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1,862,170

APPARATUS FOR WRAPPING CARTRIDGES, ETC

Filed Dec. 31, 1928

3 Sheets-Sheet 1

FIG. 1.

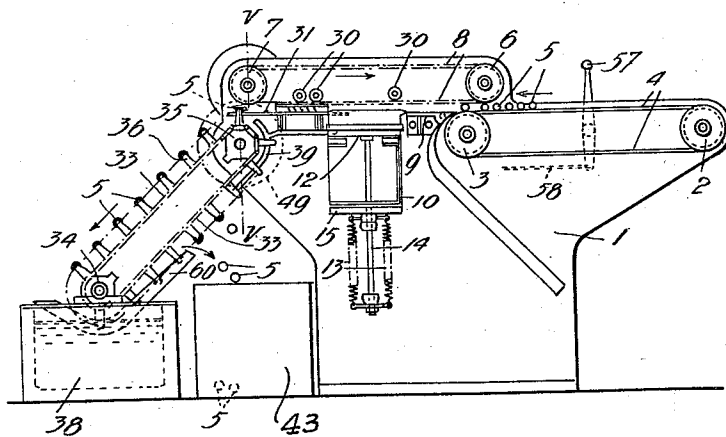


FIG. 2.

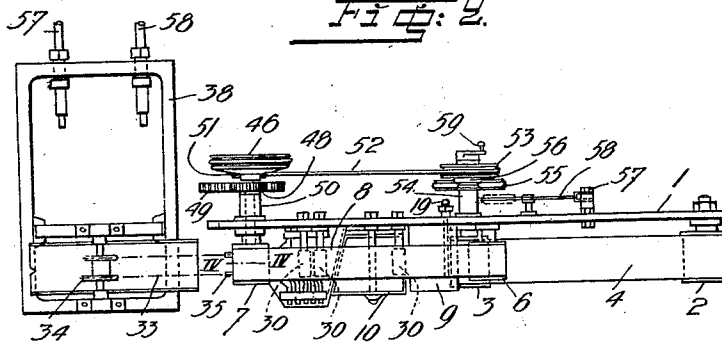
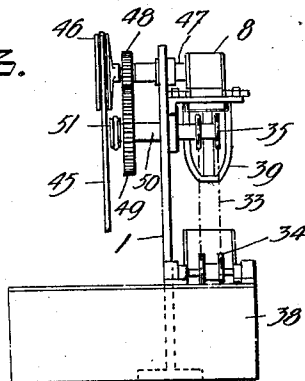


FIG. 3.



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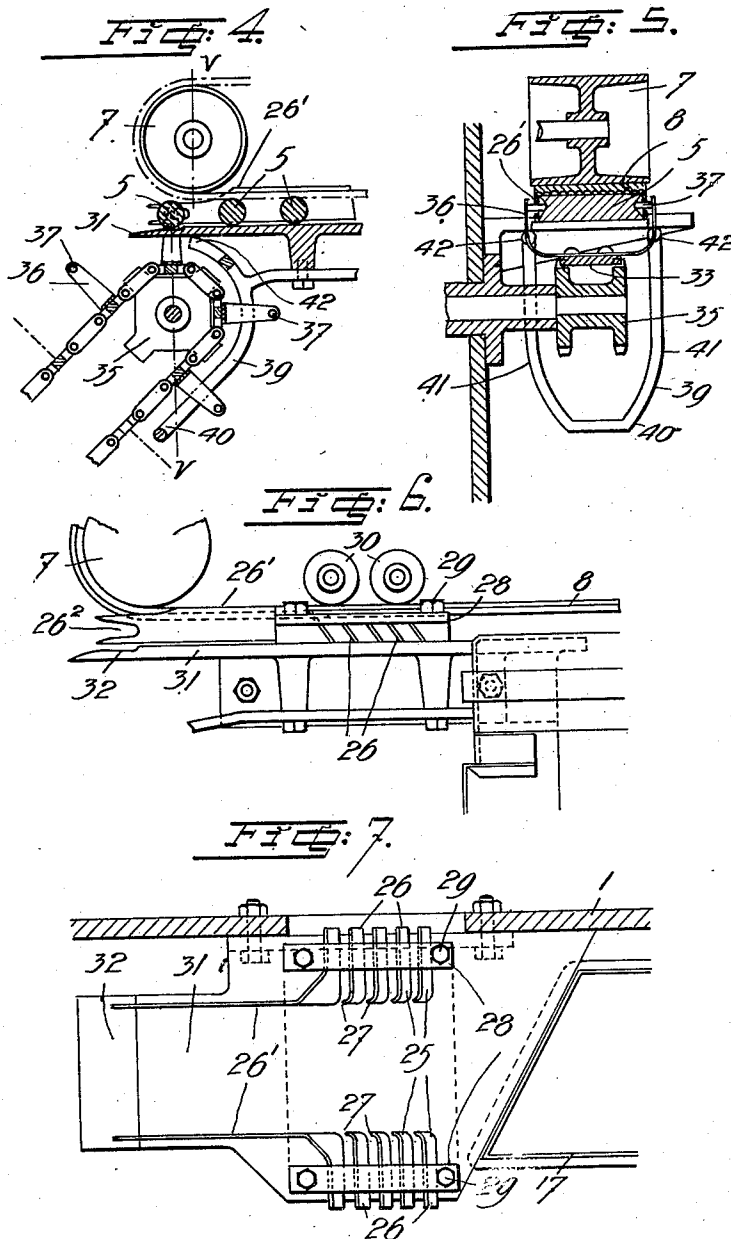
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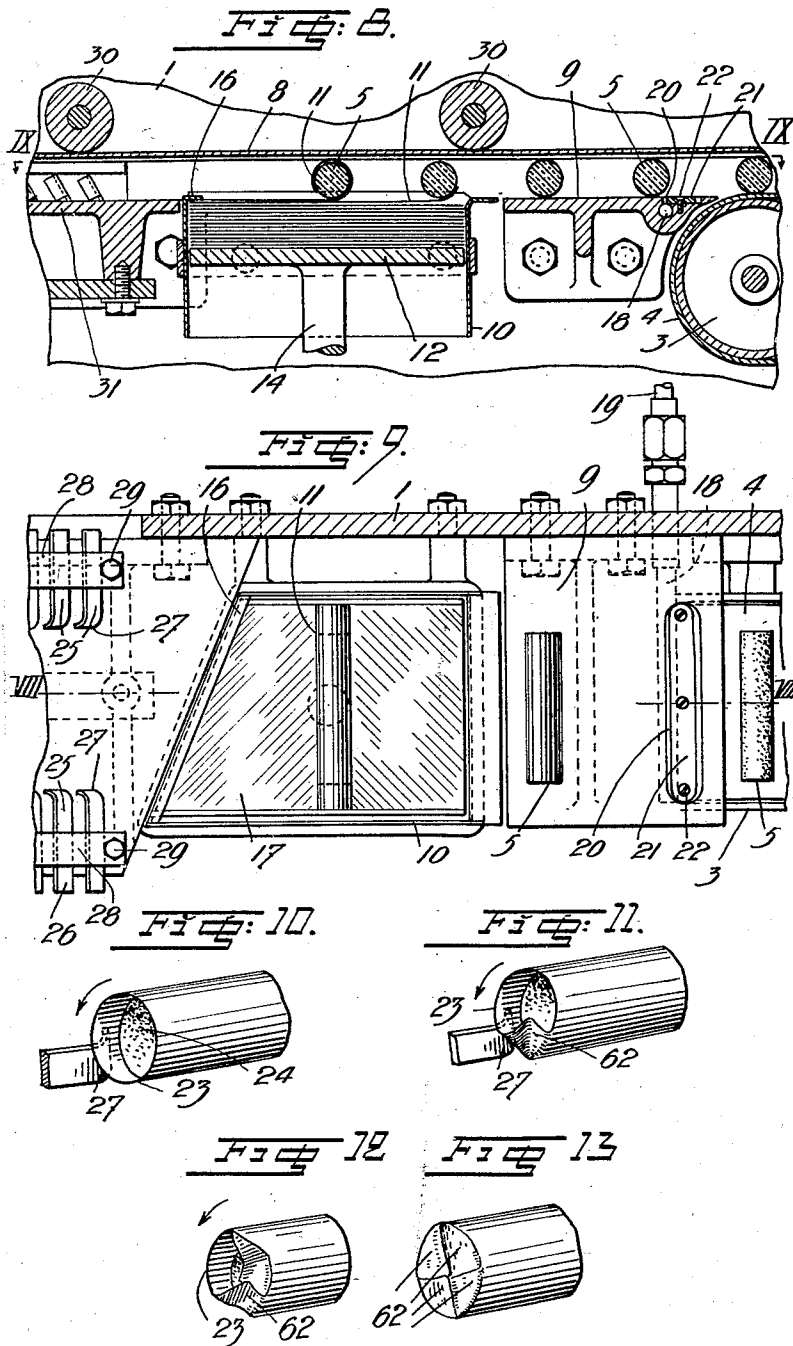
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APPARATUS FOR WRAPPING CARTRIDGES, ETC

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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APPARATUS FOR WRAPPING CARTRIDGES, ETC.

Application filed December 31, 1928, Serial No. 329,625, and in Sweden January 4, 1928.

The present invention has for its object an apparatus for wrapping up cartridges of plastic explosives or other similar materials in paper or such like wrappers.

The invention has for its object an apparatus for wrapping up cartridges of plastic explosives, for instance dynamite, in paper, i. e. to provide the cartridges with wrappers or covers of paper or similar material.

Cartridges of plastic explosives, for instance dynamite, have hitherto usually been wrapped up by hand which method causes waste of time and comparatively high cost. According to the present invention the cartridges are automatically wrapped up by means of a machine in such a way that the cartridges are brought to roll forward over a sheet of paper (or the like) serving as wrapper or cover, whereby the paper will be caught by the cartridge and wound up around the cartridge, whereupon during the continued rolling forward of the cartridge the edge-portions of the sheet of paper projecting beyond the ends of the cartridges will be automatically folded over the end surfaces of the cartridge by means of suitable devices, in such a way that the cartridge will be wholly wrapped up.

Machines have been employed before for wrapping cylindrical articles. Such machines have included means for supporting the article, means for applying wrappers to the article and providing a suitable supply of adhesive for securing the wrappers to the articles, means for firmly gripping the articles, and means operating in sequence to progressively fold the surplus portions of the wrappers around the ends of the articles.

However, so far as is known, it has never before been proposed to employ apparatus of the character herein set forth for wrapping cartridges of plastic explosive material, such as dynamite cartridges and the like, in paper and other similar wrapping materials.

In order to clearly explain the invention there is shown on the accompanying drawings by way of example a form of construction of a machine or apparatus suitable for the purpose.

Fig. 1 shows a side view of the machine.

Fig. 2 shows the machine seen in plan from above.

Fig. 3 shows an end view of the machine, seen from the left in Fig. 1.

Fig. 4 shows a section in detail on line IV—IV in Fig. 2.

Fig. 5 shows a section on line V—V in Fig. 4.

Fig. 6 shows in side view the members in the machine effecting the folding up of the paper over the end surfaces of the cartridges.

Fig. 7 shows the same device seen from above.

Fig. 8 shows in section on line VIII—VIII in Fig. 9 the part of the machine where the sheets of paper or the wrapper is wound around the cartridges.

Fig. 9 shows, seen from above, the same device in section on line IX—IX in Fig. 8.

Figures 10, 11, 12 and 13 show a cartridge with a paper wrapping during different stages of the working operations.

The invention will be described with reference to wrapping up cartridges of plastic explosives, for instance dynamite, in paper. The working method will in all essential parts be the same also when applying the invention to cartridges or bodies of other material.

1 is a frame, carrying different parts of the apparatus. 2 and 3 are rollers rotatably mounted in the frame, which rollers carry an endless conveying belt 4, the cartridges 5 being fed on the upper part of said belt in the direction shown by the arrow in Fig. 1. In the frame two additional rollers 6, 7 are rotatably mounted over which is running an endless belt or band 8 serving for feeding the cartridges, said belt being so arranged that the lower portion thereof with a suitable pressure will bear against the cartridges which are fed forward on the conveying belt 4 as shown in Fig. 1. As shown more particularly in Fig. 5, the lower face of the belt is corrugated or grooved longitudinally. The lower portion of the belt 8 is moving in the same direction as the upper portion of the belt 4, but the speed of movement of the

belt 8 is somewhat greater than that of the belt 4, whereby the cartridges, when caught by the belt 8, will be fed through the apparatus as will be described hereafter at a greater rate than that of the belt 4, with the result that the cartridges will be separated from each other by a suitable distance after having been caught by the belt 8 as indicated in Figure 1. By the effect of said belt 8 the cartridges are conveyed from the conveyor 4 in a manner clearly shown in Figures 1 and 8 over a table or board 9 and a receptacle or box 10 containing the sheets of paper 11 intended for the wrapping, which papers are pressed upwardly by means of a piston 12, movably arranged in said receptacle 10, through the action of springs 13 (or other devices suitable for the purpose). As will be seen from the drawings said piston is guided by a rod 14 fastened to the piston or made in one piece therewith, said rod passing through a corresponding opening in the bottom 15 of the receptacle 10. Said spring mechanism may be arranged in any suitable way, and therefore a detailed description thereof should not be necessary. In order to prevent the sheets of paper and the piston from being pressed too far upwards a flange-like projection 16 is arranged at the upper rear edge of the receptacle 10, said projection forming a shoulder or abutment for the rear edge of the sheets of paper (see Figures 8 and 9) serving as a stopping device for the piston and for the sheets of paper. When the sheets of paper are brought into the receptacle 10, the piston 12 is pressed down in such a way that the receptacle will contain a suitable number of sheets of paper. The front edge of the sheets of paper, i. e. the edge that first comes into contact with the cartridges during their rolling movement, is free so that, when a cartridge is under a rolling movement over the receptacle 10, the topmost sheet of paper in each case will adhere to the cartridge and be wound up thereon during the rolling movement of the cartridge. The rear portion of the sheet of paper is as shown in Figure 9 suitably cut off in such a way as to form an oblique angle to the longitudinal edges, and the receptacle 10 is formed in the same way, whereby said end portion of the sheet of paper will get the form of an oblique tongue 17 constituting the outer end of the wrapper of the cartridges and securing a tight bearing of the sheet of paper on the outer side of the wrapper. In order to make sure that the sheet of paper will adhere to the cartridges when the cartridges are rolling forward over the receptacle 10 it is preferable to provide them with an adhesive coating in case the cartridges themselves should not be sufficiently adhesive. This may be done automatically, for instance, in such a way that a transverse channel 18 is provided in the table 9 and by means of a

duct 19 is in communication with a receptacle or pump device (not shown) for supplying any suitable adhesive material of such a property as not to disadvantageously affect the cartridges. Communicating with said channel 18 a slot 20 (or a series of small holes or perforations) is arranged in the table 9, said slot extending across the table 9. The adhesive material in question, which is pressed into the channel 18, will thus be pushed out through said slot 20 and transmitted onto the cartridges upon their travel over said opening.

A plate 21 arranged in the table as shown in Figures 8 and 9 and fastened thereto by means of screws 22 is arranged in such a way that the size of the slot may be regulated as desired by adjusting said plate or substituting a plate for another one having slots or perforations of other size. As the cartridges, possibly provided with an adhesive material, are rolling forward over the receptacle 10 as above described the topmost paper in each case will adhere to the cartridges and be wound up thereon as shown in Figure 8 so that the cartridge will be enclosed in a paper coating when it by the action of the belt 8 has finished its way over the receptacle. Said paper coating extends somewhat beyond the ends of the cartridges. In order to bring about a folding of the projecting end portions 23 of the paper so that said end portions will get the form of tongues, which in usual way cover the ends 24 of the cartridges, the machine is provided with folding members 25, so constructed as to fold the projecting parts 23 at the ends of the sheets of paper as shown in Figures 11, 12, 13 when the cartridges during their rolling movement are fed past said folding members, a set of which is positioned at each side of the machine, i. e. corresponding to each end surface of the cartridge, said tongues covering the ends of the cartridges and at the same time also preventing the paper wrapper from unrolling or loosening from the cartridges. According to the form of construction shown on the drawings said member is formed of a number of strips of metal 26 or the like, the turned in ends of which have the form of oblique hooklike portions 27 being obliquely positioned as shown in Figures 7 and 9. Said members are adjustably fastened at the side of the path or way of the cartridge through the machine in such a way that said hook formed portions during the rolling movement of the cartridge come into the way of projecting portions 23 of the wrapper as shown in Figures 10 and 11 but in such a manner that they will not be in the way of the cartridges themselves. During the rolling movement of the cartridges said members will fold the end portions 23 of the wrapper, as shown in Figures 10-13 inclusive, into tongues 62 covering the ends of the cartridges. Said

members 26 can be maintained in working position by means of guides 28 held in position in the frame of the machine by means of screws 29. When the cartridges have passed said folding members their end surfaces will bear against guides 26' whereby the tongues 62 formed at the ends will be kept pressed against the end surfaces of the cartridges, until said tongues have been further pressed against the material in the cartridge and securely maintained by means of a device, which will be described hereafter.

By means of suitable pressing rollers 30 the lower part of the belt 8 is kept pressed against the cartridges so that the cartridges without being deformed will be properly brought forward by the effect of said belt which suitably can be provided with grooves as indicated in Fig. 5. After having been fed past the said folding members the cartridges are rolling over a table 31 (see Figures 1 and 6) the rear end of said table (in the direction of movement) being provided with a lowered or depressed portion 32 on the upper surface in which lower portion the cartridge enters and simultaneously comes out of engagement with the belt 8. In this position the cartridge is caught by devices which further press the tongues 62 of the paper against the ends of the cartridge and also convey or transport the cartridge in a manner which will be described hereafter.

An endless link chain 33 is mounted on two pairs of rotatably arranged chain wheels 34, 35, driven by any suitable devices. The chain carries flexible U-formed members 36 arranged at a suitable distance from each other, which U-formed members at their free ends are provided with inward projecting pins 37. According to the form of construction shown on the drawings the lower part of the chain 33 enters into a receptacle 38 containing molten paraffin for coating or impregnating the wrappers of the cartridges. 57 and 58 (see Figure 2) are inlets and outlets for steam or other heating medium. The receptacle 38 may be omitted if such impregnation or coating should be unnecessary, or the paraffin may be substituted for some other suitable liquor or fluid for treating the cartridges if desired. The chain 33 is moving in the direction indicated by the arrows in Figure 1, i. e. in such a way that the upper part is moving in a direction from the table 31 down towards the receptacle 38, and the other part is moving from said receptacle upwards towards the table 31. Below said table at the rear end thereof a U-formed guide 39 is arranged in such a way that the free ends of the U-formed member 36 during the movement of the chain will grip the foremost tapered end 40 of the U-formed member 39 (in the direction of movement) and during the continued movement slide along the outer side portions 41 of the U-formed mem-

ber 39, whereby the shanks of the U-formed member 36 will be brought apart so that while the shanks of said U-formed portion are forced outwards the inward directed free ends of the pins 37 do not come into contact with the cartridge 5 positioned on the table but will pass along the outer sides of the guides 26'. The length of the U-formed guide 39 is, however, adjusted in such a way that, when the U-formed member 36 has passed the ends 42 of the U-formed guides the pins 37 will be in position opposite the end surfaces of the cartridge 5 on the table 31 so that when the U-formed member 36 comes out of engagement with the ends 42 the shanks of the U-formed member 36 which have been brought apart when passing the U-formed member 39, on account of their flexibility snap together somewhat towards each other, i. e. take up their normal position, whereby the pins 37 as shown in Figures 4 and 5, snap into the grooves 26² provided in the guides 26' and press against the end portions of the cartridges pressing in the tongues 62 so as to fully secure the closure of the wrapper at the end surfaces. The cartridges are now caught by said pins and are rolling forward during the movement of the chain thus held by the U-formed members 36. The cartridges are thus brought through the paraffin bath in the receptacle 38 and taken out of the bath and made to travel along during the continued movement of the chain until they at last are released from the U-formed members 36, as above described, by the effect of the U-formed member 39 which brings the shanks 36 apart just enough to release the cartridges 5 whereby the cartridges will be released and fall down into a receptacle 43 serving for receiving the same.

60 is a trough of sheet metal, intended to receive molten paraffin dropping from the cartridges and bring it back to the paraffin bath. The lower curved portion of said groove prevents cartridges which might have come loose from falling down and remaining in the paraffin receptacle 38. Any suitable driving devices may be used for driving the different conveying devices. The conveying devices may be driven each by itself or from a common driving device. In each case it must be controlled that the rate of speed between the different driving devices will be suitable for the purpose, namely such that the belt 8 is driven at a somewhat greater speed than the conveying belt 4 as also that the speed of the conveying chain 33 is such in relation to the speed of feeding of the cartridges that at each time a cartridge is fed into the position on the table 31 shown at the left in Figure 4 a U-formed member 36 will come into position to grip it as shown in Figures 4 and 5.

According to the form of construction

shown on the drawings by way of example the chain 33, and the belts 8 and 4 are driven from a common source of power by means of a driving belt 45 or the like running over a pulley 46 mounted on a shaft 47 rotatably mounted in the frame, said shaft carrying the roller 7 on which the belt 8 is arranged, as also a toothed wheel 48 secured to said shaft which meshes with a toothed wheel 49 on the shaft 50, carrying the chain wheel 35 which drives the chain 33. The shaft 50 carries also a pulley 51 which is in driving connection with a pulley 53 by means of a driving belt 52 or the like said pulley 53 being arranged on a rotatable shaft (not shown) also carrying a friction disc 55 which gears with a friction disc 56 on one end of the shaft 54 feeding the belt 4, the roller 3 driving the conveying belt 4 being arranged on the other end of said shaft 54.

Said friction gearing or friction coupling is suitably arranged so as to give the belt 4 an intermittent movement whereas the chain 33 and the belt 8 move continuously. For this purpose the disc 56 for instance may at the periphery be provided with a depressed portion so formed that the disc will stop after having completed a revolution and the belt having been moved forward a distance corresponding to the length of a row of cartridges placed on the belt 4. After having placed a new row of cartridges on the belt 4, said belt may be put into motion by bringing the discs 55 and 56 in driving connection with each other by means of devices suitable for the purpose, which devices may be of any suitable construction, and therefore it ought not to be necessary to give a detailed description thereof. Said devices may for instance be regulated by means of a hand lever 57 and a link 58 or by means of other suitable devices. 59 is a crank pin by means of which a pump (not shown) may be driven for supplying the above mentioned adhesive material to the channel 18 and the opening 20.

It ought to be evident that details of the form of construction shown by way of example on the drawings may be modified without departing from the idea underlying the invention.

Having thus described my invention I declare that what I claim is:—

1. Apparatus for wrapping cartridges of plastic explosive material, comprising means for feeding the cartridges in supported position, means for applying adhesive to said cartridges during their movement, a supporting table, said table having thereon a stack of sheets of wrapping material of greater width than the length of said cartridges arranged with its upper surface substantially on a level with said table, means for rolling said cartridges in succession and in spaced relation over said table and over the surface of said stack, whereby each of said cartridges

is wrapped up in one of said sheets, means on said table for progressively folding the marginal portions of said wrappers around the edges of said cartridges, means for pressing said folded portions in place, and means for conveying said wrapped cartridges from said table, said last named means comprising an endless chain provided with spaced resilient U shaped members adapted to engage and support said cartridges at their ends and being operated by the same means as operate the feeding means.

2. Apparatus according to claim 1, wherein the U shaped members have resilient shanks provided with inwardly extending pins adapted to engage the ends of the plastic explosive material sufficient to firmly hold them without exploding them.

3. Apparatus according to claim 1, including means adapted to engage said U shaped members during their course of travel and cause them to release said plastic mass without exploding same.

4. Apparatus according to claim 1, wherein the speed of travel of said conveying means is such that a U shaped member is in position to receive a cartridge each time a cartridge is ready for discharge from said table, means being provided for preventing the explosion of said plastic mass.

5. Apparatus according to claim 1, wherein the supporting table is provided with a depressed portion onto which said cartridges are rolled into gripping position by said U shaped members.

In testimony whereof I affix my signature.
ANTON ERIK ANDELIN.