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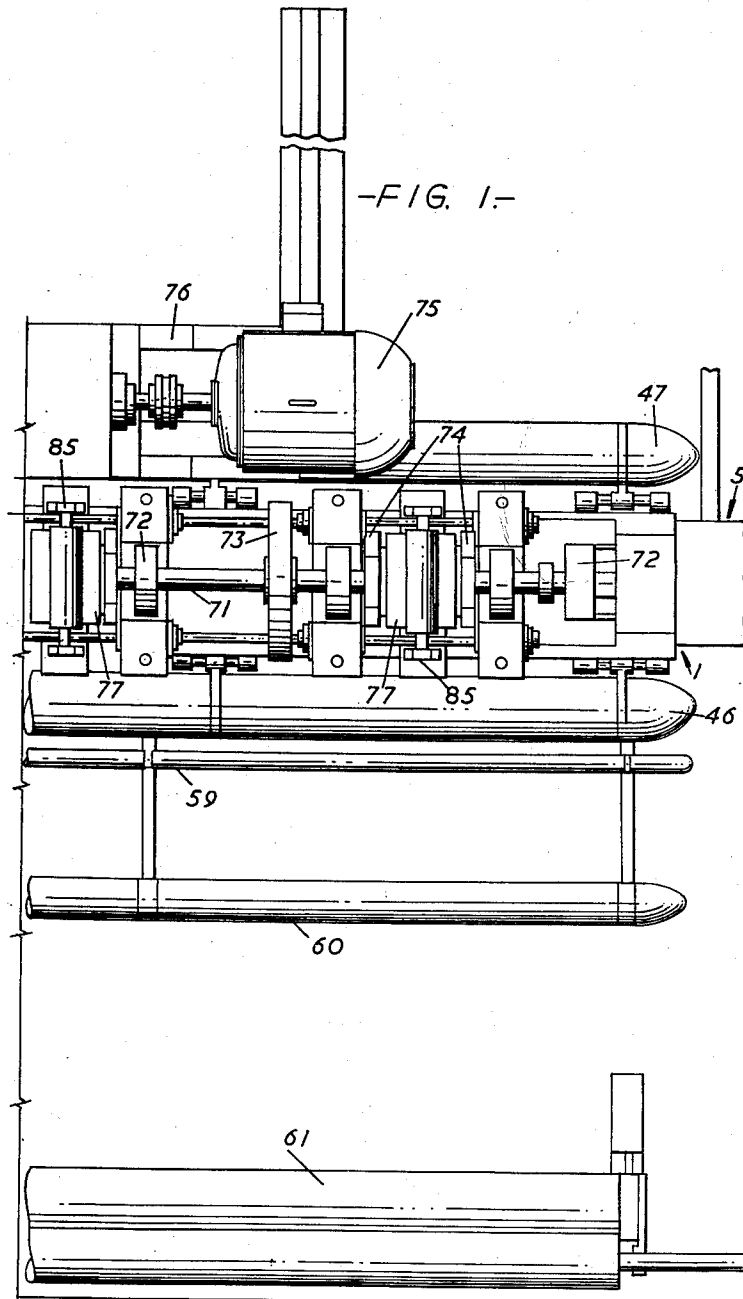
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NEEDLE ARM MECHANISM OF NEEDLE PUNCHING MACHINES

Filed Feb. 21, 1962

3 Sheets-Sheet 1



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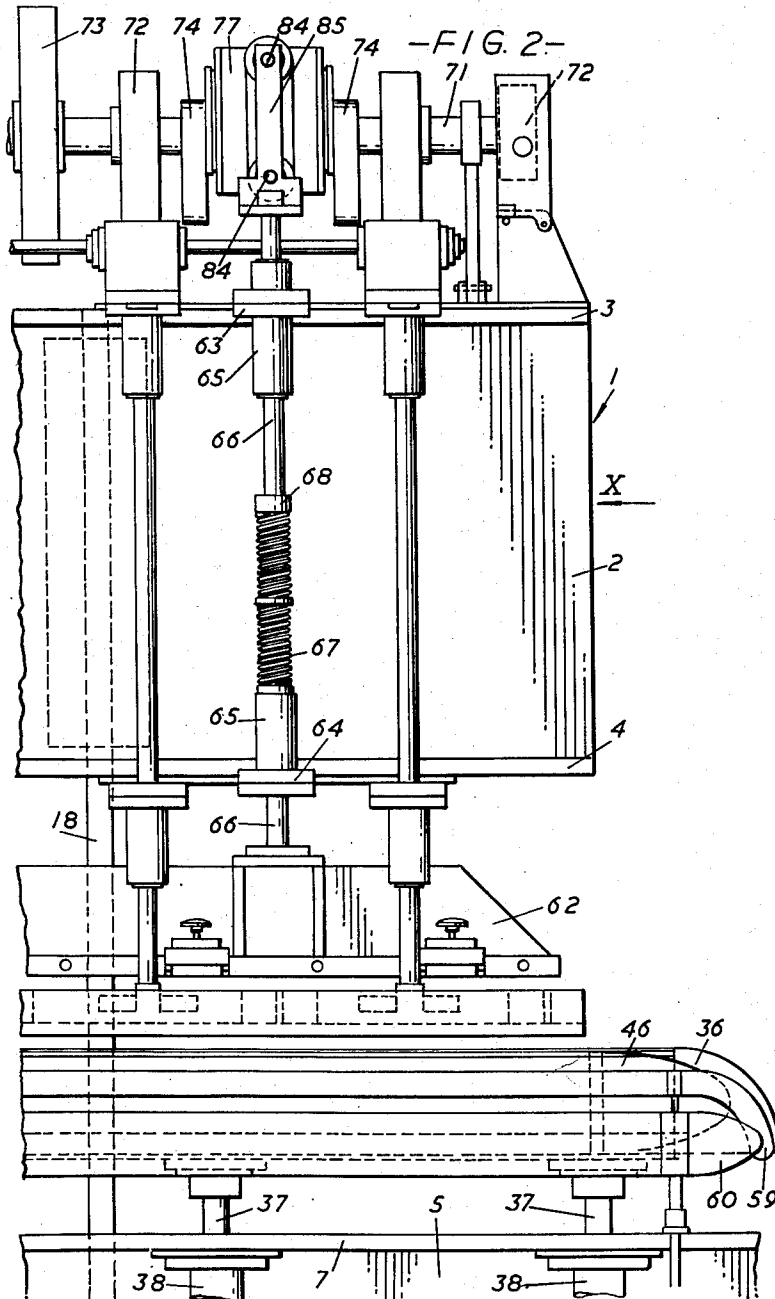
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3 Sheets-Sheet 2



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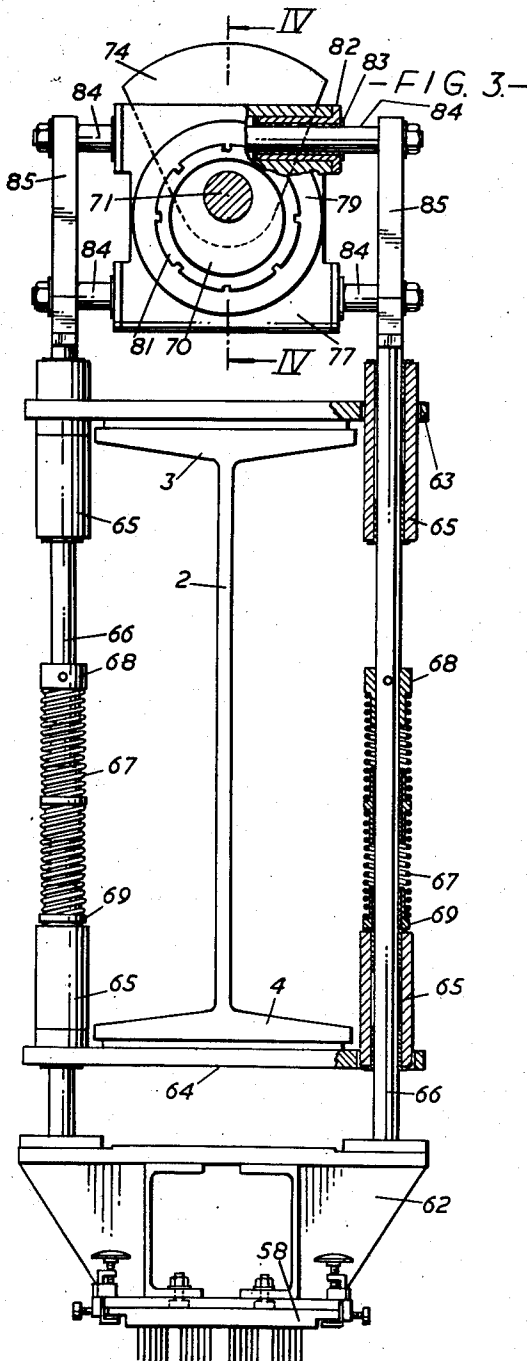
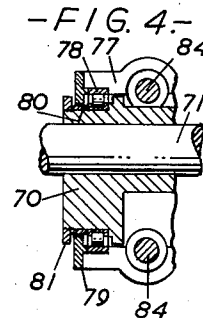
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NEEDLE ARM MECHANISM OF NEEDLE PUNCHING MACHINES

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3 Sheets-Sheet 3



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1

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NEEDLE ARM MECHANISM OF NEEDLE PUNCHING MACHINES

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Filed Feb. 21, 1962, Ser. No. 174,851
3 Claims. (Cl. 28—4)

This invention relates to needle punching machines for use, for example, in needling endless woven felts such as are used in the paper-making industry. Felts and like endless materials of greatly increased widths are now required to be needled, but these greater widths reach a figure which renders it difficult or impossible to cope with them on needle punching machines of known construction, since they involve new considerations relating to the span of the machine, the weight of the needle board and its operating mechanism, and other associated features necessary to such a machine.

It is an object of this invention to provide improved means for supporting the needle arm and needle board which will enable machines to be constructed capable of dealing with such extra wide felts, for example of a width up to (say) 450" or more.

Another object is to provide improved mechanism for reciprocating the extra heavy needle arm and needle board required in such wide machines and to minimise the amount of vibration transmitted to the machine frame.

A further object is to relieve the reciprocation-producing mechanism of most of the weight of the members to be reciprocated, since this weight is very considerable in such wide machines.

The present invention aims at achieving these objects and others which will be evident from the ensuing description, and in order that the nature of the invention and the manner of carrying it into effect may be clearly understood I shall now describe by way of example one construction of machine embodying the invention with reference to the accompanying drawings, but I desire to make it clear that other suitable embodiments of the invention may be evolved and that I claim protection for all such embodiments within the scope of the appended claims.

In these drawings:

FIGURE 1 is a plan of one end portion of a needle punching machine embodying the invention, such portion being sufficient to show two sets of the means for supporting and reciprocating the needle board, it being understood that any desired number of such sets may be used to suit the width of the machine;

FIGURE 2 is a front elevation of part of the portion of the machine shown in FIGURE 1, showing one set only of said means on a larger scale;

FIGURE 3 is an end elevation on a still larger scale of the set of said means shown in FIGURE 2, seen in the direction of arrow X in FIGURE 2;

FIGURE 4 is a fragmentary section taken on the line IV—IV in FIGURE 3.

The machine which is partly shown in these drawings is more fully illustrated and described in my copending U.S. application Serial Number 174,782 filed February 21, 1962, which is on the same date as this application and will now be briefly described using like reference numerals for like parts in that application and the present application. The machine frame includes a top beam 1 and a bottom beam 5 both of I section, the top beam having upper and lower flanges 3, 4 and a web 2 by which latter the beam is secured to semi-arched end frame members such as 18. The upper flange 7 of the bottom beam supports two rows of sleeves 38 through which pass pillars 37 carrying the needle bed 36, means being pro-

2

vided for adjusting the height of the bed. Feed and draw rollers 46, 47 extend the width of the machine, and a bar 59, and rollers 60, 61 are shown for guiding the endless material into the machine.

The needle board 58 (shown in FIGURE 3 but not in FIGURE 2) is held in the needle arm 62, and both board and arm may be in two or more sections according to the width of the machine. On each flange 3, 4 of the top beam is secured a series of upper and lower support plates 63, 64 spaced longitudinally of the beam. These plates support a front row and a rear row of bushed slide brackets 65 through which reciprocate vertical slide pillars 66 so that the pillars straddle the beam. These pillars carry at their lower ends the needle arm 62 and board 58, whose weight is substantially counterbalanced by compression coil springs 67 surrounding the pillars and located between bearing bushes 68 secured on the pillars and abutment bushes 69 seating against the lower slide brackets 65. The slide pillars 66 are in pairs spaced along the top beam to the number required according to the width of the machine, for example six, eight or ten such pairs with each pair arranged to be reciprocated vertically by its own eccentric mechanism.

These eccentric mechanisms consist of scotch cams (or cranks) each having an eccentric member 70 secured on a common shaft 71 which extends centrally above the top beam and is supported in bearings such as 72 spaced at intervals along the beam. This shaft carries fly wheels 73 and balance weights 74 and is driven through any suitable transmission means from an electric motor 75 supported on a frame 76 secured to the beam 1. The eccentric is shown in its top position in FIGURE 2 and in its bottom position in FIGURES 3 and 4.

The eccentric member 70 has an eccentric block 77 mounted around it by means at each end of a bearing ring 78, cap 79, spacer 80 and screw-threaded nut 81 (see FIGURE 4). The block 77 is mounted by bushings 82, 83 to slide along upper and lower slide rods 84 whose ends are secured to the head brackets 85 of the pair of slide pillars 66.

Thus rotation of shaft 71 moves block 77 both vertically and horizontally but only the vertical motion is transmitted to the pillars 66 and the needle arm 62. This eccentric mechanism gives a particularly advantageous reciprocating motion (viz. harmonic) and the slide pillars themselves act as the supports and guides for the needle bar, the whole arrangement being particularly well suited for the extra wide machines hereinbefore referred to.

The eccentric shaft 71 may also carry or drive auxiliary eccentric or crank devices or other devices located at the opposite end of the machine to that illustrated in FIGURES 1 and 2 and arranged for intermittently or otherwise driving the feed and draw rollers 46, 47 or other parts of the machine which form no part of this invention.

I claim:

1. In a needle punching machine having a needle bed on a frame onto which greater width of an endless material to be needled is fed and above which a needle arm with needle board is supported and said arm and said board are both arranged to be reciprocated relative to said bed to perform the needling operation, the combination of a top beam forming part of the machine frame and spanning it across the width of the machine, sets of vertical slide pillars supported on and guided by said top beam and spaced at intervals along said beam, said needle arm carrying said needle board being mounted on the lower ends of said pillars, means for counterbalancing the weight of said needle board, needle arm and said pillars including a common shaft extending centrally above said top beam, eccentric means including scotch cams mounted on said common shaft, slide rods bushings and blocks

3

arranged about said cams and secured to said pillars top of said top beam for reciprocating said needle arm and needle board relative to said bed.

2. In a needle punching machine, the combination of claim 1, wherein said vertical slide pillars are mounted in pairs on said frame to form a front row and a rear row with the pillars of each pair straddling said top beam, said top beam being provided with upper and lower horizontal flanges, slide brackets through which said pillars pass and which are secured to said upper and lower horizontal flanges of said top beam, said eccentric means comprising a series of scotch cams mounted on top of said top beam with each of said cams located above and operatively connected to its own pair of pillars to reciprocate vertically, and said common shaft extends centrally above said beam widthwise of the machine.

3. In a needle punching machine having a needle bed on a frame onto which greater width of an endless material to be needled is fed and above which a needle arm with needle board is supported and said arm and said board are both arranged to be reciprocated relative to said bed to perform the needling operation, the combination of a top beam forming part of the machine frame and spanning it across the width of the machine and having upper and lower horizontal flanges, slide brackets secured to said flanges and arranged in double rows and spaced along the front and rear of said beam, a front row and a rear row of vertical

4

slide pillars slidably guided in said brackets to form a series of pairs of pillars with the pillars of each pair straddling said top beam, said needle arm carrying said needle board being mounted on the lower ends of said pillars, springs surrounding said pillars between the upper and lower flanges of said beam which are confined between said flanges to counterbalance the weight of said needle board, needle arm and pillars, an eccentric mechanism including scotch cams located above each pair of pillars secured on a shaft which is common to a plurality of said cams and which extends centrally above said beam widthwise of the machine, bearings mounted on the upper flange of said top beam for journalling said common shaft, flywheels and balance weights on said common shaft, each said eccentric mechanism being surrounded by a block, upper and lower slide rods along which said block is slidable and whose ends are mounted in head brackets secured to the upper ends of the pair of pillars, whereby only a vertical harmonic reciprocating motion is transmitted to said pillar assembly and said operating pillars act as the supports and guides for the needle arm and needle board.

References Cited in the file of this patent

UNITED STATES PATENTS

2,004,725 Johnson ----- June 11, 1935