(19) DANMARK

(10) **DK/EP 3619152 T3**

Patent- og
Varemærkestyrelsen

(12) # Oversættelse af europæisk patentskrift

(51) Int.Cl.: ***B 65 H 29/66 (2006.01)*** ***B 65 H 29/24 (2006.01)*** ***B 65 H 29/68 (2006.01)***

(45) Oversættelsen bekendtgjort den: **2023-02-27**

(80) Dato for Den Europæiske Patentmyndigheds
bekendtgørelse om meddelelse af patentet: **2022-11-30**

(86) Europæisk ansøgning nr.: **18734470.0**

(86) Europæisk indleveringsdag: **2018-06-14**

(87) Den europæiske ansøgnings publiceringsdag: **2020-03-11**

(86) International ansøgning nr.: **EP2018065827**

(87) Internationalt publikationsnr.: **WO2018229201**

(30) Prioritet: **2017-06-14 DE 102017005661** **2018-05-09 DE 102018111190**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(73) Patenthaver: **BW Papersystems Stuttgart GmbH, Schlosserstraße 15, 72622 Nürtingen, Tyskland**

(72) Opfinder: **SCHILLING, Andreas, Nebelh hlenstrasse 52, 72805 Lichtenstein, Tyskland**
Klein, Hansjörg, Amselweg 9, 73773 Aichwald, Tyskland

(74) Fuldmægtig i Danmark: **Dennemeyer & Associates S.A, P.O. Box 700425, DE-81304 Munich, Tyskland**

(54) Benævnelse: **ANORDNING OG FREMGANGSMÅDE TIL DANNELSE AF EN FLAGESTRØM AF UNDERLAPPENDE ARK**

(56) Fremdragne publikationer:
US-A- 3 730 515
US-A- 5 275 394
US-A- 5 950 510
US-A1- 2010 044 946

DEVICE AND METHOD FOR FORMING A SHINGLE STREAM OF UNDER- OR OVERLAPPING SHEETS

The invention relates to a device, in particular a "roll cross-cutter", for forming a shingle stream of underlapping or overlapping sheets, in particular of paper or cardboard sheets, having a transport device for transporting sheets, having a shingling device for underlapping or overlapping the sheets in certain regions, having a braking device following the shingling device in the transport direction of the sheets for braking shingled sheets, in particular by forming a braking gap for the passage of sheets brought together in a shingled manner, and, preferably, having a cross-cutting device arranged upstream of the shingling device in the transport direction for cutting a material strip into individual sheets. In addition, the invention relates to a method for forming a shingle stream of underlapping or overlapping sheets, in particular of films, paper or cardboard sheets, further in particular for forming a shingle stream of individual sheets cut from a material strip by a cross-cutter, wherein separated sheets are transported to a shingling device and are underlapped or overlapped in certain regions in order to produce a shingle stream, and wherein the shingled sheets are braked by a braking device following the shingling device in the transport direction of the sheets.

A roll cross-cutter is known, for example, from DE 101 03 040 A1. With the known roll cross-cutter, paper or cardboard sheets can be provided as a quasi-endless strip in the form of a paper roll. Using a feed device with rollers or rolls, the strip is fed to a cross-cutting device where it is cut into sheets of a defined length. In many cases, a paper storage means is connected upstream of the feed device in order to hold a certain web length of paper. The cut sheets are fed with the aid of fast-running transport belts to a shingling device to form an underlap of the sheets. The shingling device includes a lifting shaft and a suction belt arranged above it. The sheets passing through the shingling device are lifted by the lifting shaft relative to the transport plane at a defined point on the sheets, in particular in relation to the trailing edge of the sheets, and pressed against the suction belt arranged thereabove. The suction belt has a lower circulation speed than the fast-running transport belts that transport the sheets further from the cross-cutting device. This brakes the sheet. In this regard, the shingling device acts as the first, rear braking unit. The following sheet therefore has a higher speed than the turned-up leading sheet. This difference in speed causes the sheets to underlap. In this manner, a continuous shingle stream is produced. With the next cycle of the shingling device, the trailing sheet is grasped by the beater shaft, pressed against the suction belt and braked. Each sheet remains in suction belt engagement for more than one cycle.

A braking device is arranged downstream of the shingling device in the transport direction of the shingle stream as a second, front braking unit. Such a braking device is described, for example, in DE 38 12 685 A1. The braking device can have at least one so-called nip roller, which forms a braking gap together with a transport belt, a further roller or roll. The distance between the braking device and the shingling device is set such that the leading edge of a sheet preferably just enters the braking gap and is decelerated when the rear sheet region, in particular the trailing edge of the sheet, is pressed against the suction belt by the lifting shaft of the shingling device. In this way, the sheet is braked or decelerated by the nip roller in the front sheet region and by the suction belt of the shingling device in the rear sheet region, preferably at approximately the same time. This prevents the sheet from rippling during braking. Following the braking device, the shingled sheet stream formed by the underlapped sheets is transported to a machine for further processing at the same speed and with the same shingle length of the underlapped sheets on a transfer table with slower-running transport belts.

The sheets are braked at their leading and trailing edges at approximately the same time, as described in the previous paragraph. A sagging leading sheet can hinder the following sheet in its forward movement during underlapping, which can lead to problems in regard to positioning accuracy. After being pushed up by the beater shaft against the suction belt, the sheets are tensioned between the suction belt and the braking device in order to prevent the sheets from sagging. Tensioning of the sheets is realised by setting the speed of the suction belt slightly lower than the speed of the nip rollers of the braking device. Due to the tensile forces exerted on the sheet by the difference in speed between the nip rollers and the suction belt, the sheet is tensioned and sagging is reduced. If the leading sheet moves out of the engagement region of the suction belt, it is no longer held by the suction belt. The leading sheet is then only held by the trailing sheet, which is (still) in the engagement region of the suction belt. Since the weight of the leading sheet, which must be borne by the trailing sheet, increases with increasing sheet length the risk of sheet sagging increases with large sheet formats.

A transfer point is provided in the transport direction of the shingle stream, at which the individual sheets are subsequently gripped or grasped by a transfer device of the machine for further processing or by the machine for further processing itself and thus transferred to the machine for further processing. The transfer point is generally located behind the end of the transfer table in the sheet transport direction. For interference-free further processing, the individual sheets must be made available at the transfer point at a specific point in time, i.e. the sheets must reach the transfer point at a specific time in relation to the leading edge and at the cycle frequency of the transfer device of the machine for further processing. The phase position and cycle frequency of the machine for further processing thus determine the cycle frequency and phase position of the entire device. The cycle is defined as the time between gripping of the leading edge of a first sheet and gripping of the leading edge of a second sheet by the machine for further processing. This means that both the shingling device and the cross-cutting device must operate with the same cycle as the machine for further processing. The phase position describes, for example, the relative position of a knife of the cross-cutting device, a lifting shaft of the shingling device and a transfer device of the machine for further processing. The phase position remains the same during operation, but changes when the sheet format is changed. The cycle frequency of the machine for further processing is usually the same for all sheet formats.

The sheets are taken over from the roll cross-cutter by the machine for further processing at a defined speed and conveyed further at this speed. Since the sheets may only be subjected to a certain degree of acceleration, the sheets must, if possible, be made available to the machine for further processing at the transfer point at the same speed. The sheets must therefore not only be made available at the transfer point at a specific point in time, but also at a defined speed.

The braking device of the roll cross-cutter is adjustable as a function of cutting length. If the sheet format, i.e. the length of the sheet, is changed, the distance between the braking device and the shingling device must be adjusted accordingly by moving the braking device in or against the transport direction of the sheets. For this purpose, the nip roller is preferably adjusted relative to the shingling device in the transport direction of the sheets in such a way that the leading edge of a sheet just enters the braking gap and is decelerated when the rear sheet region is pressed against the suction belt by the lifting shaft. Adjusting the braking device thus ensures that the sheets are braked or decelerated, preferably substantially simultaneously, at the leading and trailing edge regions of the respective sheet.

The cycle frequency and phase positions of sheet transport, shingle formation and cutting of the paper web, i.e. the periodic arrival of the leading edge of a sheet of the shingle stream at the transfer point to the machine for further processing, the periodic turning up of the trailing edge of a leading sheet in the shingling device and the periodic cutting of the strip into sheets with the cross-cutting device, must be coordinated with the phase position and cycle frequency of the machine for further processing. To ensure interference-free transfer of the sheets to the machine for further processing, the sheets must arrive at the transfer point at a specific point in time with a requested speed profile, i.e. with a specific cycle frequency. If the sheets are provided at the transfer point with a constant cycle frequency and a constant transport speed, all leading edges of sheets arriving at the transfer point have the same distance to the respective trailing leading edge of the sheet. This means that the sheets are provided with a constant overlap length at the transfer point. The overlap length should preferably be adjusted such that the distance between the nip roller and the transfer point is an integral multiple of the overlap length, so that one sheet at a time is provided at the transfer point when, at the same time, a following sheet is braked with its leading edge by the braking device and held with its turned-up trailing edge on the suction belt of the shingling device.

If a sheet has just been turned up with its trailing edge and braked, the trailing sheet can be conveyed under the leading sheet. This point in time represents an optimal stopping point of the device, since the trailing fast sheet can be conveyed under the slow leading sheet. This makes it possible to brake the fast-running transport belts more slowly than the slow-running belts, since the sheet length can be used as an additional braking distance of the trailing sheet. In contrast, braking the fast-running belts just as quickly as the slow-running belts is complex and associated with high wear. In the case of heavy braking, the sheets can also slip on the fast-running belts, which must be prevented at all costs, as otherwise the sheets will no longer be in the correct phase position, i.e. the sheets will no longer be in the intended position of the device at the correct point in time.

If the braking device is adjusted relative to the shingling device during a format change, this inevitably also leads to a change in the distance between the braking device and the transfer point to the machine for further processing or to a change in the transfer length. In order to ensure that the device stops without interference, the overlap length of the sheets in the shingle stream must therefore be changed in case of a format change and thus a change in transfer length, in order to meet the requirement that the transfer length corresponds to an integer multiple of the overlap length. In this regard, the overlap length is determined by the difference between the fast-running and slow-running transport belts.

In the event of a format change, the speeds of the fast-running and slow-running belts must therefore be adjusted such that the transfer length corresponds to an integer multiple of the overlap length. Since the sheets are gripped and conveyed by the machine for further processing at a defined speed, the speed at which the sheets are delivered to the transfer point must not deviate too much from the speed of the machine for further processing in order to prevent damage or slipping of the sheets due to excessive acceleration. The speed of the slow-running belts can therefore only be adjusted within a limited range.

Setting a suitable overlap length is very complex, since not only the distance between the nip roller and the transfer point described above must be taken into account, but also the speed deviation of the slow-running belts from the conveying speed of the machine for further processing. In addition, the device must be prevented from stopping when the knives of the cross-cutting device are actually engaged and thus cutting. It can happen that, with a change in sheet format, the knives of the cross-cutting device are actually cutting when the machine for further processing is stopped. This can damage the sheet being cut as well as the material web, disrupting the entire process or requiring time-consuming manual removal of the damaged sheet and/or web region. Stopping the machine for further processing while the knives of the cross-cutting device are actually cutting must therefore be avoided under all circumstances. For each sheet format, a constellation must be found in which the knives of the cross-cutting device are not cutting when the machine for further processing stops.

In such a case, for example, the speed of the fast-running belts can be changed. A change in the speed of the fast-running belts is coupled to a shift in the phase position of the knives of the cross-cutting device. At the same time, the speed of the slow-running belts must also be changed so that the transfer length corresponds to an integer multiple of the overlap length. This results in the sheets being delivered to the transfer point at a speed that differs from the speed of the machine for further processing. Providing the sheets to the transfer point at a speed that is not optimal results in the sheets having to be accelerated or decelerated when they are transferred to the machine for further processing. If the deviation in the speed of the slow-running belts is too great, the sheets can no longer be transferred to the machine for further processing without interference. In such a case, the overlap length must be changed so that the slow-running belts are operated at a speed that enables interference-free transfer of the sheets to the machine for further processing.

When changing the format or setting the device to a specific format, a large number of limiting conditions must therefore be observed. The overriding condition is that the device must be prevented from stopping when the knives of the cross-cutting device are actually engaged. At the same time, the speed of the slow-running belts must be set in such a way as to ensure interference-free transfer of the sheets to the machine for further processing. In addition, the transfer length should be an integer multiple of the overlap length, if possible. The above conditions are ultimately influenced by the selected speeds of the fast-running and slow-running belts as well as the distance between the braking device and the shingling device. Due to the large number of conditions, it is not possible to satisfy all conditions for each sheet format. For each sheet format, it is therefore only possible to find a compromise between the overlap length and the speeds of the fast-running and slow-running belts with which the constraints, i.e. preventing the knives of the cross-cutting device from stopping during engagement and interference-free transfer of the sheets to the machine for further processing, can still be satisfied.

Operation of the device under sub-optimal conditions, i.e. the transfer length is not an integer multiple of the overlap length and/or the speed of the slow-running transport belts is not optimally adapted to the machine for further processing, results in the leading edges of the sheets each having a different position when the machine stops, depending on the sheet format. Only the first leading sheet always comes to rest with its leading edge at the transfer point in the same defined position, irrespective of format, when the device stops. The fast-running and slow-running belts must come to a stop at the same time when the device stops, otherwise the phase position of the sheets with respect to one another could be altered, in particular between the sheets engaged by the slow-running belts and the sheets engaged by the fast-running belts.

From US 5,275,394 A a roll cross-cutter for forming a sequence of underlapping sheets is known, wherein the sheets are fed to a sheet feeder. The sheets are stacked in the sheet feeder and can be fed to a sheet processing machine in cycles as required. The disadvantage here is the need to interpose a sheet feeder, which serves as a buffer for the sheets.

US 3,370,515 A describes a roll cross-cutter with a transfer table. The transfer table can be lowered and pushed under the shingling device.

From US 2010/044946 A1 a roll cross-cutter is known, wherein the roll cross-cutter comprises a frame on which a cross-cutter, a shingling device and a braking device are arranged. The frame is mounted on rollers and can be moved perpendicular to the transport direction of the sheets.

Rapid braking of the slow-running belts is not really problematic. However, rapid braking of the fast-running belts leads to high material stress and is technically complex. Rapid braking not only leads to increased wear on the fast-running belts and their braking devices, but also to increased energy consumption. In order to be able to stop the fast-running belts and sheets rapidly, significantly more energy is required than when slow-running belts are braked. In the event of an abrupt stop of the fast-running belts, the sheets are in danger of slipping further due to mass inertia. Since a slipped sheet no longer has the correct phase position in the device in relation to the functional units of the device, in particular the braking device and shingling device, slipping of the sheets must be prevented. For this reason, braking of the sheets is usually assisted by switchable additional braking units, such as blowing air and/or suction air. The additional braking units further increase the energy requirement when braking the fast-running belts.

It is the object of the present invention to provide a device and a method each of the above-mentioned type, which permit a change of the sheet format with little effort and a system stop which is simple in terms of process engineering, wherein in particular unfavourable operating states during a system stop, such as stopping of the cross-cutting device while cutting, are to be prevented. In addition, the device as well as the method should enable a material-saving and energy-saving system stop.

The aforementioned object is achieved according to the invention with a device of the above-mentioned type in that the shingling device is designed to be adjustable in and/or against the transport direction of the sheets as a function of cutting length, where “as a function of cutting length” refers to a change in the arrangement of the shingling device relative to the cross-cutter and, preferably, relative to the braking device, for a format change of the sheet format. In the method according to the invention, the shingling device is accordingly adjusted in or against the transport direction of the sheets when the cutting length of the sheets is changed or when the sheet format is changed.

The basic concept of the invention is to move, offset or displace the shingling device in or against the transport direction of the sheets as a function of the current (new) sheet length and, in particular, relative to the braking device immediately following the shingling device, so that for each adjustable sheet length, a travelling sheet is braked approximately simultaneously at the front by the braking device and at the rear by the shingling device. In particular, the invention makes it possible to keep the distance between the transfer point and the braking device or the transfer length constant during a format change, wherein the braking device is preferably not adjusted during a format change. Instead, the distance between the braking device preferably arranged so as to be stationary and the shingling device is adapted to the actual cutting length by adjusting the shingling device, i.e. it is changed beyond the extent of a fine adjustment.

Thus, the distance between the front transfer point of the separated sheets to a sheet processing machine and the braking device or the transfer length can remain the same for different formats or cutting lengths, which leads to considerable simplification when adjusting the device according to the invention to a different sheet format. In particular, if the transfer length remains constant, there is no need to change the overlap length of the sheets in the shingle stream during a format change. Since the overlap length remains unchanged for all sheet formats, the speed of the slow-running transport belts can be kept the same for all sheet formats. This means that only the speed of the fast-running transport belts and the phase position of the knives of the cross-cutting device and the lifting means of the shingling device have to be adjusted to the new sheet format. The speed of the slow-running belts therefore always corresponds to the speed at which the sheets are taken over and transported further by the machine for further processing.

With the same distance between the front transfer point and the braking device, i.e. the nip rollers, and with the same overlap length of the sheets in the shingle stream, wherein the transfer length corresponds to an integer multiple of the overlap length, it is ensured during a system stop when the leading edge of a leading sheet is at the transfer point that the leading edge of a trailing sheet is just braked by the braking device and the trailing edge of this sheet is moved out of the sheet stream by the shingling device, i.e. is raised or lowered. This allows the fast-running belts to be braked unequally to the slow-running belts, since it is always ensured that a further trailing sheet can be transported with its leading edge under or over the sheet that is leading in the transport direction and moved, i.e. raised or lowered, out of the sheet stream by the shingling device. The sheet length or the distance between the shingling device and the braking device serves as a buffer for the trailing sheet. Regardless of the sheet format, this ensures that the trailing sheet can be conveyed under or over the leading sheet.

When the machine for further processing stops, the same defined stop position thus exists for each sheet format. This means that the leading edges of the sheets located between the transfer point and the braking device have the same positions for each sheet format in the event of a stop. At the same time, the same number of shingles is located between the transfer point and the braking device, i.e. the same number of sheets in the event of a system stop. The fast-running belts can be stopped with a delay in relation to the slow-running belts due to the buffer between the leading and turned-up sheet and the trailing sheet, so that a stop while the knives of the cross-cutting device are cutting can be effectively prevented for each sheet format. The device is thus able to stop the fast-running belts as a function of the position of the knives of the cross-cutting device in such a way that the knives of the cross-cutting device are not actually cutting. This is made possible by stopping the fast-running belts and the cross-cutting device with a short time delay compared to the slow-running belts.

The device is thus able to brake the fast-running and slow-running belts during a system stop in such a way that the belts or the sheets transported by the belts are no longer in a matching phase position. When the device is restarted, the slow-running belts can be started up just before the fast-running belts, thus restoring the correct phase position in the device. A system stop as well as a subsequent system start are thus possible in a simple way and in a short time.

The material stress on the fast-running belts and their braking units can be reduced by braking the fast-running belts and slow-running belts to different degrees. At the same time, the energy required for braking the fast-running belts is reduced. Since the risk of uncontrolled slipping of a sheet is minimised by the reduced braking, the braking of the sheets has to be supported by additional braking units only to a lesser extent or not at all. In this manner, the energy requirement in case of a system stop can be further reduced.

The shingling device of the device according to the invention can preferably be designed to underlap the sheets coming from the cross-cutting device. The underlapping shingle stream can then be further processed in a printing machine, for example. Shingling devices for producing an underlapping shingle stream are generally known to the person skilled in the art, for example from DE 101 03 040 A1 or DE 101 19 408 A1. In principle, however, the shingling device can also be designed to overlap the sheets of the sheet stream coming from the cross-cutting device. A shingling device for producing an overlapping shingle stream is described, for example, in EP 1 976 789 B1. The overlapping shingle stream can be processed further in a stacking device. The term “overlap length” is used for both an overlap and an underlap and refers to the distance from the leading edge of the leading sheet to the leading edge of the immediately trailing shingled sheet.

The shingling device can have a deceleration unit for braking the sheets and a lifting unit for underlapping the sheets, or a deceleration unit and a pressing-down unit for overlapping the sheets. A lifting unit can be used to press a leading sheet in the sheet stream, preferably in the region of the trailing edge, against a deceleration unit arranged above the lifting unit. The deceleration unit and the lifting unit can be designed as separate assemblies that functionally interact. The lifting unit can, for example, have a beater shaft guiding an eccentric beater which, due to the rotation of the beater shaft, lifts the sheet, particularly in the region of the trailing edge, and presses it against the deceleration unit arranged above the beater shaft. The deceleration unit, for example formed by a transport belt provided with holes and forming a suction belt together with a suction box, decelerates the movement of the pushed-up sheet. Since the transport belt has a lower transport speed than the fast-running transport belt used to transport the sheets from the cross-cutting device to the shingling device and on, the sheets are braked by the deceleration unit and transported further in the transport direction at a lower speed than the following sheet. The trailing sheet, which still rests on the fast-running transport belt, has a higher speed and is thus conveyed under or over the leading sheet. In this manner, underlapping or overlapping of a continuous shingle stream in relation to the trailing edge of the sheets is produced. With the next cycle of the shingling device, the trailing sheet is grasped by the beater shaft, pressed against the suction belt and braked. Each sheet remains in suction belt engagement for more than one cycle. If the leading sheet leaves the area of influence of the suction belt during underlapping, the leading sheet continues to be held up by the trailing sheet, which is in the engagement region of the suction belt. To support lifting of the leading sheet, additional suction elements can be arranged between the suction belt and the braking device, which generate a negative pressure and thus support the load-bearing capacity of the suction belt. Alternatively or in addition, blower elements can be arranged between the suction belt and the braking device to assist in lifting the leading sheet by means of positive pressure.

However, other constructional solutions for creating an underlapping or overlapping shingle stream are also possible. For instance, the sheets can also be lifted by means of compressed air or through the generation of negative pressure. For this purpose, the shingling device can also have a pressure or suction box that is controlled in a cycled manner, i.e. compressed air is periodically discharged or negative pressure is periodically generated to lift or suck in the sheet. Lifting of the sheets and subsequent deceleration can also be carried out with the same assembly, for example a suction

box, which sucks in the sheet preferably in the region of the trailing edge and then transports it further in a decelerated manner. Appropriately adapted constructional configurations are possible to produce underlapping or overlapping of the sheets.
A quasi-endless strip of paper or cardboard can be fed to the device according to the invention. For example, the strip can be unwound from a roller and fed through a paper storage means. In a cross-cutting device, the strip can be cut into sheets with a defined format, i.e. a defined length. The cross-cutter can be a shaft equipped with one or more knives. In combination with at least one further knife, which is located below the strip or sheet transport plane and is preferably fixed, the strip is cut into sheets. Alternatively, the cross-cutter can consist of two counter-rotating shafts, each equipped with one or more knives.
The shingling device is followed by a braking device in the transport direction of the sheets. The braking device can have one or more nip rollers which, for example, form a braking gap with slow-running transport belts for the passage of sheets brought together in a shingled manner. The braking device brakes the incoming sheets at the leading edge of the sheet and ensures that the underlapping or overlapping sheets are conveyed further in the transport direction at an equal and constant speed. During operation, a sheet preferably enters the braking gap of the braking device at the same time as its leading edge, while it is braked at the trailing edge by the suction belt of the shingling device at substantially the same time. In operation, the braking device has a slightly higher speed than the suction belt of the shingling device so that the sheets are tensioned and sag less. The speed of the suction belt is approximately 95 - 99 % of the braking device speed, preferably 97 %.
The sheets are transported at high speed by fast-running transport belts until the leading edge of the sheet enters the braking gap of the braking device and the sheets are simultaneously braked at the trailing edge by the suction belt of the shingling device. The sheets are then transported further at a constant, lower speed by means of slow-running belts.
The braking device can be followed by a transfer table in the transport direction, on which the overlapping sheets are transported further in the transport direction and from which the individual sheets are transferred to a following machine for further processing. The transfer takes place at a transfer point that depends on the machine for further processing. The transfer point, at which the individual sheets must be delivered at a specific time, at a specific speed, and at a specific cycle frequency in order to be taken

over by the machine for further processing, is usually located just behind the transfer table in the sheet conveying direction.

According to the invention, the shingling device is designed in such a way that it is adjustable in and/or against the transport direction of the sheets as a function of cutting length, where "as a function of cutting length" refers to a change in the distance of the shingling device relative to the stationary cross-cutting device for a format change of the sheet format.

The braking device is designed to be non-adjustable in and/or against the transport direction of the sheets as a function of cutting length. In other words, this means that the braking device is arranged so as to be stationary and is not moved, offset or displaced relative to the transfer point when the sheet format is changed. The braking device then always has the same distance to the transfer point, regardless of the sheet format. Thus, there is no adjustment of the braking device as a function of cutting length. The constant transfer length makes it significantly easier to adapt the system to a changed sheet format. Within the context of the invention, however, the possibility is fundamentally also not ruled out of the braking device being designed to be adjustable in addition to the shingling device in and/or against the transport direction of the sheets as a function of cutting length, which enables a very precise alignment of the two functional units with the leading and trailing edges of a trailing sheet.

The distance between the braking device and the cross-cutting device in the transport plane of the sheets is the same for different cutting lengths of the sheets or for different sheet formats. Thus, when changing the format, there is no need to adjust this distance, which further simplifies the format change.

The shingling device can have a deceleration unit and a lifting unit for underlapping the sheets or a deceleration unit and a pressing-down unit for overlapping the sheets, wherein, preferably, the deceleration unit and the lifting unit or pressing-down unit are jointly adjustable in or against the transport direction of the sheets. This enables short set-up times when adjusting the device according to the invention to a changed cutting length of the sheets. The deceleration unit and the lifting unit or the pressing-down unit can each have their own drive for adjustment in and/or against the transport direction of the sheets and, preferably, can be controlled jointly or separately. If the deceleration unit, for example designed as a suction belt, has a sufficient length in and/or against the transport direction of the sheets, only the lifting unit or the pressing-down unit can also be adjusted in and/or against the transport direction of the sheets.

A known roll cross-cutter of the type described in DE 101 19 408 A1 has a modular character, wherein the cross-cutting device and the shingling device are arranged in a common chassis. The chassis can be moved or displaced laterally or transversely of the transport direction of the sheets relative to a feeder of a machine for further processing by means of rollers mounted on rails. The lateral mobility of the chassis provides good access for maintenance and service work, wherein the chassis allows the cross-cutting device to be moved completely out of the region of the feeder of the machine for further processing.

However, access to the functional units mounted in the chassis is complex and time-consuming. When the shingling device and the cross-cutting device are arranged in a common chassis, the poor accessibility of the shingling device, the cross-cutter and the sheet transport belts is a particular disadvantage, which further makes it difficult in particular to adjust the shingling device in and/or against the transport direction of the sheets to adapt to changed sheet formats or cutting lengths.

In an alternative embodiment of the invention, which can be realised in particular in conjunction with the aspects of the invention described above, the device according to the invention has a chassis in which at least the shingling device is accommodated or mounted, wherein the chassis is designed to be movable or displaceable laterally or transversely of the transport direction of the sheets independently of the cross-cutting device and, preferably, relative to a feeder of a machine for further processing. The chassis can be guided via rollers on rails. The chassis can be motor-driven. According to the invention, the transport plane is separated in the region between the cross-cutting device and the shingling device.

In a preferred embodiment of the invention, the fast-running transport belts of the cross-cutting device and the fast-running transport belts of the overlapping direction engage in one another in a comb-like manner. The device allows the transport belts of the shingling device to be displaced or adjusted in and against the transport direction of the sheets so that the transport belts can be moved out of comb-like engagement to allow the chassis of the shingling device to be displaced transversely of the transport direction. After the chassis has been moved laterally out of the region of the cross-cutting device, access to the shingling device for maintenance and/or changeover work, and in particular for a format-dependent adjustment of the shingling device in and/or against the transport direction of the sheets, is easier and possible within a shorter period of time. A paper web can remain drawn in up to the cross-cutting device, which leads to a further simplification of the process.

In addition, the braking device can be mounted in the chassis and thus arranged together with the shingling device so that it can move laterally relative to a machine feeder and the cross-cutting device. A transfer table can also be attached to the chassis, which is used to transport the sheets from the braking device to the machine for further processing and defines a transfer point at its end for transferring the following sheets of the shingled sheet stream to a transfer device of the machine for further processing.

The cross-cutting device is preferably designed to be non-movable transversely of the transport direction of the sheets and, in particular, transversely of a paper storage means and, further in particular, of an unwinding device for paper rolls. In principle, however, it is also possible to design the cross-cutting device to be movable laterally or transversely of the transport direction of the sheets and relative to the paper storage means and the unwinding device.

For transfer of the sheets to a machine for further processing, roll cross-cutters known from the prior art are conventionally provided with a transfer table which can be pivoted relative to the transport plane of the sheets, which transfer table, after pivoting down, can be moved laterally of a machine feeder together with a chassis in which the braking device, the shingling device and the cross-cutting device are mounted. Due to the pivotable arrangement of the transfer table on the chassis, the maximum transfer length of the transfer table is limited by the running height of the transfer table when the chassis is moved laterally or by the clear distance of the pivot axis of the transfer table to the installation site or to the floor.

To solve the above-mentioned problem, in an alternative embodiment of the device according to the invention, a transfer table is provided for transferring sheets to a sheet processing machine, wherein the transfer table is non-pivotably mounted and is vertically adjustable in at least one linear or arcuate movement. The transfer table is vertically adjustable or vertically movable obliquely to the transport plane of the shingle stream. In contrast to a pivotable attachment of the transfer table, according to the invention, a lowering of the transfer table obliquely to the floor, preferably in a straight line, is possible, so that the transfer length is not limited by the floor clearance of the transfer table, but can be greater than the floor clearance. The transfer table can also be easily moved out of the region of a machine feeder. This is particularly advantageous if the transfer table is attached to a chassis and can be moved or displaced together with the chassis transversely of the transport direction of the sheets relative to the machine feeder. The braking device and the shingling device can then preferably be mounted in the chassis. After lowering, the transfer table is then below the transport plane of the sheets and can be retracted into the chassis or accommodated in the chassis. The transfer table can be retracted into the chassis in such a way that, in the lowered state, it does not project beyond the braking device in the transport direction.

In an advantageous embodiment, the braking device has at least one pressure roller, also referred to as a nip roller, for forming a braking gap, wherein the transfer table is adjusted or moved downward during lowering relative to the nip roller arranged above the transport plane of the sheets. A belt section can be associated with the transfer table and moved together with the transfer table independently of the pressure roller. The pressure roller can be arranged stationarily in a movable chassis or machine module that also carries the shingling device. The belt section of the transfer table can be moved along in the direction of the pressure roller when the transfer table is raised obliquely, such that a braking gap is formed between the pressure roller and the belt section. The braking gap is preferably formed between the pressure roller and the belt start of the belt section. The braking gap can thus be easily adjusted and adapted to different thicknesses of the sheets.

It is expedient if the transfer table is associated with its own slow belt section to transport sheets from the braking device to a transfer point. The slow belt section is preferably constructionally decoupled from the fast belt section, wherein the fast belt section transports the sheets from the cross-cutting device to the shingling device and further on to the braking device. In particular, this constructional decoupling can provide that the fast-running belts and the slow-running belts can be moved relative to each other in the horizontal direction and/or in the vertical direction and/or obliquely to the floor when the transfer table is lowered or raised. Thus, the transfer table can preferably be moved obliquely to the transport plane of the sheet stream and relative to the braking device without impairing the transport function of the belt sections.

The inclination of the movement path of the transfer table to horizontal can preferably be between 30° and 60°, further preferably about 45°, when the transfer table is lowered obliquely.

The embodiments of the invention described above can be combined with one another as required. The disclosure content of the invention is not limited to the combinations of inventive features specified by the selected paragraph formatting.

Further features of the present invention will become apparent from the following description of an exemplary embodiment of the invention made with reference to the drawings and from the drawings themselves. All the features described and/or shown in the drawings, individually or in any combination, form the subject matter of the present invention regardless of the way in which they are summarised in the claims or the way in which these refer back to one another.

The invention is explained in greater detail below with reference to the figures, in which:

Figure 1 shows a schematic representation of a device for forming a shingle stream of underlapping sheets according to the prior art in side view,

Figure 2 shows a schematic representation of a device according to the invention for forming a shingle stream of underlapping sheets in the operating state in side view, and

Figure 3 shows a schematic representation of the device shown in Figure 2 in a non-operating state with a transfer table that can be moved obliquely to the transport plane of the shingled sheet stream.

Figure 1 schematically shows a device 1 known from the prior art for forming a sheet stream 2 of underlapping sheets 3 of paper or cardboard. The device 1 has a feed device 4 which conveys a quasi-endless film, paper or cardboard strip 5. The strip 5 is provided by an unwinding device 6 from a paper or cardboard roll 7 on a feed side and is guided through an intermediate paper storage means 8. The paper storage means 8 is fed from the top. A cross-cutting device 9 downstream of the feed device 4 in the transport direction X of the sheets 3 cuts the strip 5 into sheets 3 of defined length. The cross-cutting device 9 is designed in the form of a rotatably mounted shaft 10, which has on its circumference a cutting edge 11 arranged parallel to the longitudinal axis and a fixed cutting edge 12 arranged below it. When the cutting edge 11 arranged on the shaft 10 and the stationary cutting edge 12 are in engagement, the strip 5 is cut. By changing the speed of rotation of the shaft 10 and/or changing the speed of the material web 5, the sheet length can be adjusted.

The sheets 3 are transported further in transport direction X over a belt section with at least one fast-running transport belt 13 at the same speed. A following shingling device 14 consists of a lifting unit 15 and a deceleration unit 16. The lifting unit 15 has a beater shaft 17 with at least one beater 18. The deceleration unit 16 has at least one suction belt 19 arranged above the transport plane Y of the sheets 3. The suction belt 19 is formed by a transport belt provided with holes, which interacts with a vacuum-generating suction box 20. The beater 18 of the lifting unit 15 presses a sheet 3, in particular in relation to the trailing edge, against the suction belt 19 with each revolution. Since the suction belt 19 moves at a lower speed than the fast-running transport belt 13, the leading edge of a trailing sheet 3 is conveyed under the raised trailing edge of a leading sheet 3. With the next revolution of the beater shaft 17, the trailing sheet 3 is raised at the trailing edge so that the further trailing sheet 3 can be conveyed under the trailing sheet 3. In this way, a sheet stream 2 of underlapping sheets 3 is created. If the trailing edge of the leading sheet 3 is no longer in the engagement region of the suction belt 19, the leading sheet 3 is held above the sheet transport plane by the trailing sheet 3, which is in the engagement region of the suction belt 19.

Downstream of the shingling device 14, a braking device 21 is provided in the transport direction X of the sheet stream 2. The braking device 21 has a plurality of nip rollers 22 that form a braking gap together with slow-running transport belts 23. The distance between the braking device 21 and the shingling device 20 is set such that the leading edge of a sheet 3 preferably enters the braking gap and is decelerated precisely when the rear sheet region, in particular the trailing edge of the sheet 3, is pressed against the suction belt 19 by the beater 18 of the beater shaft 17. In this way, the sheet 3 is braked or decelerated preferably substantially simultaneously by the nip rollers 22 in the front sheet region and by the suction belt 19 in the rear sheet region. Following the braking device 21, the sheet stream 2 is transported further on a transfer table 24 to a transfer point 25 at the same speed and, in particular, with substantially the same shingle length L1 of the underlapping sheets 3.

At the transfer point 25, the sheets 3 are grasped by a transfer device of a machine for further processing, such as for example a printing machine, which is not shown, and transferred to the machine for further processing. To ensure interference-free transfer, the sheets 3 must reach the transfer point 25 at a specific point in time with reference to the leading edge at a specific speed, i.e. at a specific cycle frequency. The cycle frequency of the machine for further processing thus determines the cycle frequency of sheet provision at the transfer point 25. At the same time, the machine for further processing specifies a speed at which the sheets 3 are to be made available at the transfer point 25.

The distance A1 between the transfer point 25 and the shingling device 14 is independent of format in the known device. The distance A2 between the shingling device 14 and the cross-cutting device 9 is also independent of format. If the sheet format (the length of the sheet 3) is changed, the distance A3 between the braking device 21 and the shingling device 20 must be adapted accordingly in the known device to the changed sheet format by adjusting the braking device 21 in or against the transport direction X of the sheets 3. This is shown in Figure 1 by the double-headed arrow 32. The nip rollers 22 are adjusted relative to the beater shaft 17 in such a way that, even during a format change, it is still ensured that the leading edge of a sheet 3 enters the braking gap and is decelerated precisely when the rear sheet region is pressed against the suction belt 19 by the beater 18.

However, an adjustment of the braking device 21 relative to the shingling device 14 also leads to a change in the distance between the braking device 21 and the transfer point 25 to the machine for further processing. Since the transfer length, i.e. the distance between the braking device 21 and the transfer point 25, should be an integer multiple of the overlap length, the overlap length or the degree of shingling of the sheets 3 in the sheet stream 2 must therefore be adjusted as a function of the format when the format is changed.

Adjustment of the overlap length L2 of the sheets 3 is done by changing the speed differences between the fast-running transport belts 13 and the slow-running transport belts 23. Due to the changed distance between the braking device 21 and the transfer point 25, it is necessary to adjust the phase position of the lifting unit 15 of the shingling device 14 and the shaft 10 of the cross-cutting device 9 carrying the rotating cutting edge 11. However, adjustment of the phase position can result in the cross-cutting device 9 being stopped while cutting when the system stops. Manual paper removal from the region of the cross-cutting device 9 and/or shingling device 14, which is necessary as a result, leads to a delay when the device 1 is restarted.

Because of the aforementioned conditions that must be met or observed when setting up the device 1 or changing the sheet format, it is not possible to satisfy all of these conditions. For this reason, the device 1 is usually operated with less than ideal settings. This means, for example, that the transfer length does not generally correspond to an integer multiple of the overlap length. At the same time, a sheet 3 is not generally provided at the transfer point by the slow-running transport belts 23 at the same speed at which the sheets are transported further by the machine for further processing. Thus, optimum operation is generally not possible with the device known from the prior art.

Figure 1 shows schematically that in the known device 1 the cross-cutting device 9, the shingling device 14 and the braking device 21 are arranged in a common chassis 26, which can be moved by rollers and rails laterally or transversely of the transport direction X out of the region of a machine feeder 27 of the machine for further processing and relative to the paper storage means 5 and the unwinding device 6. The paper storage means 5 and the unwinding device 6 are arranged in a stationary

machine module 28. In order to be able to move the chassis 26 out of the region of the machine feeder 27, the transfer table 24 is pivotably held or attached to the chassis 26.
In Figure 2, another device 1 for forming a shingle stream 2 of underlapping sheets 3 is shown schematically in a side view. Identical or matching functional units, assemblies, components as well as other matching features of the devices 1 shown in Figures 1 and 2 are provided with the same reference signs. In the embodiment shown in Figure 2, the formation of a shingle stream 2 of underlapping sheets of paper or cardboard is carried out in accordance with the shingle stream formation described above for the device 1 of Figure 1.
In contrast to the device 1 shown in Figure 1, the shingling device 14 in the embodiment shown in Figure 2 is designed to be adjustable in and/or against the transport direction X of the sheets as a function of cutting length. This is shown schematically in Figure 2 by the double-headed arrow 29. The braking device 21, on the other hand, is designed to be non-adjustable in and/or against the transport direction X of the sheets 3 as a function of cutting length. In other words, this means that when the cutting length of the sheets 3 is changed or the sheet format is changed, the shingling device 14 is offset, displaced or moved relative to the braking device 21 as a function of the current sheet length in such a way that, for each set sheet length, a leading sheet 3 is braked approximately simultaneously at the front by the braking device 21 and at the rear by the shingling device 14. Thus, the distance A4 between the transfer point 25 of the separated sheets 3 to a machine for further processing and the braking device 21 or the transfer length remains the same for different formats or cutting lengths of the sheets 3, which leads to a considerable simplification when adjusting the device 2 shown in Figure 2 to a different sheet format.
For a format change, the shingling device 14 can be adjusted as a whole in or against the transport direction X of the sheet stream 2, i.e. the lifting unit 15 and the deceleration unit 16 are moved together, being for this purpose accommodated or mounted in a chassis or frame or carrier movable in and/or against the transport direction X of the sheets 3. In principle, however, it is also possible that if the suction belt 19 extends sufficiently in the transport direction X, only the beater shaft 17 with the beater 18 is adjusted in or against the transport direction X.
The transfer length between the braking device 21 and the transfer point 25 thus remains the same during a format change. Likewise, the distance A5 between the braking device 21 (or the nip rollers 22) and the cross-cutting device 9 remains the same. Because the transfer length is always the same, there is no need to change the

overlap length L2 of the sheets 3 in the shingle stream 2 when changing formats. The speed of the slow-running transport belts 23 can thus be kept the same for each sheet format, which means that the sheets 3 can be made available at the transfer point 25 at the same speed, irrespective of format, at which the sheets 3 are taken over by the machine for further processing and transported further. Only the speed of the fast-running transport belts 13 has to be adapted to the new sheet format. Furthermore, only the phase position of the shaft 10 of the cross-cutting device 9 has to be adjusted to the new sheet format.

When the machine for further processing stops, the leading edges of each sheet 3 come to rest at the same position between the braking device 21 and the transfer point 25, irrespective of format, due to the constant overlap length. The position of the leading edge of the first sheet 3, as well as the position of the leading edge of the following sheet 3, are the same at every stop of the machine for further processing, irrespective of sheet format. This applies to all sheets located between the braking device 21 and the transfer point 25. In the event of the system stopping, a sheet 3 has just entered the braking gap of the braking device 21 with its leading edge and has been turned up substantially simultaneously by the beater 18 of the shingling device 14 and braked at its trailing edge by the suction belt 19 of the shingling device 14. The following sheet 3 can be conveyed under the leading sheet 3 so that the fast-running transport belts 13 and the slow-running transport belts 23 do not have to come to a standstill at the same time in order to maintain the phase position of the fast-running and slow-running transport belts 13, 23. The fast-running transport belts 13 can brake more slowly and the trailing sheet 3, which rests on the fast-running transport belts 13, can continue to run under the leading sheet 3, which has already been pushed up.

Stopping of the cross-cutting device 9 during cutting can be prevented because the distance between the shingling device 14 and the braking device 21 serves as a buffer. If stopping of the cross-cutting device 9 during cutting is imminent, the cross-cutting device 9 can be stopped together with the fast-running transport belts 13, for example, with a slight delay, so meaning that the cross-cutting device is no longer in the cutting state. Due to the slower braking of the fast-running transport belts 13, wear-free stopping of the device with reduced energy demand during the braking process is realised. This defined stop point is the same for all sheet formats. This means that the leading edges of all sheets 3 between the braking device 21 and the transfer point 25 have the same position relative to the transfer point for all sheet formats in the event of a stop. The phase position between the fast-running transport belts 13 and the slow-

running transport belts 23 can be changed due to the buffer when the device stops. When starting up the device 1, it is then only necessary to start up the slow-running transport belts 23 shortly before the fast-running transport belts 13 in order to restore the synchronous, coordinated phase position of the fast-running and slow-running transport belts 13, 23. A subsequent system start is thus simply and quickly possible.
A drive can be provided for adjusting the shingling device 14 which can be controlled automatically, in particular as a function of a set sheet format, in order to adjust the distance between the braking device 21 and the shingling device 14 in such a way that the sheets 3 are braked or decelerated, preferably substantially simultaneously, at the front and rear edge regions of the sheets 3.
Additional suction elements can be provided between the shingling device 14 and the braking device 21 which use a vacuum to suck freely suspended and sagging sheets upwards in the direction of the suction belt 19. Alternatively or in addition, blower elements can also be arranged to push the sheets to a height in the direction of the suction belt 19.
Figure 3 schematically shows a side view of a device 1 of the type shown in Figure 2 before it is put into operation. Identical reference signs indicate identical functional units, assemblies and components as well as technical features.
According to the embodiment shown in Figure 3, the shingling device 14 is accommodated or mounted together with the braking device 21 in a chassis 30 and is movable, in particular displaceable, with the chassis 30 laterally, i.e. transversely of the transport direction X of the sheets 3, out of the region of a machine feeder 27, wherein the chassis 30 can be moved on rails via rollers. The cross-cutting device 9, the paper storage means 8 and the unwinding device 6, on the other hand, can be associated with a stationary machine module 33, such that by moving the chassis 30 laterally relative to the cross-cutting device 9, easy access is also possible to the shingling device 14, the cross-cutting device 9 and the cutting edges 11 and 12. The fast-running transport belts 13 of the cross-cutting device 9 and the fast-running transport belts 13 of the shingling device 14 engage with one another in a comb-like manner, not shown in Figure 3. The fast-running transport belts 13 of the cross-cutting device 9 and/or the fast-running transport belts 13 of the shingling device 14 can be moved in and/or against the transport direction X. In this way, the comb-like engagement of the transport belts can be cancelled to allow the chassis to be moved transversely of the transport direction X of the sheets 3. In addition, a paper web can remain drawn in up to the cross-cutting device 9, which leads to a simplification of the process. After the chassis 30 has been

moved laterally out of the region of the cross-cutting device 9, access to the various functional units for maintenance and/or changeover work, but in particular for a format-dependent adjustment of the shingling device 14 in and/or against the transport direction X of the sheets 3, is possible in a simple manner and in a short period of time.

As shown schematically in Figure 3, a transfer table 24 is provided which can be moved obliquely to the transport plane Y of the sheets 3 or of a formed shingle stream 2. This is shown in Figure 3 by the two dashed lines 34. Preferably, the transfer table 24 can be lowered into the inner region of the chassis 30 in such a way that the front end 31 of the transfer table 24 does not project beyond the chassis 30 in the transport direction X of the sheets. As a result, the lateral movement of the chassis 30 out of the region of the machine feeder 27 is not impeded by the transfer table 24. The non-pivotable attachment of the transfer table 24 to the chassis 30 allows the transfer table 24 to be lowered obliquely to the floor, preferably in a straight line, wherein the transport plane of the transfer table 24 always remains horizontally aligned. Alternatively, the transfer table 24 could first be lowered in a vertical motion and then retracted into the chassis 30 in a horizontal motion.

What is not shown in detail in Figure 3 is that, together with the transfer table 24, a slow-running belt section can be moved obliquely to the transport plane Y of the shingle stream 2 formed during operation of the device 1. The nip rollers 22 of the braking device 21, on the other hand, are arranged stationarily on the chassis 30, so that a braking gap is formed between the nip rollers 22 and the slow-running transport belts 23 when the transfer table 24 is raised in the direction of the braking device 21. This position of the transport belts 23 relative to the nip rollers 22 is shown in Figure 2. The braking gap is formed between the nip rollers 22 and the belt starts of the slow-running transport belts 23.

As can be seen further from Figure 2 and is not shown in detail in Figure 3, the slow-running transport belts 23 associated with the transfer table 24 are constructionally separated from the fast-running transport belts 13 in such a way that it is possible to uncouple the slow belt section from the fast-running belt section by lowering the transfer table 24 and to recouple it when the transfer table 24 is raised to ensure sheet transport.

In the device 1 shown in Figures 2 and 3, web feed for the paper storage means 8 is implemented from below, which contributes to a simplified execution of the method.

List of reference signs:

1	Device
2	Shingle stream
3	Sheets
4	Feed device
5	Belt
6	Unwinding device
7	Roller
8	Paper storage means
9	Cross-cutting device
10	Shaft
11	Cutting edge
12	Cutting edge
13	Transport belt
14	Shingling device
15	Lifting unit
16	Deceleration unit
17	Beater shaft
18	Beater
19	Suction belt
20	Suction box
21	Braking device
22	Nip roller
23	Transport belt
24	Transfer table
25	Transfer point
26	Chassis
27	Machine feeder
28	Machine module
29	Double-headed arrow
30	Chassis
31	Table end
32	Double-headed arrow
33	Machine module
34	Dashed line

ANORDNING OG FREMGANGSMÅDE TIL DANNELSE AF EN FLAGESTRØM AF UNDERLAPPENDE ARK

Patentkrav

1. Anordning (1), særligt rulletværskærer, til dannelse af en flagestrøm (2) af under- eller overlappende ark (3), særligt af papir- eller kartonark, med en transportanordning til transport af ark (3), med en flageanordning (14) til sektionsvis under- eller overlapning af arkene (3), med en bremseanordning (21), der følger efter flageanordningen (14) i arkenes (3) transportretning (X), til bremsning af ark (3) i flageform, særligt ved dannelse af en bremsespalte til gennemløb af ark (3), der er samlet i flageform, og, fortrinsvis, med en tværskæreanordning (9), der er placeret før flageanordningen (14), til skæring af et materialebånd (5) til enkelte ark (3), **kendetegnet ved,** at flageanordningen (14) er udformet, således at den kan justeres i og/eller modsat af arkenes (3) transportretning (X) afhængigt af skærelængden, hvor bremseanordningen (21) i og/eller modsat af arkenes (3) transportretning (X) er udformet, således at den ikke kan justeres afhængigt af skærelængden, og hvor afstanden mellem bremseanordningen (21) og tværskæreanordningen (9) i arkenes (3) transportplan (Y) er den samme ved forskellige skærelængder.

2. Anordning (1) ifølge krav 1, kendetegnet ved, at flageanordningen (14) omfatter en forsinkelsesenhed (16) og en løfteenhed (15), og at forsinkelsesenheden (16) og løfteenheden (15) kan indstilles sammen.

3. Anordning (1), særligt rulletværskærer, til dannelse af en flagestrøm (2) af under- eller overlappende ark (3), særligt af papir- eller kartonark, med en transportanordning til transport af ark (3), med en flageanordning (14) til sektionsvis under- eller overlapning af arkene (3), med en bremseanordning (21), der følger efter flageanordningen (14) i arkenes (3) transportretning (X), til bremsning af ark (3) i flageform, særligt ved dannelse af en bremsespalte til gennemløb af ark (3), der er samlet i flageform, og, fortrinsvis, med en tværskæreanordning (9), der er placeret før flageanordningen (14), til skæring af et materialebånd (5) til enkelte ark (3), særligt ifølge et af de foregående krav, **kendetegnet ved,** at flageanordningen (14) er opbevaret i et chassis (30), der er udformet, således at det kan bevæges i forhold til tværskæreanordningen (9) lateralt i forhold til arkenes (3) transportretning (X).

4. Anordning ifølge krav 3, kendetegnet ved, at de hurtigtløbende transportbånd (13) i tværskæreanordningen (9) og de hurtigtløbende transportbånd (13) i flageanordningen (14) griber ind i hinanden som en kam.

5. Anordning ifølge krav 4, kendetegnet ved, at de hurtigtløbende transportbånd (13) og/eller de langsomme i tværskæreanordningen (9) og de hurtigtløbende transportbånd (13) i flageanordningen (14) er udformet, således at de kan justeres henholdsvis bevæges i og modsat af arkenes (3) transportretning (X).

6. Anordning ifølge krav 3 og 5, kendetegnet ved, at tværskæreanordningen (9) er udformet henholdsvis lejret, således at den ikke kan bevæges på tværs af arkenes (3) transportretning (X).

7. Anordning (1), særligt rulletværskærer, til dannelse af en flagestrøm (2) af under- eller overlappende ark (3), særligt af papir- eller kartonark, med en transportanordning til transport af ark (3), med en flageanordning (14) til sektionsvis under- eller overlapning af arkene (3), med en bremseanordning (21), der følger efter flageanordningen (14) i arkenes (3) transportretning (X), til bremsning af ark (3) i flageform, særligt ved dannelse af en bremsespalte til gennemløb af ark (3), der er samlet i flageform, og, fortrinsvis, med en tværskæreanordning (9), der er placeret før flageanordningen (14), til skæring af et materialebånd (5) til enkelte ark (3), særligt ifølge et af de foregående krav, **kendetegnet ved,** at der er tilvejebragt et afleveringsbord (24) til aflevering af ark til en arkforarbejdningsmaskine, og at afleveringsbordet (24) er lejret ikke-svingbart og kan indstilles i højden i mindst én lineær eller bueformet bevægelse på skrå i forhold til flagestrømmens transportplan.

8. Anordning ifølge krav 7, kendetegnet ved, at der er tilordnet en hurtigtløbende båndstrækning (13) til bremseanordningen (21), og at der er tilordnet en langsomtløbende båndstrækning (23) til afleveringsbordet (24), hvor den langsomtløbende båndstrækning (23) kan indstilles i højden eller bevæges i højden sammen med afleveringsbordet (24) uafhængigt af den hurtigtløbende båndstrækning (13).

9. Anordning ifølge krav 8, kendetegnet ved, at bremseanordningen (21) indeholder mindst én trykrulle (22), og at der er tilordnet en båndstrækning til afleveringsbordet (24), der kan bevæges sammen med afleveringsbordet (24) uafhængigt af trykrullen (22), hvor der, fortrinsvis, ved højdeindstilling af afleveringsbordet (24) dannes en bremsespalte mellem trykrullen (22) og båndstrækningen (24).

10. Anordning ifølge et af de foregående krav, kendetegnet ved, at der mellem sugebåndet (19) i flageanordningen (14) og bremseanordningen (21) er anbragt sugeelementer oven over arktransportplanet og/eller blæseelementer til at løfte frithængende ark.

11. Fremgangsmåde til dannelse af en flagestrøm (2) af under- eller overlappende ark (3), særligt af papir- eller kartonark, desuden særligt til dannelse af en flagestrøm (2) af enkelte ark (3), der er udskåret af et materialebånd (5) ved hjælp af en tværskæreanordning (9), hvor separate ark (3) transporteres til en flageanordning (14) og under- eller overlappes sektionsvist for at skabe en flagestrøm (2), hvor arkene (3) i flageform bremses med en bremseanordning (21), der følger efter flageanordningen (14) i arkenes (3) transportretning (X), særligt udført med en anordning (1) ifølge et af de foregående krav, **kendetegnet ved,** at flageanordningen (14) i forbindelse med en ændring af arkenes (3) skærelængde indstilles i eller modsat af arkenes (3) transportretning (X), og hvor afstanden mellem bremseanordningen (21) og et afleveringspunkt (25) til aflevering af ark til en videreforarbejdende maskine holdes konstant i forbindelse med en ændring af arkenes (3) skærelængde.

12. Fremgangsmåde ifølge krav 11, kendetegnet ved, at der i forbindelse med et systemstop i flageanordningen (14) er tilvejebragt en buffer til et efterløbende ark (3).

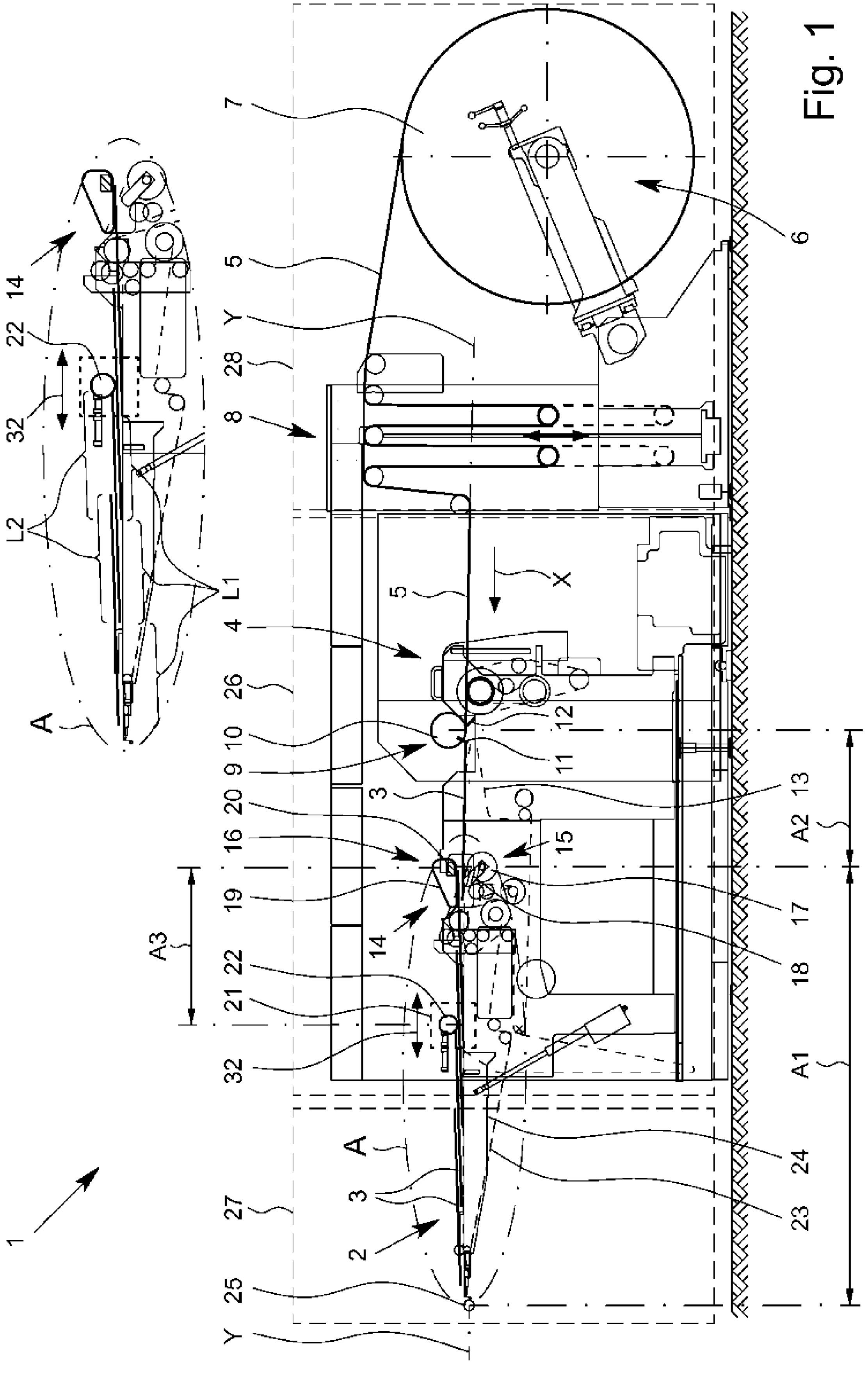
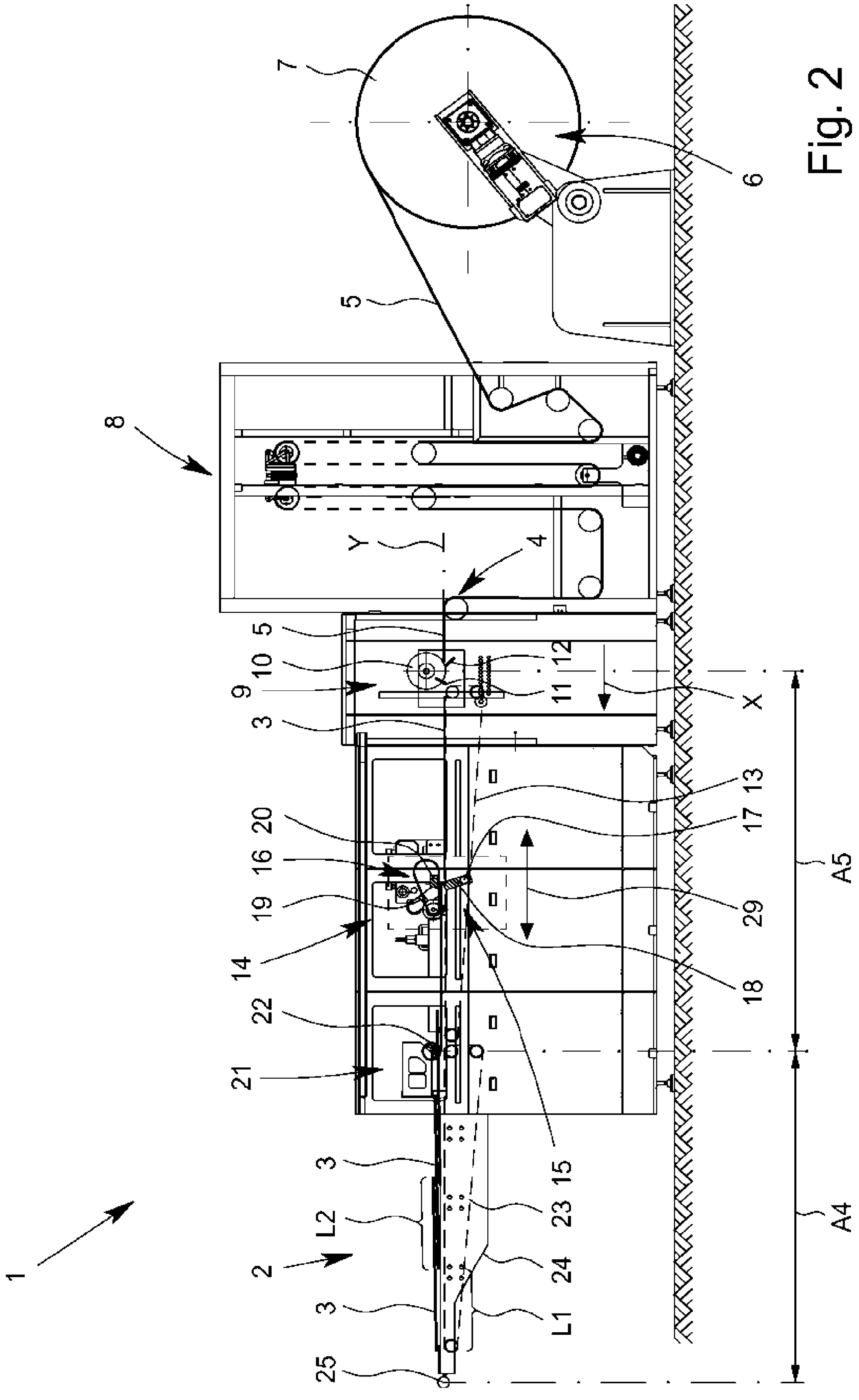

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
32
A
A1
A2
A3
L1
L2
X
Y

Fig. 1



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
29
X
Y
L1
L2
A4
A5

Fig. 2

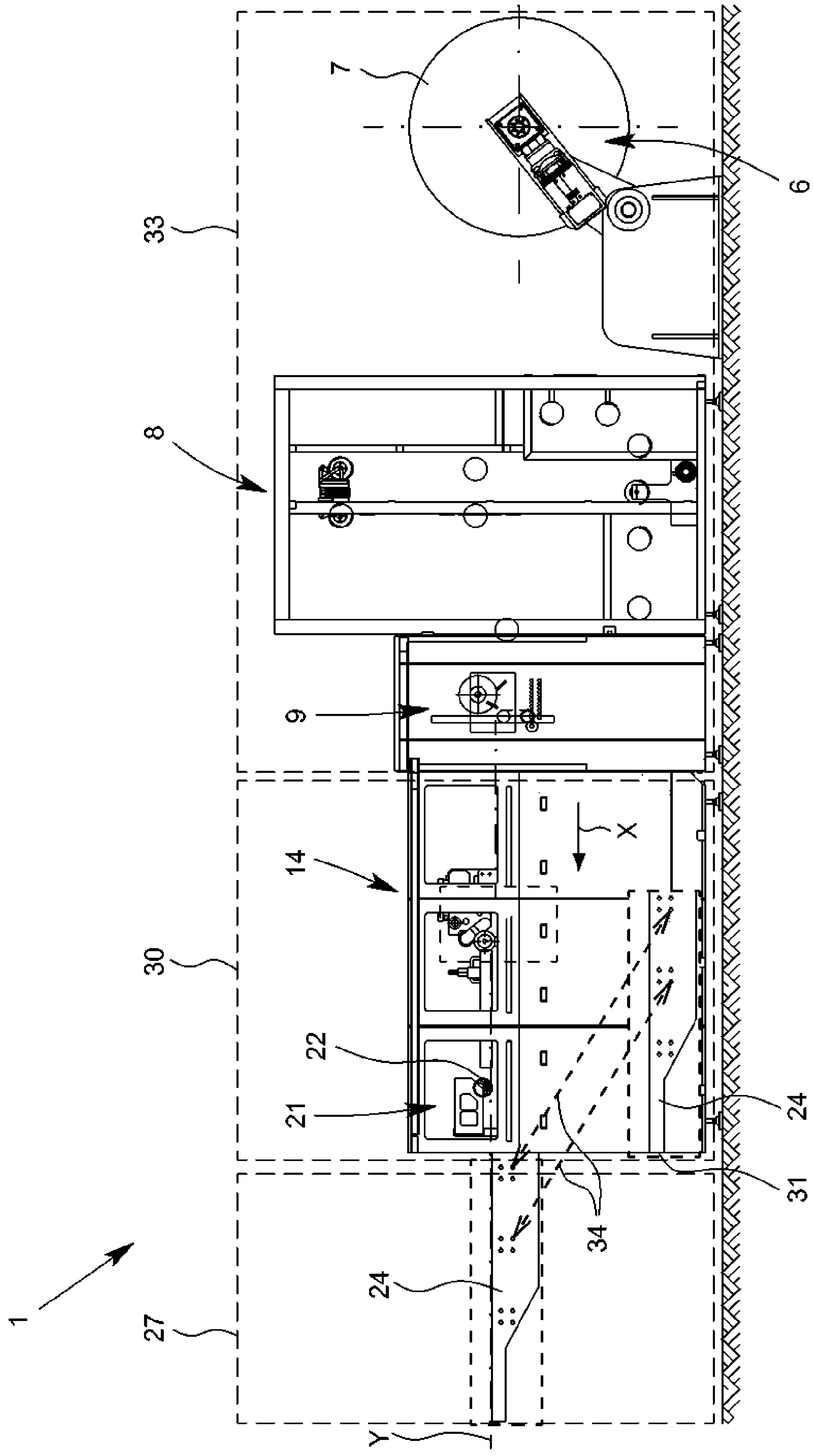


Fig. 3