

[54] CARPET SHEARING MACHINE

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[58] Field of Search 26/15 R

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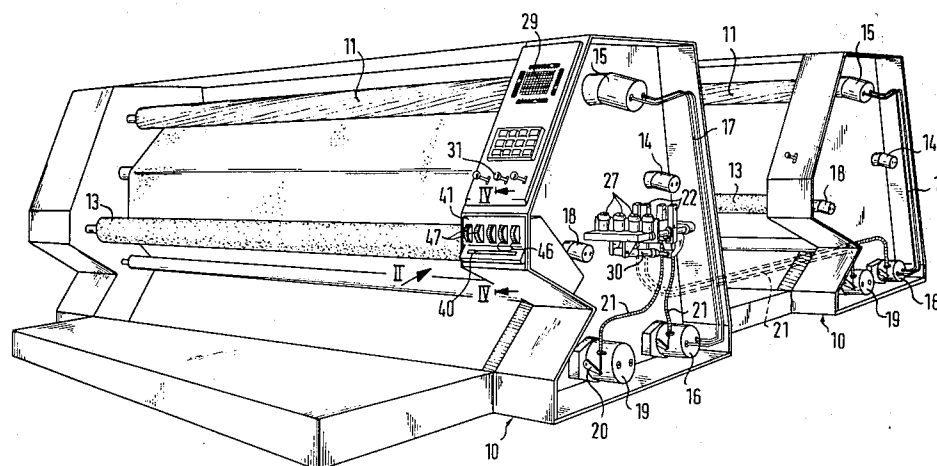
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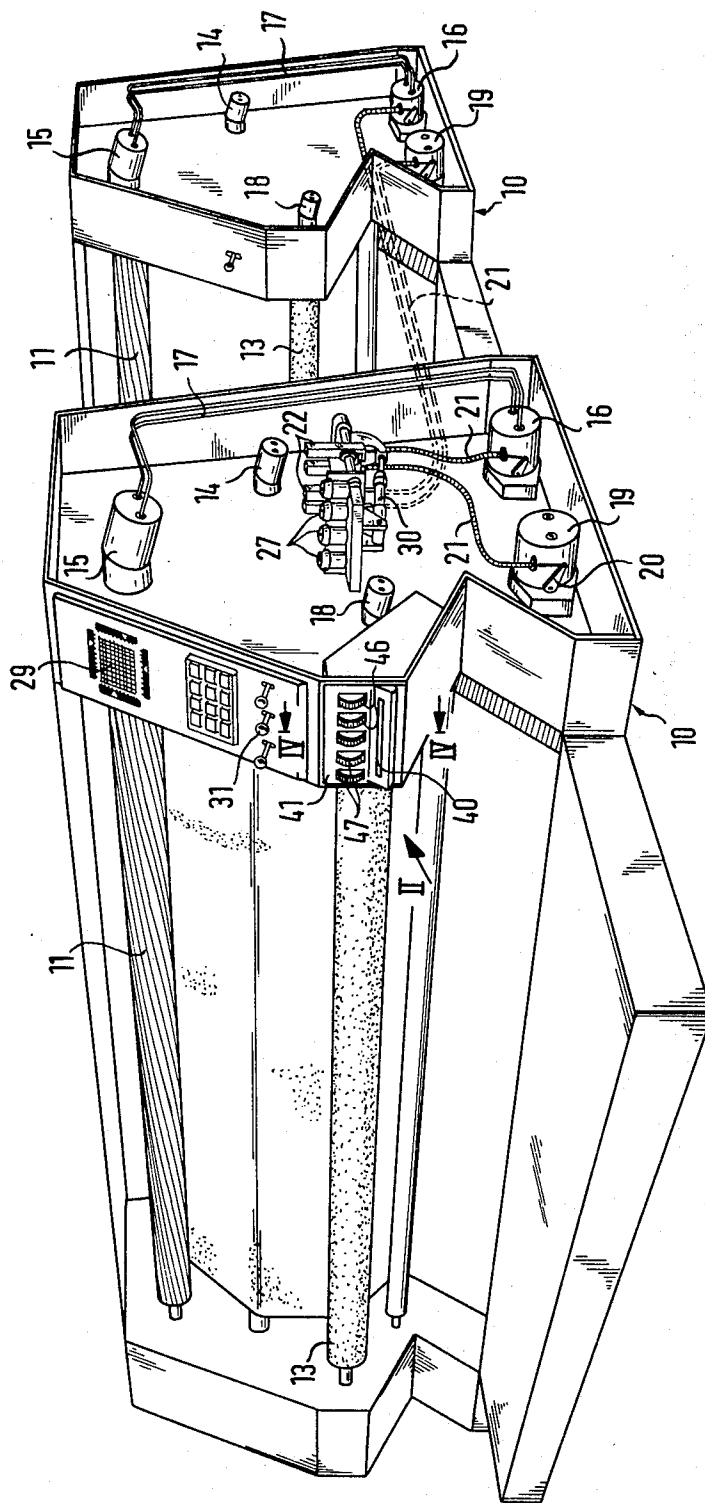
[57] ABSTRACT

A carpet-shearing machine which includes members comprising cross-brushes, shearing cylinders and cloth-beams which are disposed in a machine frame. The machine further includes a pressure fluid device for driving the members and a servo-control device for maintenance of an always constant relationship between cloth-speed and number of revolutions of the shearing cylinders. The servo-control device includes

setting spindles which have setting members thereon. A control plate which is formed as a program card causes resetting of the setting members. The control plate is equipped with a plurality of exchangeable program-switching ledges, corresponding in numbers with the setting members. The program-switching ledges are capable of being reprogrammed by shortening. Pulse-emitting controlling and adjustable nominal-value potentiometers are provided. A setting motor device is arranged for each of the setting members and an actual-value potentiometer is disposed on each of the setting spindles of the setting members and operatively connected with a corresponding one of the nominal-value potentiometers. A plurality of the program ledges is provided and in particular one for each of the nominal-value potentiometers. The program-switching ledges are formed as teeth projecting on one side for an operative mechanical joinder with the adjusting devices of the nominal-value potentiometers for setting the nominal-value potentiometers. Each of the nominal-value potentiometers has associated therewith an electronic control device for operatively controlling and comparing the corresponding actual-value potentiometer therewith, and for driving a corresponding one of the setting motor devices only until the actual-value potentiometer is in position of coincidence with the nominal-value potentiometer and for terminating the preselected program by stopping the corresponding setting motor device upon position coincidence of the actual-value potentiometer with the nominal-value potentiometer, thereby fixing the corresponding setting position of the setting member on its setting spindle.

3 Claims, 13 Drawing Figures





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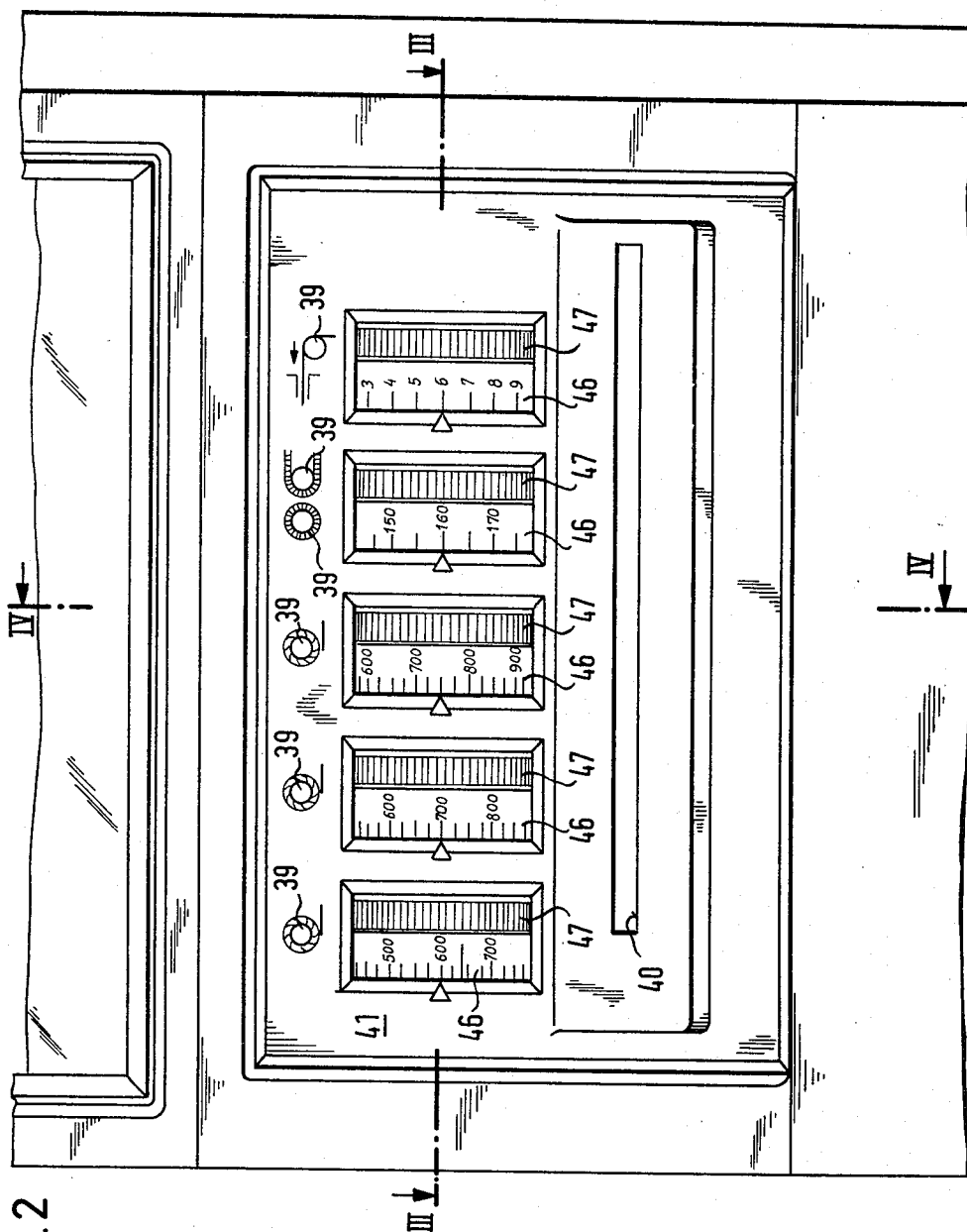
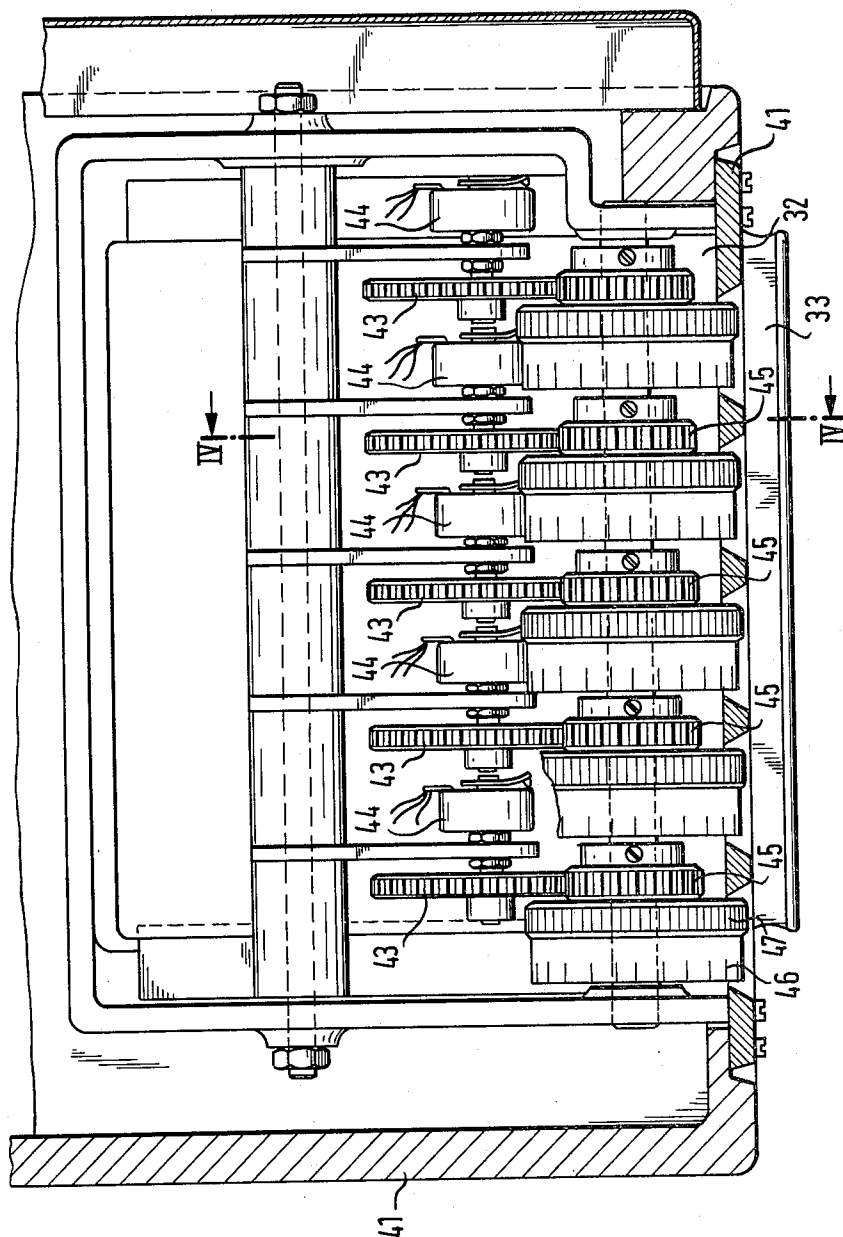


Fig. 2

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Fig. 3



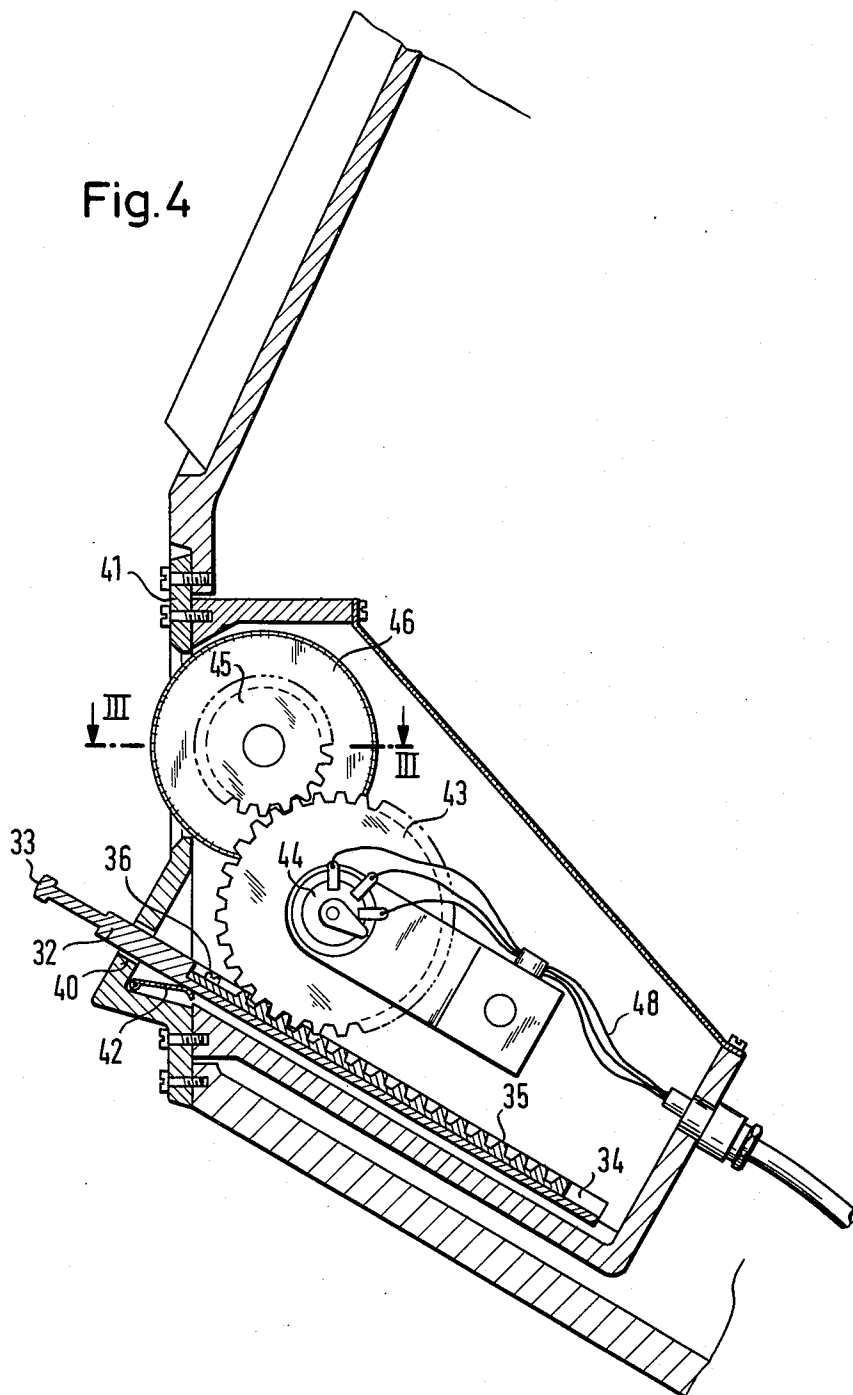
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Fig. 4



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Fig. 5

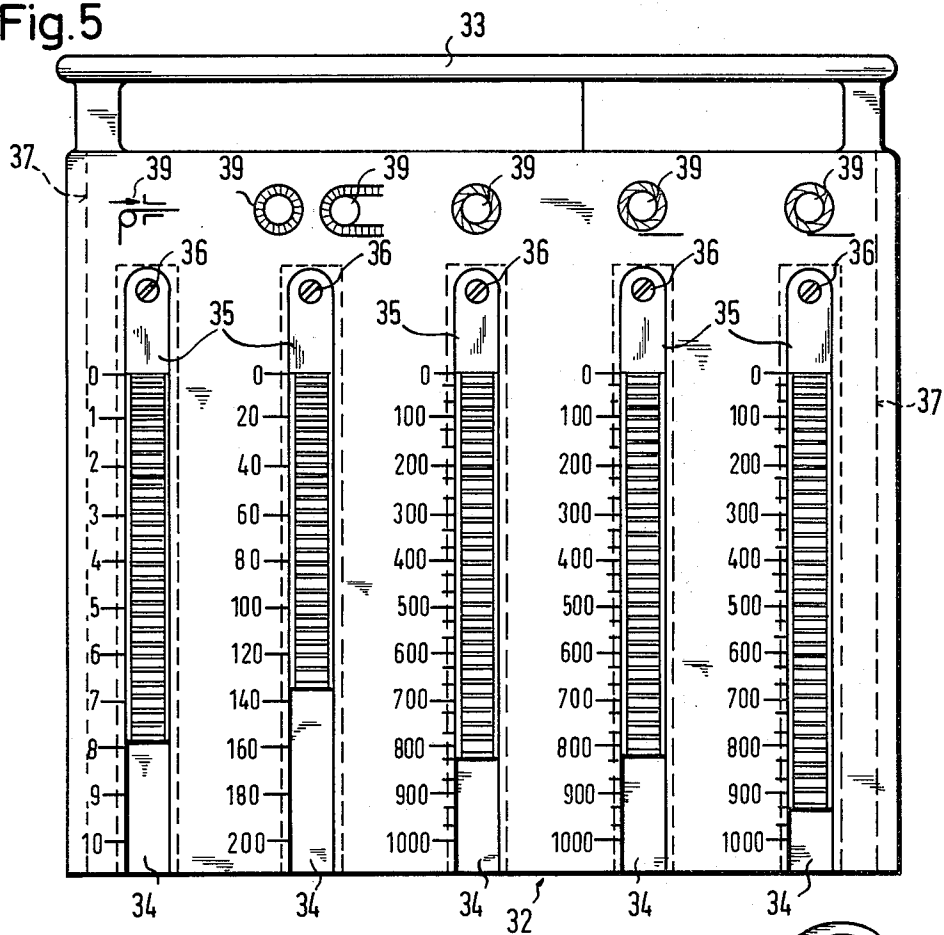


Fig. 6

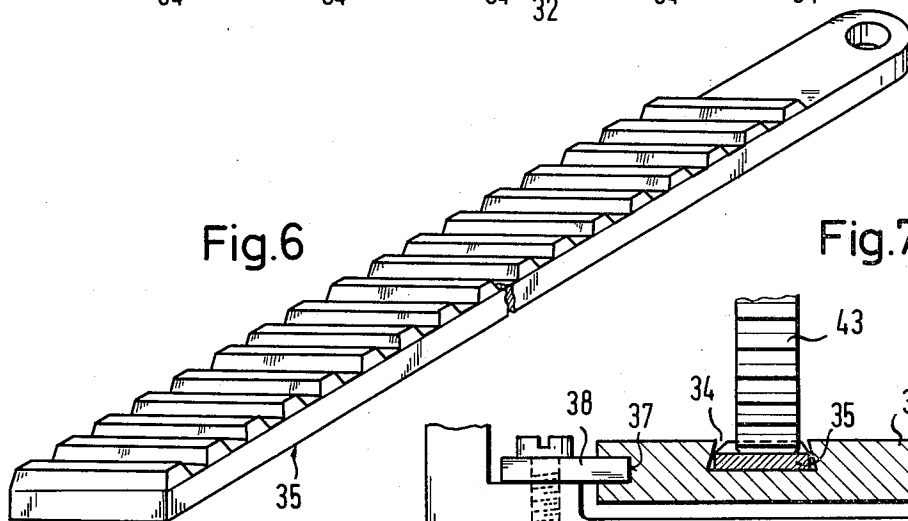
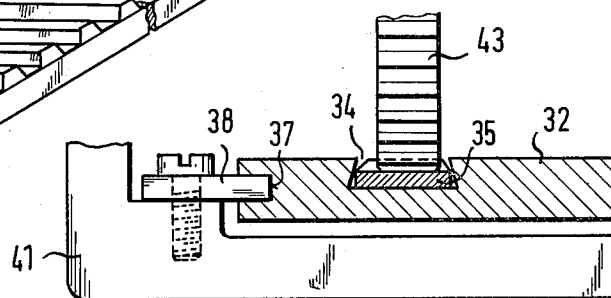


Fig. 7

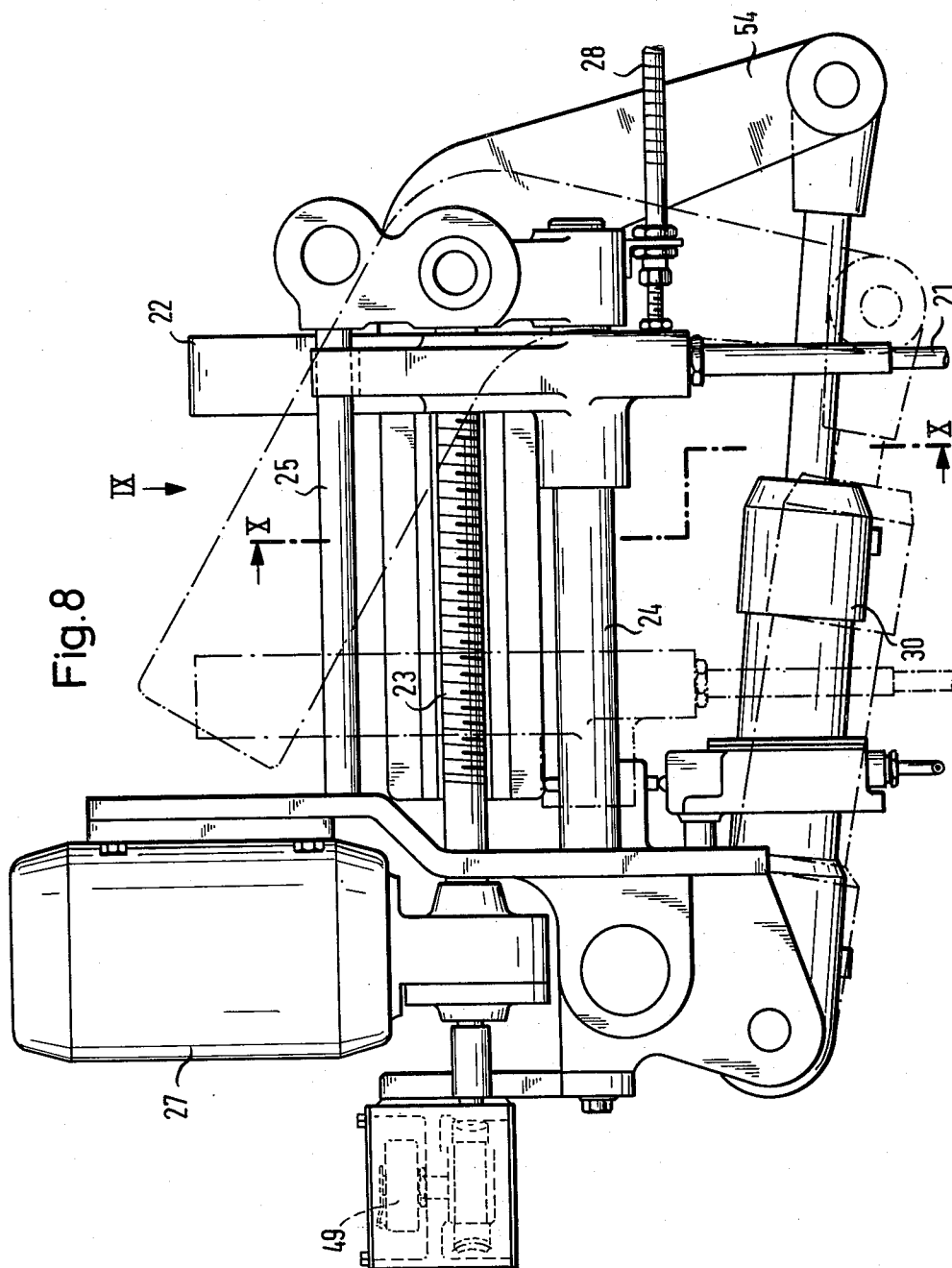


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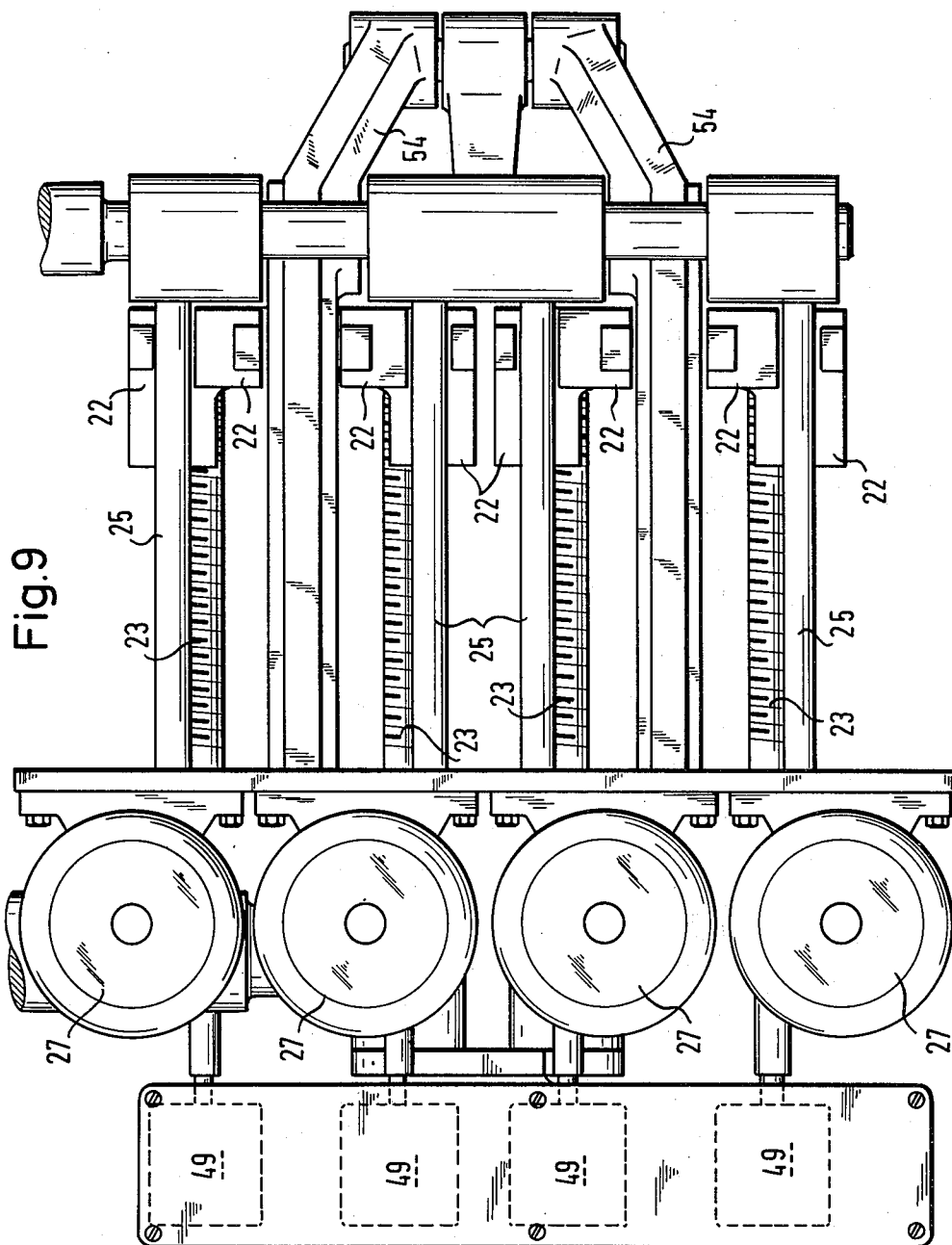
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Fig. 10

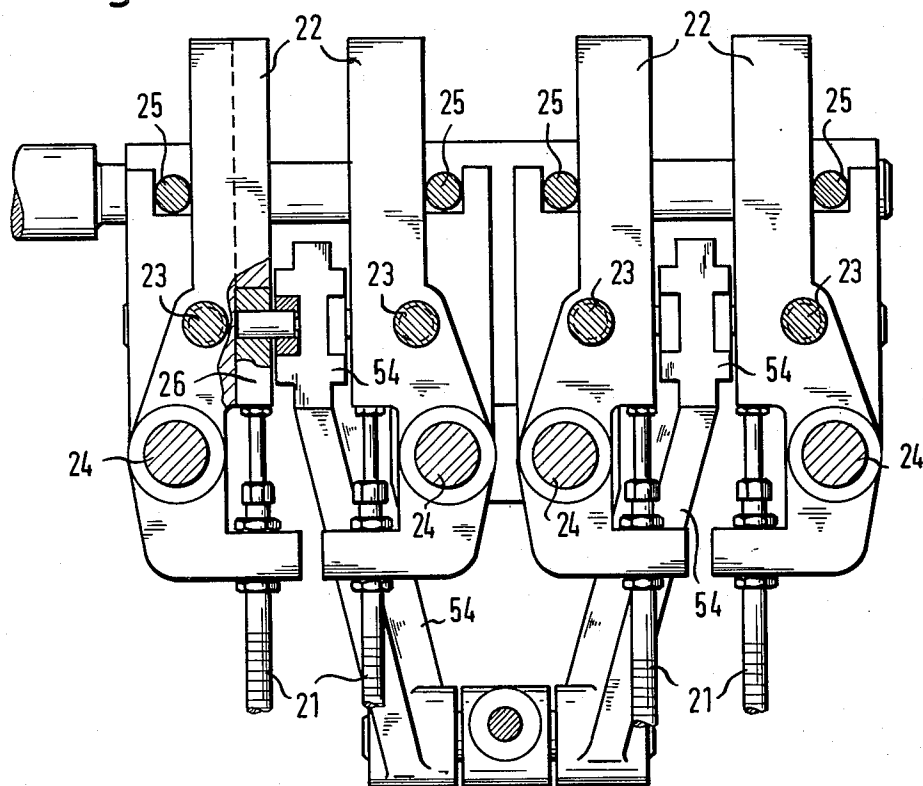
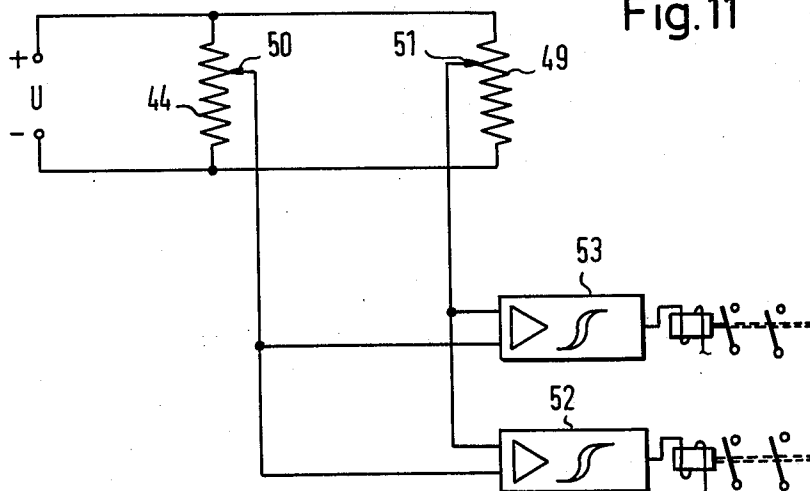
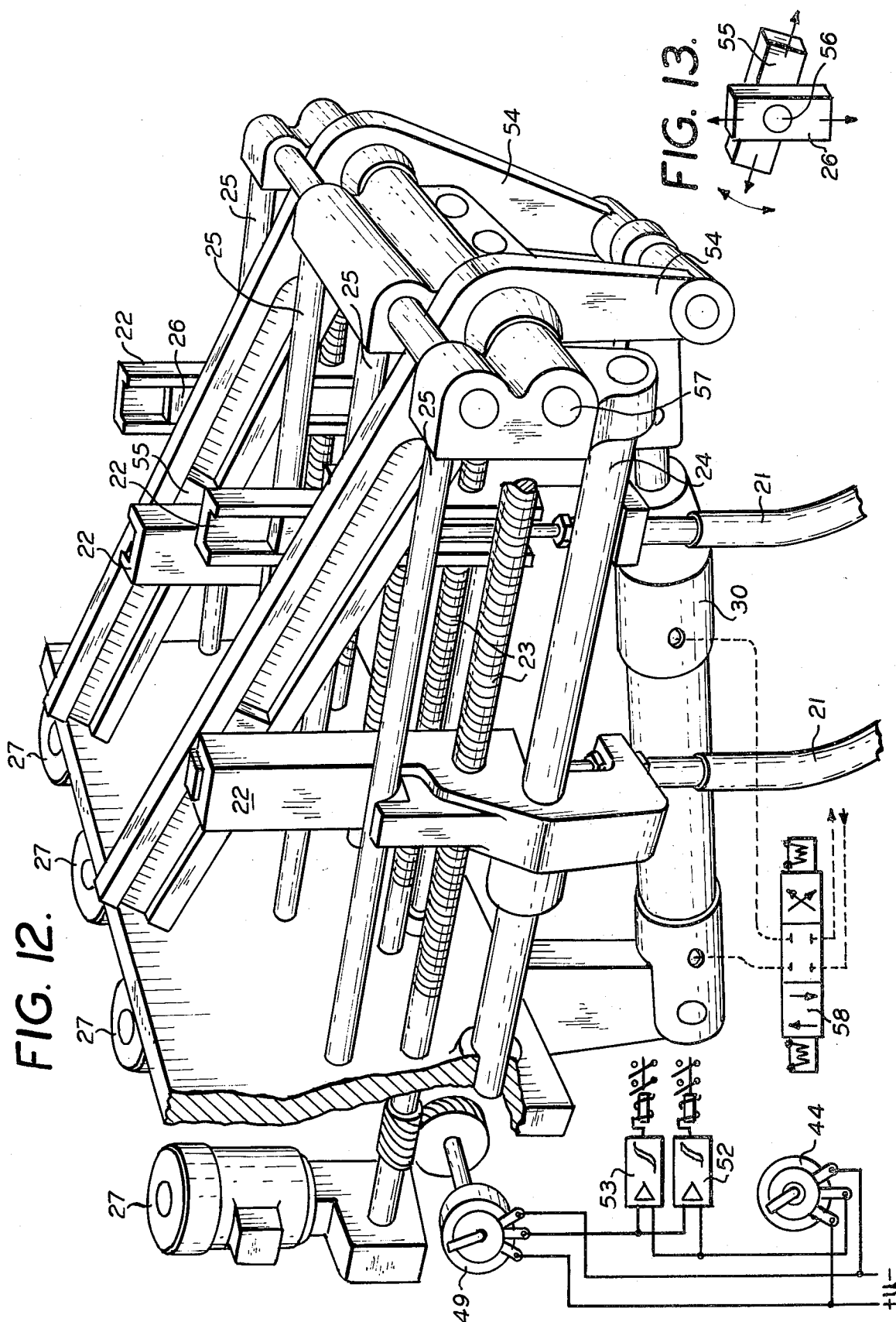


Fig. 11



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CARPET SHEARING MACHINE

The present invention relates to a carpet shearing machine with cross-brushes, shearing cylinders and cloth-beams provided in a machine frame, which members are driven by pressurized drive means, for example, oil hydraulically actuated over setting-member-controlled oil pumps and oil motors, as well as a servo-control for maintenance of a constant relationship between the cloth speed and the number of revolutions of the shearing cylinders.

In order to obtain for carpet goods an optimum quality, it is a basic presumption for the shearing process, that the goods, which depend upon the starting materials and structure, are fed at a certain predetermined cloth speed, and are treated with a certain predetermined number of revolutions of the shearing cylinders.

In recognition of this difficulty and recognizing the requirements of the practice, in case of using the same starting materials and the same cloth structure, i.e., to obtain always the desired same quality effect, it is one object of the present invention to provide means and ways which make this possible.

It is an object of the present invention to provide a carpet shearing machine, wherein for the setting arrangement of the setting members of the servo control, a control plate formed as a program-card is provided, which is equipped with a number of exchangeable program switching ledges capable of being reprogrammed by shortening, which number corresponds with the number of setting members of the servo control performing setting functions, which ledges are formed with teeth or the like projecting on one side for a forced mechanical joinder of setting means effective on the setting members of the servo control, and by their preselectable insert lengths, effect angular displacement of setting motors for the setting members for the servo control.

Furthermore it is of structural importance that the program setting members are provided in a joint program work housing, whereby at the front side of this housing an insert slit opening is provided, which can be covered in case of non-use, for the entrance of the control plate into the housing. Also into or onto lateral guide rails, in the housing there are provided a number of potentiometer setting wheels each with a nominal value potentiometer the number being equal with the number of the program switching ledges on the control plate, as well as transmission wheels which mesh these setting wheels. The transmission wheels in turn are coupled for joint rotation with co-axially disposed adjacent hand setting wheels and scale wheels, which are visible and accessible from the outside. Finally control connections are provided from the actual nominal value potentiometers to the setting member-setting motors.

By this arrangement, it is achieved that the total program switching work is received dust tight in a particular housing part equipped particularly therefor, whereby in addition, the hand setting wheels which are accessible from the service side may be used to control the setting of the machine independently from the program control.

In summary it can be stated, that it is possible by means of the present invention to reduce the unavoidably cumbersome arrangement operation of a carpet shearing machine to an absolute minimum and, in addition, to be able to achieve the same shearing effect with

absolute safety by utilizing the previous shearing program card containing the previous shearing program. Beyond that the operator of such machine is in position by the shortening of the program switching ledge, consisting of a breakable working material, to preprogram with this ledge, an individual shearing action for the goods. The present invention provides a most usable solution, and is far superior due to its particular effectiveness, reliability and higher output, than will previously known carpet shearing machines with a manually settable control.

With these and other objects in view, which will become apparent in the following detailed description, the present invention, which is shown by example only, will be clearly understood in connection with the accompanying drawings in which:

FIG. 1 is a perspective total view of a carpet shearing machine containing two shearing cylinders;

FIG. 2 is a front elevation of a part of the machine receiving the program work housing;

FIG. 3 is a part top plan view of the program work housing shown partly in section;

FIG. 4 is a fragmentary side elevation of the program work housing likewise in section;

FIG. 5 is a top plan view of a program card equipped with program switching ledges;

FIG. 6 is a perspective view of a program switching ledge;

FIG. 7 is a fragmentary showing of the reception of the program card;

FIG. 8 is a fragmentary side elevation of the elements forming the servo control;

FIG. 9 is a top plan view of the showing in FIG. 8;

FIG. 10 is an end view of the servo control shown in section;

FIG. 11 is a circuit diagram of the electronic trailing control of the potentiometer;

FIG. 12 is a perspective view of the setting members and of the guide blocks, disclosing their cooperation with the control swing; and

FIG. 13 is a perspective view of the structure combining the guide blocks.

Referring now to the drawings, in the shown carpet shearing machine are arranged shearing cylinders 11 for shearing of carpet goods. At the entrance side of the machine there are disposed cross brushes 13, while at the exit of the machine, beams are provided of which only the driving motors 14 are shown. The drive of the shearing cylinders 11 takes place by means of oil motors 15, which are controlled by oil pumps 16 and are connected with the latter by means of pressure means conduits 17. The brushes 13 are driven by oil motors 18, and the beams by the oil motors 14. Furthermore, additional oil pumps 19 serve as a drive. The beams and cross brush motors are fed from the driving pumps 19. All beams as well as the wind up roller motor are fed by the pumps 19. The shearing cylinders 11, however, have individual drives, which are controlled by the pumps 16. All oil pumps can be controlled by means of swinging levers 20. The control of the pumps takes place over flexible setting means 21, which are connected with the setting members 22 of a servo control.

In the shown servo control there are provided for example, four setting members 22, which are adjustable on setting spindles 23. The mounting of the setting members 22 takes place over the guide rods 24 and 25. The lever arms of control arms 54 move the guide

blocks 26 of the setting members, whereby the setting means 21 are pulled out correspondingly. The setting spindles 23 are operated by setting motors 27. At each setting member 22, there is arranged a separate setting device 28 for setting the scale value on a table 29 of the service table. Furthermore, outside of the setting motors, 27 there are provided at the rear, actual value potentiometers 49 which are more clearly described below.

The control of the oil pumps, to which the setting members 21 lead from the servo control, takes place by actuation of a hydraulic cylinder 30. One of the levers 31 of the control panel of the machine is an operating lever for actuation of the hydraulic cylinder, the latter controlled by a magnetic valve and the setting means 21 of all setting members 22 are pulled by the lever arms of the control arms, so that the swinging 20 of the levers 20 pumps are operated. The position of the setting members 22 on the setting spindles 23 of the servo control means of very predetermined machine setting, so that a very predetermined shearing effect is obtained.

The control of the setting for the setting members 22 takes place in accordance with the present invention by means of a program card 32 formed as a switching plate. This program card is formed as a gripping ledge 33 at the upper end. It has one side, spaced apart and adjacent to each other, a plurality of groove shaped recessions 34, which are undercut. In each of these grooves is received a switching ledge 35, which is formed as a toothed ledge and is coupled by means of a securing screw 36 with the program card. These program switching ledges 35 comprise a breakable working material and can at any time be shortened during the setting of the machine, so that a precise predetermined setting program is contained therein. In the switching plate 32 there are laterally arranged guide grooves 37 into which counter guide means 38 enter for guiding of the plate. Above each program switching ledge 35 there are disposed function symbols 39 on the plate.

In use of this program card for the preselection of the machine setting, this card is inserted in a slot 40 in the front side of a program work housing, whereby the slot 40 when not in use can be closed up by a flap 42. The toothed ledges 35 cooperate with potentiometer-setting wheels 43 such that the coaxially disposed nominal value potentiometers 44 are angularly displaced over the length of the toothed ledges. These setting wheels 43 are in engagement with transmission wheels 45, which in turn are connected for a joint rotation with scale wheels 46 and manually operated setting wheels 47. The scale wheels 46 and the manually operated wheels 47 are visible from the outside and accessible. Above each wheel there are, provided exactly as in the program card, function symbols 39.

During the operation of the potentiometer setting wheels 43 and the angular setting of the nominal value potentiometers 44 for the duration of the adjustment, a control pulse is transmitted over the control conduits 48 onto the setting motors 27 of the servo control, so that they run and the setting members 22 are adjusted. The nominal value potentiometers 44 and the already previously mentioned actual value potentiometers 49 are thereby connected in a direct current circuit (FIG. 11). The sliders 50 and 51 are connected to two amplifiers 52 and 53. These amplifiers switch on a respective

setting motor 27 of the servo control. In this respect the amplifier 52 switches the motor for a right run, and the amplifier 53, switches the motor however, for a left run. The actual value potentiometers 49 are successively controlled until the sliders are again in the same level. If this position is obtained no current flows any more, and the setting motors terminate their run and the setting of the machine has been accomplished.

Now by operation of the switching lever 31 over the servo control, the flow of the oil pumps to the oil motors takes place, so that the machine can be placed into operation.

In the servo-control in accordance with FIGS. 8, 9, 10, 11, 12 and 13, for example, four setting members 22 are mounted on guide rods 24.

Rods 25 serve to stabilize the setting members 22. By means of driving motors 27 and threaded spindles 23 the individual setting members 22 can be selectively positioned on the guide rods 24.

Each threaded spindle 23 is equipped with an actual-value potentiometer 49 for the control of the prevailing position. The total setting path of each setting member 22 is equal with the setting range of the actual-value potentiometer 49 associated therewith. A nominal-value potentiometer 44 is coordinated to each of the setting members 22 and serves the preselection of a predetermined position. They are disposed in the control panel of the machine coaxially with the setting wheels 43. Upon operation of scale wheels 46 on the control panel, the slider-positions of the nominal-value potentiometers are varied, whereby the setting motors 27 are operative and move the setting members 22 along the guide rods 24, until each actual-value potentiometer 49 reaches the same sliderposition as the nominal-value potentiometer 44 associated therewith and the electric current of the two amplifiers; 52 and 53 has reached the value 0. The preselection of the desired values is thereby terminated.

Each setting member 22 is connected, as disclosed in FIG. 1, by means of a flexible setting means with a corresponding hydraulic pump. Two lever arms 54 of a control device, as shown in FIG. 12, are provided on opposite sides with guide grooves and the four setting members 22 have guide grooves on one side in which pairs of sliding blocks 55 and 26 slide. The latter are pivotally connected together by means of a bolt 56. The control device, which is formed like a knee-lever, is coupled at its short arm with the hydraulic cylinder 30. Upon feeding of pressurized oil by means of the four-way valve 58 and corresponding with the switching position of the valve controlled by lever 31, the piston rod of the hydraulic cylinder moves in, as shown in FIG. 12, and the lever arms 54 of the control device swing out from the previous horizontal position into the disclosed inclined position. The setting means 21, which are coupled with the sliding blocks 55 and 26 are thereby pulled out. Since the swing angle of the control device is directly proportional with the stroke of the hydraulic cylinder, and thus is of constant value, the individual setting means 21 are more or less strongly pulled out corresponding to the position of the setting members 22 to the rotary axis 57, as a zero-point of the control device. It is thereby of particular advantage that all setting means 21, independent from the position they assume relative to each other, are moved inwardly and outwardly at equal times, even in case of a half swing

out of the control device or setting means 21 are pulled out only half of the way.

It is to be understood that depending upon the length of the program-switching ledges 35, the nominal value potentiometers 44 obtains a very predetermined angular displacement and thereby brings about a very predetermined setting of the setting members 22 of the servo control, which can be preselected very exactly. In each case the correct machine setting is preselected with respect to the material to be sheared.

It is understood also that the shown and described embodiment constitutes merely a possible example for the realization of the present invention. One could rather form the switching plates also in a different manner. Important is the fact, that they contain shortable program switching ledges, which thereby contain a very predetermined preselection program which is transmitted by a mechanical transmission means to the setting members of the servo control to maintain a desired between the running speed of the material and the number of revolutions of the shearing cylinders, to obtain optimum quality values.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense.

I claim:

1. A carpet-shearing machine with members comprising cross-brushes, shearing cylinders and cloth-beams disposed in a machine frame, comprising pressure fluid means for driving said members, a servo-control means for maintenance of an always constant relation between cloth speed and number of revolutions of said shearing cylinders, said servo-control means including setting spindles having setting members thereon, respectively, a control plate means formed as a program card for causing resetting of said setting members, said control plate means being equipped with a plurality of exchangeable program-switching ledges, corresponding in numbers with that of setting positions of said setting members, said program-switching ledges capable of being reprogrammed by shortening, pulse-emitting controlling nominal value potentiometers each having means for adjusting same, setting motor means for each of said setting members and, an actual value potentiometer disposed on each of said setting spindles of said setting members and operatively connected with a corresponding one of said nominal value potentiometers, a plurality of said program ledges, one for each of said nominal value potentiometers, said program-switching ledges being formed as teeth means projecting on one side for an operative mechanical joinder with said adjusting means of said nominal value potentiometers for setting said

nominal-value-potentiometers, each of said nominal value potentiometers having associated therewith an electronic control means for operatively controlling and comparing said corresponding actual value potentiometer therewith, and for driving a corresponding one of said setting motor means only until said actual value potentiometer is in position coincidence with said nominal value potentiometer and for terminating the preselection program by stopping said corresponding setting motor means upon position coincidence of said actual value potentiometer with said nominal value potentiometer, thereby fixing the setting position of said setting members on said setting spindles, respectively.

2. The carpet-shearing machine, as set forth in claim 1, wherein

each of said program cards comprise, a rectangular plate with an upper gripping ledge on a front side thereof, and a plurality of reception grooves on one surface of said plate, spaced apart from each other, extending in a substantially longitudinal direction of said plate starting from a rear end and extending to said upper gripping ledge and forming undercut grooves, for a sunken reception of said program-switching ledges, the latter made of breakable working material and formed as tooth ledges with securing breakthroughs, the thickness of said working material being adjusted to the depth of said reception grooves, and said plate being equipped laterally with guides which cooperate with guide rails formed on a housing of said machine.

3. The carpet shearing machine, as set forth in claim 1, which includes

a joint program working housing, a program card being received in said program-working housing, said program-working housing having on its front side a coverable insert slot opening for the entrance of said program card into said housing, two lateral guide rails means mounted in said housing for guiding straight said program card inside of said housing, said adjusting means for said nominal value potentiometers comprise a plurality of setting wheels, the number of said setting wheels corresponding with the number of said program-switching ledges, transmission wheels engaging said setting wheels, respectively, said transmission wheels being coupled for joint movement with coaxially disposed adjacent hand setting wheels and scale wheels, and the latter wheels extending through said housing being visible and accessible.

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