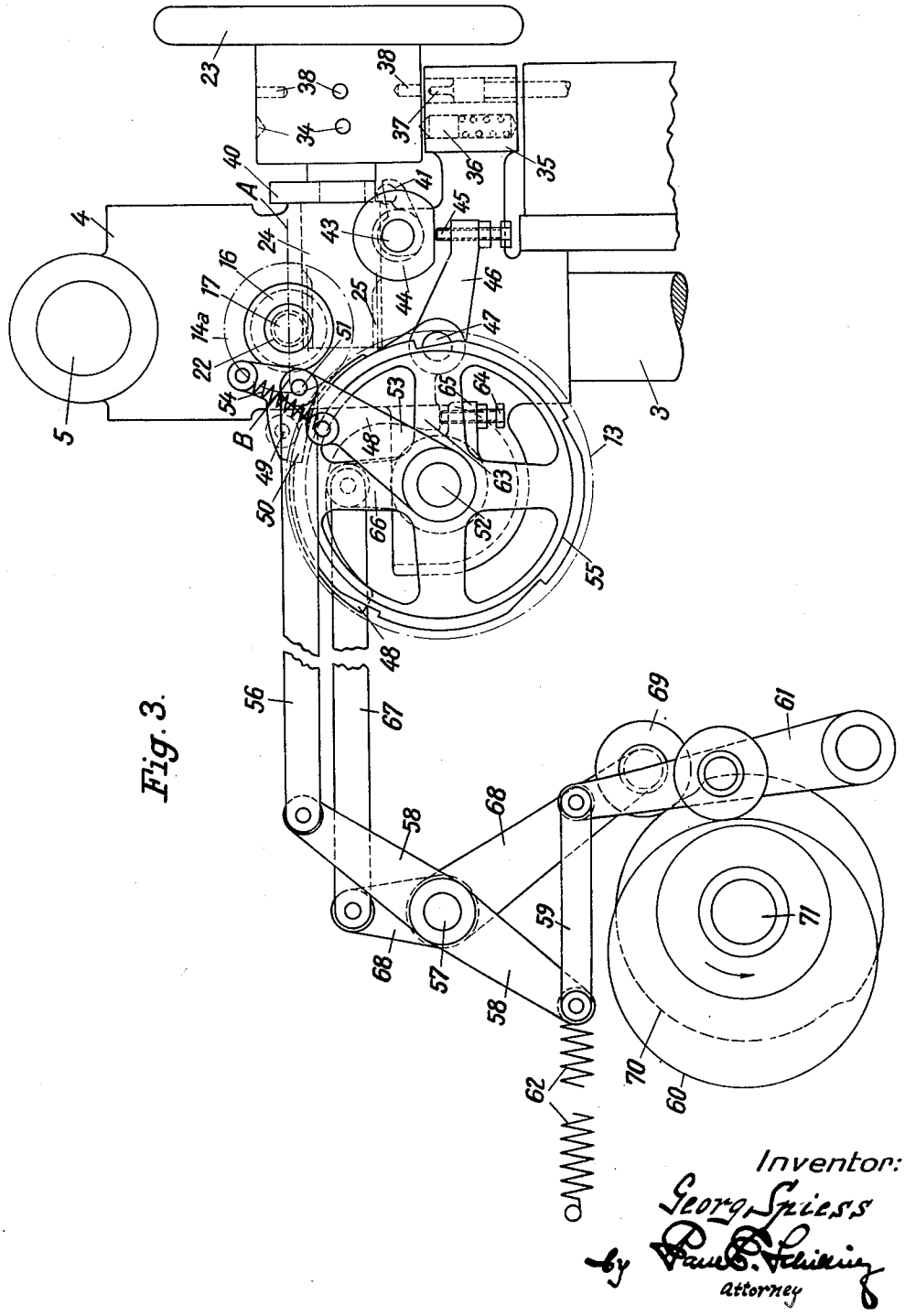


Fig. 3.

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DEVICE FOR ADJUSTMENT OF THE PILE FEED IN SHEET FEEDING MACHINES

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Fig. 4.

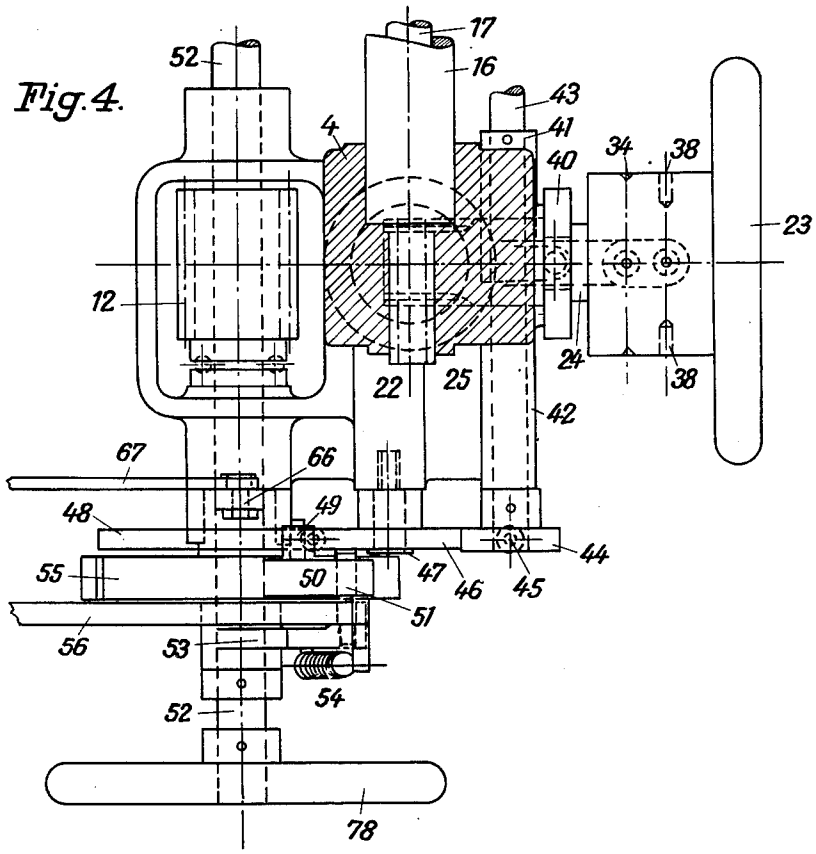
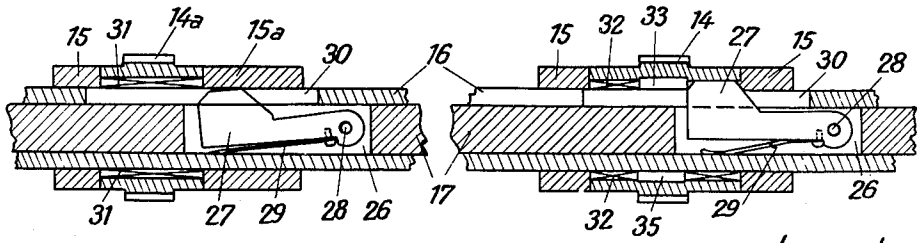


Fig. 5.



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DEVICE FOR ADJUSTMENT OF THE PILE FEED IN SHEET FEEDING MACHINES

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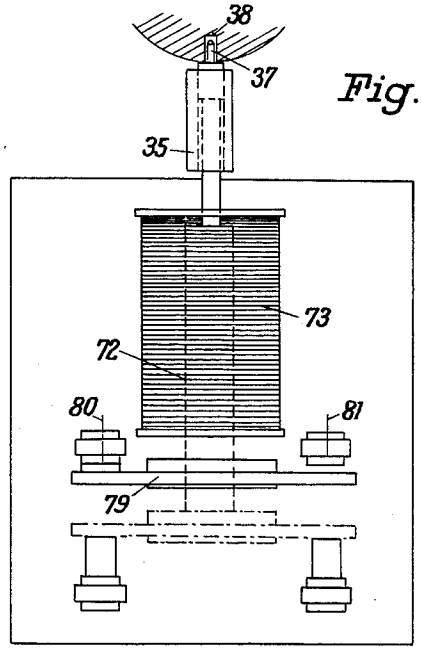
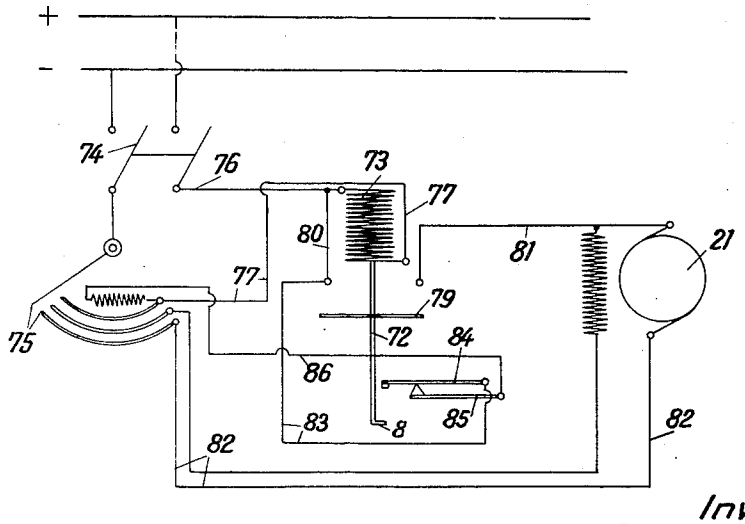


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE

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DEVICE FOR ADJUSTMENT OF THE PILE FEED IN SHEET FEEDING MACHINES

Application filed May 24, 1929. Serial No. 365,606, and in Germany May 21, 1928.

I have filed applications in Germany on May 21, 1928; Sweden April 23, 1929; Great Britain May 2, 1929; France May 3, 1929.

Devices for the adjustment of the pile feed in sheet feeding machines are known, in which the feeding devices for each side of the pile can each be put in or out of action individually, the feeding device for each side being each connected with its driving member by means of a separate coupling which can be put in and out of gear, and being driven from the feeding machine automatically by means of a separate ratchet and pawl mechanism. In such devices the adjustment of the pile by hand is effected by means of a crank handle which renders it possible to turn the feeding mechanisms of both sides simultaneously and of one side only individually in one direction, but which renders it necessary for the purpose of turning in the other direction to disengage the pawls on the one or the other side or on both sides. The adjustment and regulation of the pile by hand in these known devices is very troublesome, even when the machine is at rest, and is especially so when the feeding machine is in operation.

The present invention has for its object the simplification of the adjustment of the pile by hand, and with this object in view the invention consists in a device for raising the pile table in sheet feeding machines, having a motor drive and a hand drive, wherein the raising means arranged on the two sides are capable of being individually put out of action, characterized in that, in addition to the drive automatically operated by the sheet feeding machine, and the known directly operating hand drive, a common separate hand-controlled motor drive is also provided, and that the raising means, for example, the chain wheels 8, 9, can be put in and out of operation either both at the same time or singly by the displacement of a common coupling member. The invention further consists in a device for putting out of action the automatic pile feeding mechanism on both sides of the pile simultaneously, and in an arrangement of the said device in such manner that it comes into operation automatically when the hand-controlled feeding mechanism is employed. Further, according to the invention, a safety device is provided, which renders it impossible to use the hand control when the machine is running.

A preferred constructional form according to the invention is illustrated by way of example in the accompanying drawings, in which:

Figs. 1 and 2 show in elevation and plan the general arrangement of the pile frame with the devices appertaining thereto,

Fig. 3 shows to a larger scale a side view of the control device,

Fig. 4 is a plan of the control device partly in section taken on line A—B of Fig. 3,

Fig. 5 is a section to a larger scale taken on lines C—D and E—F respectively of Fig. 2.

Fig. 6 is an elevation of the electrical protective device, and

Fig. 7 shows the diagram of connections of the latter.

The pile frame consists of two uprights 1, which are connected with one another by means of a tie member 2, and two standards 3, the top parts 4, 4*a* of which are constructed in the form of bearing members, and are likewise connected by means of a tie 5. The uprights 1 and the standards 3 are further connected in pairs with one another by means of axles 6. On the axles 6 two tubular shafts 7 are rotatably mounted on which shafts chain wheels 8 are arranged. Over these chain wheels chains 9 run, on which latter the pile carrier 10 is fixed. On each tubular shaft 7 there is further mounted a worm wheel 11, which engages with a worm 12 mounted in the top 4 and 4*a* respectively of the standard 3, a toothed wheel 13 being mounted on the end of the shaft of the said worm. The two toothed wheels 13 engage respectively each with toothed wheels 14, 14*a* which are loosely and rotatably mounted between stop rings 15, 15*a* on a common tubular shaft 16, which is journalled in the two top parts 4, 4*a* of the standards and has a sliding feathered shaft 17 in its interior. On the one end of the shaft 17 a bevel wheel 18 is mounted which engages with a bevel wheel

19. The latter is mounted on the one end of a shaft 20 which consists of several parts connected by means of universal joints and is driven by a motor 21.

The shaft 17 is mounted inside of the tubular shaft 16 and its bevel wheel 18 in such manner as to be slidable therein, and for this purpose is constructed at its other end in the form of a rack 22 (Figs. 3 and 4), with which the teeth of a pinion 25 arranged on a short control shaft 24 mounted on the top 4 of the column and provided with a hand wheel 23, engage. By turning the hand wheel 23 the shaft 17 is consequently displaced longitudinally in the tubular shaft 16.

In recesses 26 (Fig. 5) of the shaft 17, feathers or sunk keys 27 are pivoted by means of pins 28 which are pressed outwards by springs 29 through slots 30 of the tubular shaft 16. Adjacent to the slot 30 on the tubular shaft 16 between the stop rings 15, 15*a* two toothed wheels 14, 14*a* are mounted which are provided in the interior of their hubs with key slots, into which the keys 27 can enter in order to carry with them the toothed wheels 14, 14*a* simultaneously with the tubular shaft 16. The hubs of the toothed wheels 14, 14*a* are different in length and are constructed in their interiors differently. Whilst the toothed wheel 14*a* having the shorter hub is only provided with continuous key slots 31 for the insertion of the key 27, the other toothed wheel 14 provided with a longer hub, has besides the key slots 32 for the insertion of the key 27, an annular recess 33 in the middle which, when the key 27 is in its central position with regard to the toothed wheel 14, permits a free rotation of the shaft 17 with the tubular shaft 16 when the toothed wheel 14 is at rest.

In the central position of the sliding feathered shaft 17 shown by way of example in Fig. 5, the right hand feather or sunk key 27 carries the right hand toothed wheel 14 (Fig. 2) with it, whilst the left hand feather or sunk key 27 has passed out of the recess 31 of the toothed wheel 14*a* and rotates inside of the enlarged stop ring 15*a*, which presses it back into the external hollow shaft 16, without carrying the toothed wheel 14*a* with it. This means therefore that in this position of the sliding feathered shaft the right hand side the pile is raised whilst the left hand side remains stationary. If the feathered shaft 17 is caused to slide longitudinally towards the left (see Fig. 5) into the adjacent position the right hand feather is inside of the annular recess 33 of the hub of the toothed wheel 14, and thus rotates freely inside of the same without carrying the toothed wheel with it, whilst the left hand feather is inside of the key slot 31 of the hub of the toothed wheel 14*a* and carries this latter with it. In this position of the feathered shaft 17 the left hand side of the pile will thus be raised whilst the right hand side will remain stationary.

If the feathered shaft 17 is displaced longitudinally still further towards the left into the left hand position of adjustment both feathers carry the toothed wheel 14 and 14*a* with them. In this position of the shaft 17 the pile is thus raised uniformly at both sides.

In the right hand end position of the feathered shaft which adjoins on the right the position shown in Fig. 5, the right hand feather or key, as also the left hand one, are each pressed back by the stop rings 15 and 15*a* respectively appertaining to the toothed wheels 14 and 14*a* respectively into the tubular shaft 16, both feathers rotating inside of the stop rings 15 and 15*a* respectively without carrying the toothed wheels 14, 14*a* with them, i. e. the pile feeding mechanism is put out of operation on both sides. In this position the pile feeding operation by hand by means of the hand wheel 78 is possible.

The four positions of the feathered shaft 17 described, are, as previously mentioned, obtained by adjustment of the hand wheel 23, the shaft 24 and the toothed gearing 25, 22. For facilitating the finding of the correct position of the feathered shaft recesses 34 are arranged in the hub of the hand wheel 23, into which recesses a click pin 36 arranged so as to be slidable under the pressure of a spring 35 engages. In each working position of the feathered shaft 17 the adjusting device is locked by the engaging of a locking pin 37 in bores 38 which are likewise arranged in corresponding number and spacing on the hub of the hand wheel 23. The click pin 36 and the locking pin 37 are guided in bores of a cast-on portion 39 of the top 4 of the standard.

By means of the hand wheel 23 the motor drive of the pile feeding means can thus be so regulated that the pile travel drive is either uniform on both sides of the pile or, according to choice, is rendered stationary on either side as desired or on both sides simultaneously. In order that the hand control of the motor pile feeding device cannot be employed when the mechanical pile feeding device is in operation, a safety device is provided which operates in such a manner that on each adjustment of the hand control wheel 23 with the exception of the position in which the feathered shaft 17 does not carry any of the chain wheels 14, 14*a* with it, i. e. in the right hand end position, the pile feeding mechanism operated by the machine is put out of action. The said safety device consists in a lifting disc 40 mounted on the shaft 24 of the hand control wheel 23, which disc 40 acts upon a short lever arm 41 of the shaft 43 mounted in each of two cast-on projections 42 of the bearing tops 4, 4*a*. The shaft 43 carries at each of its ends a lifting

disc 44 which acts on an arm 46 of a two-armed lever mounted so as to be capable of swinging on a fixed pin 47, said arm 46 being provided with an adjusting screw 45 and the other arm of the said lever being constructed in the form of a curved guide 48. The curved guide arm 48 acts against a stop pin 49 of a pawl 50, said pin being provided with a roller, and said pawl being linked by means of a pin 51 to a pawl lever 53 arranged so as to be capable of swinging around the shaft 52 and being drawn by a spring 54 into the teeth of a ratchet wheel 55 likewise mounted on the same shaft 52. The pawl lever 53 is connected by means of a link rod 56 with a two-armed lever 58 mounted so as to be capable of swinging around a fixed pin 57, on the other arm of which lever 58 on the one hand a roller lever 61 controlled by a cam disc 60 engages by means of a link rod 59 and on the other hand a spring 62 engages.

The curved control guide 48 is provided with a stop 63, against which the one arm 65 of a bell crank lever arranged so as to be capable of swinging on the shaft 52 acts, said arm 65 being provided with an adjusting screw 64. The other arm 66 of this bell crank lever is connected by means of a link rod 67 with the one arm of a two-armed lever 68 arranged so as to be capable of swinging around the pin 57, the other arm of said two armed lever which is provided with a roller 69 being controlled by a cam disc 70. The cam discs 60, 70 are mounted on a shaft 71 which makes one revolution in the course of one working operation.

The position of the cams is such that on the return movement of the pawl 50 the latter is raised by the previously mentioned mechanism.

In Fig. 3 the hand control device is shown in the position in which the feathered shaft is in the extreme right hand position, so that the motor drive of the feathered shaft does not operate on the pile feeding, and the pile feeding is regulated automatically by means of the sheet feeding machine. In this position the arm 41 is located on a flattened portion of the cam disc 40 and the adjusting screw 45 of the arm 46 of the control cam 48 is located on the flattened portion of the cam disc 44. If now the mechanical feeding of the pile by hand is to be put into action, then by turning the hand control wheel 23, after the locking pin 37 has previously been put out of action, the control cam 48 is so adjusted by means of the cam disc 40, the lever 41 and the cam disc 44, that the pawl 50 is permanently prevented from engaging in the teeth of the ratchet wheel and the automatic feed of the pile is consequently permanently put out of operation.

The motor operated feed of the pile can take place either with the machine at rest or when it is running, but the motor 21 can only be switched in when the feathers 22 are exactly adjusted into one of their various working positions. For this purpose the locking pin 37 is connected with the armature 72 of a relay 73 which is arranged in the circuit of the motor 21.

The mode of operation is as follows:

If the switch 74 and the starter 75 of the motor 21 are switched in then the circuit of the relay 73 through the lead 76, relay 73, lead 77 and starter 75 is closed. At the same time, however, the circuit of a relay 87 locking the starter lever is closed through leads 76, 80, 83, contact 84, 85, lead 86, relay coil 87, starter 75 and switch 74, so that the starter lever cannot be moved beyond the first stud. The armature 72 is attracted. When the locking pin 37 connected with the armature enters into a bore 38 the circuit of the motor is closed by means of a contact bridge 79 arranged on the said armature, through lead 76, lead 80 and contact bridge 79, lead 81, motor 21, lead 82 and starter 75 whilst the contact 84, 85 in the circuit of the locking relay 87 is broken by means of a carrier 89 arranged on the lower end of the armature 72, so that the starter lever can be moved further on. If, however, the locking pin 37 cannot enter into a bore 38 in consequence of the feather not being in the corresponding position then the contact bridge 79 does not close the circuit of the motor and the current passes through leads 76, 80, 83, contact 84, 85, lead 86, locking relay 87, starter 75 and switch 74. As the locking magnet is excited the starter lever remains locked so that it cannot be turned beyond the first stud. If, on the other hand, as previously described, the armature 72 has been attracted to the full extent then on the closing of the motor circuit by means of the contact bridge 79 the contact 84, 85 in the circuit of the locking magnet is simultaneously broken by means of the carrier 89 arranged on the armature, so that the starter can be moved onwards to effect further switching operations.

What I claim is:—

1. In a device for raising the pile table in sheet feeding machines having a motor drive and a hand drive, and wherein raising means arranged at opposite sides of the table are capable of being independently put into and out of action, the combination, with a drive automatically operated by the sheet feeding machine, and a directly operating hand drive, of a cooperating separate hand-controlled motor drive, and coupling means whereby the individual raising means may be separately or conjointly put into or out of operation.

2. A device according to claim 1, characterized in that the coupling means consist of a longitudinally displaceable sliding feathered shaft adjustable into various coupling positions, corresponding to a right-hand drive, a left-hand drive, a drive from both

sides and an idle position of the drive, said shaft being provided with two sliding feathers serving for the drive of the raising means for each side respectively.

3. A device according to claim 1, characterized in that the coupling means consist of a longitudinally displaceable sliding feathered shaft adjustable into various coupling positions, corresponding to a right-hand drive, a left-hand drive, a drive from both sides and an idle position of the drive, said shaft being provided with two sliding feathers serving for the drive of the raising means for each side respectively and said feathered shaft being slidably arranged within a hollow shaft on which two gear members driving the raising means of the one side and of the other side respectively are loosely mounted so as to be rotatable, in such manner that they can be uncoupled from the feathered shaft singly or conjointly at the same time.

4. A device according to claim 1, characterized in that the coupling means consist of a longitudinally displaceable sliding feathered shaft adjustable into various coupling positions, corresponding to a right-hand drive, a left-hand drive, a drive from both sides and an idle position of the drive, said shaft being provided with two sliding feathers serving for the drive of the raising means for each side respectively and an operating device for the feathered shaft connected with operating members, by means of which, through the agency of curved levers, the automatic pile table raising means operated by the mechanism is put out of action in every position of the feathered shaft with the exception of the position in which the hand-controlled pile table raising means is out of operation.

5. A device according to claim 1, characterized in that the coupling means consist of a longitudinally displaceable sliding feathered shaft adjustable into various coupling positions, corresponding to a right-hand drive, a left-hand drive, a drive from both sides and an idle position of the drive, said shaft being provided with two sliding feathers serving for the drive of the raising means for each side respectively, an operating device for the feathered shaft connected with operating members, by means of which, through the agency of curved levers, the automatic pile table raising means operated by the mechanism is put out of action in every position of the feathered shaft with the exception of the position in which the hand-controlled pile table raising means is out of operation, and a locking device which renders it impossible to alter the position of the feathered shaft when the motor driven pile table raising means is in operation.

6. A device according to claim 1, characterized in that the changing-over of the motor driven pile feeding device is only possible after the motor has been first switched off and the feather has then been displaced and that the motor can only be switched in after the change-over device has been locked in a working position.

7. A device according to claim 1, characterized in that an adjusting device is provided for adjusting the feathered shaft and an armature effects the locking of the adjusting device, the circuit of which is closed by the starting of the motor closes the motor circuit when in the attracted or locking position by means of a contact bridge, whereas, when the armature is in the non-locking position, it breaks the motor circuit and closes through the medium of a second contact the circuit of a relay which locks the starter.

In testimony whereof I have affixed my signature.

GEORG SPIESS.